

**THE ANTS OF NEW MEXICO  
(HYMENOPTERA: FORMICIDAE)**



**THE ANTS OF NEW MEXICO  
(HYMENOPTERA: FORMICIDAE)**

William Mackay  
and  
Emma Mackay

The Edwin Mellen Press  
Lewiston•Queenston•Lampeter

**Library of Congress Cataloging-in-Publication Data**

Mackay, William (William P.)

The ants of New Mexico : Hymenoptera:Formicidae / William Mackay and Emma Mackay.  
p. cm.

Includes bibliographical references (p. ).

ISBN-0-7734-6884-6

1. Ants--New Mexico. I. Mackay, Emma. II. Title.

QL568.F7 M145 2002

595.79'6'09789--dc21

2002037952

A CIP catalog record for this book is available from the British Library.

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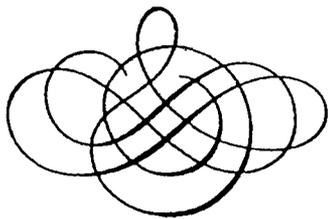
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The Edwin Mellen Press  
Box 450  
Lewiston, New York  
USA 14092-0450

The Edwin Mellen Press  
Box 67  
Queenston, Ontario  
CANADA L0S 1L0

The Edwin Mellen Press, Ltd.  
Lampeter, Ceredigion, Wales  
UNITED KINGDOM SA48 8LT

Printed in the United States of America





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## FOREWORD

I have had the pleasure of using the Mackays' book, *Ants of New Mexico*, and I have found it to be the best regional insect guide I have used. There are several reasons this book stands out from all the rest. It is student friendly. Most regional entomological books are written for the specialist. This book is equally useful to a myrmecologist, an entomologist and the entomology or ecology student. The keys are easy to use, the illustrations are well done and the text is clear and concise.

Another reason this book stands out is that it not only covers all of the ants known to live in New Mexico, it covers many species that are suspected of being found in the State.

Many ants are very difficult to identify, particularly those from the genera *Leptothorax*, *Myrmica*, *Camponotus*, *Lasius* and *Formica*. I have had the opportunity to correctly identify many ants from these genera using the Mackays' book. Most of the other ant books available are too technical or written in such a way that they are useless for a student or a non-specialist.

*Ants of New Mexico* will set the standard for all future regional works on ants and other insects in both style and substance.

Richard Fagerlund, B.C.E.  
University of New Mexico

## PREFACE

The natural history of ants is not well known, although they are among the most common terrestrial insects. Much of the work that remains can be done by amateurs, or by individuals with interests other than ants. We intend this book for you, to allow you to identify ants that you can find in the state of New Mexico, as well as eastern Arizona, southern Colorado, western Texas and northern Chihuahua. We will keep the terminology as simple as possible, and provide illustrations for the diagnostic features of most of the species. Hopefully this book will assist in providing hours of pleasure for those of you with interests in these fascinating group of animals, pleasures which we have enjoyed for over 30 years. This book is also designed for ecologists and behaviorists, as well as other biologists, who would like to use ants as experimental animals.

We dedicate this book to Walt and Linda Whitford, our dearest friends for more than 20 years, who have stood by us through many trials and tribulations of our life. Walt is a major desert ant ecologist, and has published a multitude of papers on our favorite animals and deserts in general.

We would like to thank a number of individuals who have assisted us in one way or another. Our teenage daughters, Mary Ana and Linda Christina, have accompanied us on nearly all of our field trips. They have not only tolerated our frequent stops, and camping in the rain and snow and other experiences, but also joined in to help us collect our specimens, since they were about 3 years old. James Cokendolpher, Richard Fagerlund, David Richman, Stefan Cover, Donald Lowrie, Elizabeth Milford and Sandra Brantley sent us a multitude of ant specimens. Richard Fagerlund (University of New Mexico) & Stefan Cover (Museum of Comparative Zoology, Harvard) critically reviewed the manuscript and tested the keys. We would like to thank all of these individuals, because without them, this book would have never been completed.

William and Emma Mackay  
El Paso, TX  
Sunday, August 04, 2002

## ABSTRACT

We report a total of 239 species and subspecies of ants from New Mexico, USA, with a listing of another 54 that probably occur in the state. This is about 37% of the species that occur in the United States. The subfamilies and genera include: PONERINAE: *Amblyopone*, *Hypoponera*, *Odontomachus*; CERAPACHYINAE: *Acanthostichus*, *Cerapachys*; PSEUDOMYRMECINAE: *Pseudomyrmex*; ECITONINAE: *Neivamyrmex*; MYRMICINAE: *Aphaenogaster*, *Cephalotes*, *Crematogaster*, *Cyphomyrmex*, *Formicoxenus*, *Leptothorax*, *Manica*, *Monomorium*, *Myrmecina*, *Myrmica*, *Pheidole*, *Pogonomyrmex*, *Rogeria*, *Solenopsis*, *Stenamma*, *Strumigenys*, *Tetramorium*, *Trachymyrmex*, *Tranopelta*; DOLICHODERINAE: *Dorymyrmex*, *Forelius*, *Linepithema*, *Liometopum*, *Tapinoma*; FORMICINAE: *Acanthomyops*, *Brachymyrmex*, *Camponotus*, *Formica*, *Lasius*, *Myrmecocystus*, *Paratrechina*, *Polyergus* and *Prenolepis*. We include keys to the species, distribution maps, discussions of the habitats and natural history of each species.

## INTRODUCTION

New Mexico is one of the states in the southwestern part of the United States, bounded on the West by Arizona, on the north by Colorado, on the east and south by Texas, and on the south by the state of Chihuahua, Mexico. Physiographically, New Mexico is one of the most interesting of the states (Map 1). The Colorado plateau extends well into the western part of the state, the Rocky Mountains extend from the North as far south as the region around Santa Fe. The Piedmont of the Rocky Mountains covers about one-third of the eastern part of the state. Several areas of the state contain isolated mountains, which are often located in arid regions, thus creating "sky islands", or mesic peaks. Much of the central portion of the state includes regions of relatively lower elevation, covered primarily with grassland, or desert

shrubs. Much of this area, as well as other areas of the state are geologically interesting, due to the activity of ancient volcanoes. The physiographic variation causes patterns in rainfall, and temperature. These patterns have resulted in a variety of plant communities located throughout the state (Map 2).

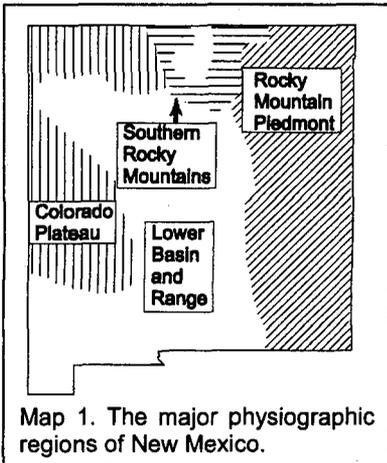
The vegetation of New Mexico has been well documented (Dick-Peddie, 1993). The northern part of the state is covered with forest, as well as several mountains located throughout the state (Map 2). More than half of the state is covered with grasslands or shrublands. Temperatures and precipitation closely match the types of vegetation found throughout the state, with the higher elevation forests being subject to cooler temperatures and more precipitation, the lower elevational areas subjected to higher temperatures

and less precipitation. This variety of climates and plant communities allows New Mexico to be one of the richest areas in America, in terms of numbers of species of ants. More than  $\frac{1}{3}$  of the ant species found in the United States occurs in New Mexico.

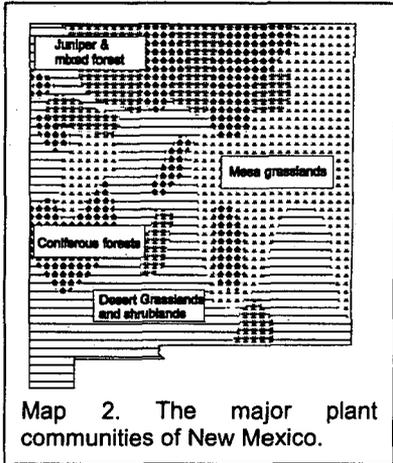
The ants of New Mexico are poorly known. Cole published a series of papers on ants, which will be cited in the text. Whitford and his colleagues (See Kay and Whitford, 1978; Schaffer and Whitford, 1981;

references to articles on ants. Other recent works on ants would be indispensable for the serious myrmecologist, including Bolton (1994) and Hölldobler and Wilson (1990).

We have attempted to construct keys using current names, and which will be relatively easy to use by a non-specialist, but it must be kept in mind that ants are difficult to identify to species. We have also cited the most recent keys so identifications may be checked in more



Schumacher and Whitford, 1976; Whitford, 1976, 1978a, 1978b; Whitford and Bryant, 1979; Whitford and Ettershank, 1975; Whitford et al., 1975, 1976, 1981; Wisdom and Whitford, 1981) have published extensively on the biology of the ants of New Mexico. Gregg's keys (1963) would be useful for identification of ants at least for the northern part of the state. Males can be identified to genus using Smith (1943a). Smith (1979) and Bolton (1995) would be helpful in understanding nomenclatural changes made since the keys were written, as well as providing



complete keys. Certainly we have not collected all of the species present in New Mexico. Therefore we also include additional genera and species collected in nearby states (especially Arizona, Colorado, Texas, and Chihuahua) and indicate that we did not actually collect them in New Mexico. References to complete keys to most genera can be found in Mackay and Vinson (1989) and Hölldobler and Wilson (1990, Table 2-2). Many works on ants of other states can be found in Hölldobler and Wilson (1990, Table 2-3).

Ants can be found almost anywhere in New Mexico. To collect legally, you will need a permit. Check with the New Mexico Game and Fish Office, PO Box 25112, Santa Fe, NM 87504 or (505) 827-7911. If you collect on private property, be sure to ask for permission. The vast majority of landowners are very cooperative, encouraging you to "take all of them". You may even be invited for a glass of lemonade, or even supper!

The general procedure is to locate an interesting area, and spend one or more hours turning over stones, searching logs and stumps or capturing ants foraging on the soil surface, and on vegetation. Look carefully, as most of the really interesting ants are difficult to find. Tree limbs and logs can be opened using handsaws, axes or portable electric saws. We have found the Wyoming© brand of collapsible handsaws to be very practical (Plate 1, Fig. 1). The battery-operated DeWalt© reciprocating saw and circular saw, with the 12V charger are especially useful. It is important not to use standard inverters to convert 12 VDC to 120 VAC to charge the batteries using the standard rechargers. It is best to collect the ants using a pair of forceps, as several of our species can sting. Handle them carefully, as they are easily smashed with the forceps. Ants from a single colony should be placed in a single vial of 70 - 95 percent ethanol (isopropyl alcohol can be used, but tends to harden specimens). Each vial should be carefully labeled with either a field notebook number, or a complete label that lists the location,

date, name of collector, and brief field notes. We usually mix ants collected on the soil surface from a single locality in a single vial, and ants collected on vegetation in a second vial. Most ants can be identified to at least genus with a hand lens, and practice. We use the Victorinox© Swiss Army knife, which contains the hand lens, the wood saw (capable of sawing surprisingly large limbs) and the fishhook remover that is great for excavating nests with high precision and care. Additionally it has a variety of other tools that are very useful (Plate 1, Fig. 2). Cheaper brands of a similar knife work reasonably well.

We also use trowels, picks and pruners (or twig cutters), which we carry on a belt (Plate 1, Fig. 3). A leather pack with vials is carried on the same belt. All of our collecting equipment can be placed in a large, denim collecting bag (Plate 1, Fig. 4). An insect net can be useful for collecting flying sexuals during the day. A single swing of a net can result in abundant males and females from a single mating swarm. A pair that is mating should be preserved together in a single vial, and later pinned together on a single pin, with a biological note.

Collecting ants is a very pleasurable pastime, and can lead to many interesting discoveries. There are two methods that will maximize the numbers of species collected: collecting very intensely in a single location for several hours, using several techniques, or visiting several sites and collecting briefly at each site. Many ant species are localized in their distributions, and it is possi-

ble to find a rare species that is common in a certain area. Extractions of litter, subterranean baits, and pitfall traps usually yield ants which you won't collect by hand (see more detailed notes about these techniques later).

How many specimens should you collect? Generally 10 workers (various sizes if present) are sufficient for identification. You should always attempt to find winged females and males, although they are not always present in a nest. Avoid collecting the nest queen, as this will usually destroy the entire nest. Some species have several queens, and it will do little damage to collect a few. Collection of brood is not necessary for identification, but you should note its presence in the nest. If you suspect you are collecting something unusual, collect as many specimens as you can find. Avoid killing an excessive number of animals, and repair the nest as well as possible after you have taken what you need.

Labels should be permanent, in the sense that they will not be affected by alcohol. Several pens are available with indelible ink, but it is important to test the pens, as some of the inks are not permanent. We use Ceramicron (Pentel©) pens. Several small labeling machines are available on the market, which make permanent labels. Again, check the label to be sure that it is permanent when placed in alcohol. Many computer printers will make decent, permanent labels, especially dot matrix printers. Avoid laser printers (the print tends to "flake off") and most inkjet printers, as the ink slowly (or rapidly!) dissolves in alcohol. We have done a

number of experiments with different printers, and have found the Lexmark© printers print permanent labels, when the Super Sharp Waterproof (#1361400) cartridge is used. In an emergency, a pencil will produce a decent, temporary label. The labels should be printed on high-quality heavy stock card, as regular paper may disintegrate in the alcohol.

There are several, specialized techniques which can be used to collect ants, and often result in species of ants that are not collected using other techniques. For example, pitfall traps are very effective in collecting the rarer, soil inhabiting species. We use 2 sizes of plastic cups (Solo®), a 16-ounce and a 12-ounce (Plate 1, Fig. 5). The 12-ounce cup is placed inside the 16-ounce cup, so that the lips of the cups match. The pair of cups is carefully buried in the ground up to the level of the cup. The inner cup is then removed and the soil is dumped, this cup is then replaced in the larger cup and a small amount of alcohol, containing about 10% ethylene glycol (or regular anti-freeze) is placed in the cup, using a variety of squirt bottles (Plate 1, Fig. 6). Often the alcohol will completely evaporate, but the ethylene glycol will keep the specimens in good shape. The amount of liquid to be used depends on the weather conditions: normally the cup is filled to about 1/8 of its capacity, in hot climates it may be necessary to fill the cup half full. The cups are then left in-place for a certain period of time, at least 24 hours. At the end of the time, the inner cup is carefully removed, and rinsed into a vial with the contents.

Again the vial must be labeled as to the location and the placement of the cup on a transect. We have found that a transect of 10 cups, spaced 10 meters apart, is very effective. We usually place three transects in any one area.

There are a number of problems involved with pitfall traps. Some of the traps may be removed by mammals and destroyed. It is possible that these animals consume the contents of the cup, especially the ethylene glycol, which has a sweet taste (it is also poisonous to the animals). This disturbance can be avoided by reducing the quantity of ethylene glycol used in the cup. Humans will also occasionally destroy pitfall traps. The second major problem is that the ants in the bottom of the cup are contaminated by soil. Soil clouds the contents of the cup, and makes it difficult to sort the ants later. This contamination is greatly reduced by using the second cup as described above. The third problem is that the cup may fill and overflow during a rainstorm. This can be reduced by placing small blocks of wood supported by nails above the trap. Even with this precaution, surface water will enter the cup, diluting the alcohol, and contaminating the contents with soil. It is important to rinse the specimens and place them in fresh alcohol as soon as possible to remove the ethylene glycol, as well as to reestablish the original concentration of alcohol, if the samples were diluted by rain.

We usually place baits at the same stations with the pitfall traps. Our baits are made using 2 ml cryogenic vials (Corning© #25702), with

10 holes drilled in them (three sets of three along the sides, and a single hole at the bottom). The holes along the sides allow entrance of ants, the single hole in the bottom allows the attachment of a string, which aids and retrieval of the baits (Plate 2, Fig. 7). The diameters of the holes can be varied to exclude larger ants (for example, we use vials with holes > 1 mm for thief ants, most ants can enter a hole with a diameter of 2 mm). Almost anything can be used for bait, ranging from pieces of Vienna sausage, mealworms, or various mixtures of honey and oils. Normally we place one of these baits on the soil surface (at least one meter from the pitfall trap), the second bait is hung in the vegetation, using the string, and the third bait is buried in the soil at a depth of five to ten cm. These baits (at least the surface and vegetation baits) should be retrieved after about one-half hour, as the contents will be removed if they're left in the field for longer period of time. Normally we leave the subterranean bait in the soil for 24 hours. When the baits are retrieved, we simply carry a tray of scintillation vials (we use vials with the largest diameter openings, 2 cm, Wheaton© #986568), the bait tubes are picked up and if ants are present, they're rapidly placed in the vial containing alcohol and the lid is placed on the vial. The ants are able to enter and exit through the holes in the sides, and thus it is necessary to be nimble in order not to lose valuable specimens. Later, we remove the ants in the traps, clean the traps, and use them again. It is important to check them very carefully before reusing

them, as ants occasionally get stuck on the string, or in the side holes.

Other miscellaneous techniques are very effective in collecting ants. In mesic habitats, samples of litter can be collected in a cloth bag. The samples should be sieved (mesh of about 1 cm), to remove the larger pieces of organic matter. The samples are then placed in a Berlese funnel, of two general types. The first type consists of a bucket containing a fine mesh, under which is a funnel, and a vial (Plate 2, Fig. 8). A vial of alcohol is placed in the bottom of the bucket, the funnel is located above the vial, and litter is scattered on the mesh. The lid is then placed on the Berlese funnel, and the attached light is turned on for period of several hours to 3 days. The heat from the bulb causes the ants (and other creatures) to migrate downward, and into the vial. These traps are very bulky, and difficult to use due to the travel that is usually involved in collecting the samples. If the habitat to be sampled is not far from the home or the laboratory, the samples can be collected in cloth bags, returned to and extracted at the facility. If extensive travel is required, the second, portable type of trap may be used in the field. This type consists of a cloth bag, from which can be hung in a tree or motel room (available from BioQuip® Products, 17803 La Salle Avenue, Gardena, CA 90248-3602). A similar type of mesh is constructed inside the bag, again the sample is scattered on this mesh. If electricity is available, a light bulb may be used as in the previous type of trap. If electricity is not available, this trap can be hung in the sun, or small heat

packs (available at sporting goods stores) may be placed on top of the litter.

Most reproductive ants, or sexuals, are active at night. This is especially true of the males of the fascinating group of army ants. These reproductives can be collected in large numbers using a black light trap (available from BioQuip). This trap consists of a bucket, with a funnel (Plate 2, Fig. 9), under which is located a jar of alcohol. An ultraviolet light is located above the funnel. These traps can be connected to a cigarette lighter of a vehicle. The sexuals are attracted to the ultraviolet light, fall onto the funnel, and tumbled into the jar under the funnel. It is best to place these traps on a white, portable table, located in the few meters from the vehicle. You can then assemble the light just before dusk, plug it in, and relax in the vehicle while the trap does the work. It is always interesting to visit the trap at regular intervals, to see what sorts of creatures you're collecting, and to capture any of the ants that have not made into the jar. It is important to plug your ears with cotton, to avoid the unpleasant experience of having an insect exploring the inside of your ear! Different species of ants are active at different times of the night, but in general most of the interesting creatures will be collected by midnight. The trap can be placed in the vehicle, or in the trunk, and disassembled the next day. The contents of the jar can be placed in a larger container, or simply dumped into a leak-proof plastic bag. Additional alcohol may need to be added. On humid, warm summer nights, is pos-

sible to collect a liter or more of insects, so it is often necessary to place a fairly large container under the funnel, or change the contents often. Later the material in the jar can be sorted at home or in the laboratory during the winter months, when ant activity is low. Be sure to share your samples, as well as a litter samples, with other entomologists, that are interested in other groups of insects. You may develop a network of individuals that exchanges samples, and you may be able to obtain specimens from localities that would be impossible for you to visit.

Once you have collected specimens, what do you do next? You will need access to a dissection microscope to identify the ants to species. You may be able to use a microscope at a local school or university, or may purchase your own. Some myrmecologists simply leave the ants in alcohol. Specimens can be identified in alcohol, or you can remove them from the alcohol, allow the surface alcohol to evaporate, and identify them while holding them with forceps. This method involves 2 problems: you have to maintain the levels of the alcohol in the vials, and it is usually difficult or impossible to put the ant in the right position for identification. The first problem can be reduced by placing the individual vials in a larger jar, and maintaining the level of the alcohol in the jar. The second problem is difficult to avoid. Thus most myrmecologists use another method for preparing their specimens for identification: mounting them on an insect pin.

Most ants are too small to allow the insertion of an insect pin.

Thus a number of techniques have been developed to mount an ant indirectly to the pin (Fig. 10). Each researcher has his or her favorite technique, and considers anyone who uses a different technique to be unenlightened, to say the least! We will provide details on the technique we consider to be the best, and most commonly used by other entomologists. The specimen is actually glued

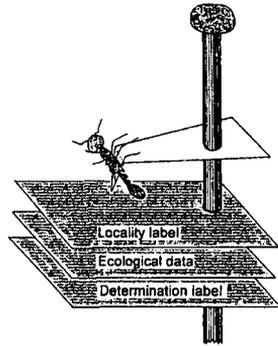


Fig. 10. Ant mounted on a card triangle and insect pin.

to a small triangle, which is mounted to the pin. These small triangles can be cut from stock card, or can be punched using a point punch, which rapidly punches perfect triangles from the card stock. The triangle is then mounted on an insect pin, the end of the triangle is bent downwards at a 90° angle. This bent portion is then glued to the right side of the ant, as is shown in Fig. 10. We use water soluble, white glue, thus allowing the specimen to be unmounted at a later time, by simply soaking the specimen and triangle in water or 70% ethanol. More than one specimen can be mounted on a single pin (each on a separate triangle),

such as a major, minor, female and male, all from the same nest. Larger specimens should be mounted on two triangles, one supporting the mesosoma, the second supporting the gaster.

The locality label is mounted below the specimen, ecological data on another label, and finally the determination label (name of the species) on a third label. These labels can be easily prepared using a computer and a high quality printer that will accept heavy cardstock. Your labels can be printed using a size 4 or 5 font, and would look like these (usually without the borders).

Note that the locality label lists the state (the country may be necessary), county, followed by the specific locality, then the date (note we use v instead of 5, as 10-5 could be May 10 or October 5), and finally the collectors name and field number. The field number corresponds to a number in your field notes or notebook, where more extensive data would be kept. You may want to add the latitude and longitude, if you have a GPS (Global Positioning System). This is especially useful if you are collecting in the middle of nowhere. The second label would have a summary of the ecological information, the third label would have the identification of the specimen. Each pin would have at least the locality label, and one of the pins in the series would have all 3 labels.

NEW MEXICO, Los  
Alamos Co., Los Alamos  
10-v-2000  
W. & E. Mackay # 16345

Low mount of pablics.  
Faring at 10x45  
Reproduction and breed  
in use. # 16345

Figures/notes  
mounted (C'mon)  
det. W. Mackay 20020

How should you store these dried specimens? They have to be well protected, as they can be de-

stroyed by dermestid beetles, or other similar museum pests. They should be stored in an airtight box or drawer that contains mothballs. Be careful as a loose mothball can wipe out a lot of your collection! If you are really serious about your ant collection, store it in a cabinet of glass topped drawers, with the specimens placed in pinning trays (small boxes with foam bottoms). These can be easily moved around each time that you need to reorganize your collection. You can pack the bottom with mothballs, and not have to worry about dermestids for several years. Each drawer should have a pinning tray full of mothballs. The excess specimens can be stored in alcohol in small vials, which are placed in jars filled with alcohol (Plate 2, Fig. 11).

Ants make wonderful pets! They are easy to find, easy to collect, and relatively easy to care for. Several products are available in toy stores, in which your ants may be kept and observed. Ants can also be kept in an aquarium. It is usually necessary to line the upper edge of the aquarium, in order to prevent the ants from escaping. Several products can be used, including baby powder, Vaseline, or a product called Fluon® AD-1 (which is available from Northern Products Inc., P. O. Box 1175, Woonsocket, RI 02895). Fluon is the most effective material; it can be painted on the sides of a container, and later dries to wax-like material that the ants cannot climb. Unfortunately it is expensive, but a small amount will protect several containers. You may want to construct an elaborate system of chambers and tubes for your ants. The ac-

tual nest may be made of Petri-plates (or similar containers), partially filled with Plaster of Paris, or dental stone, and kept moist with frequent applications of water. Just remember that the more elaborate your setup, the more likely an escape will occur!

Queens of some species can be collected with a little effort. It is common to turn over a stone, or peel a piece of bark from a log, and see the nest queen right on the surface. This is especially common in the morning when the stone or other material is just beginning to warm. Later in the day you may not even see workers under similar stones. You must have everything ready, or she will escape while you fumble for your equipment. Queens of many species of harvester ants (*Pogonomyrmex*) are near the surface in the spring when the soil temperatures first increase. Occasionally they are in the first shovel of soil. Other genera as *Monomorium* and *Solenopsis* contain multiple queens, and it is easy to get several. In many cases it is simply a virgin female reproductive, which has dropped its wings during the excavation process. Place these individuals in a small container, together with workers from the same nest. After about an hour, workers will have gathered around the female, if she really is a queen. Otherwise they will treat this individual as if it were another worker. You may be tempted to trade queens with others, but please do not move them far from the location where they were collected. It is illegal to ship queens without a permit, and you could be fined or arrested, or

even worse, spread a pest species by accident.

Once you have started your ant colony, you must provide them with a constant source of water. The best technique involves using a test tube (or other small glass or plastic container) full of water, with a ball of cotton in the open end. This container can be left on its side, and will maintain moisture in the cotton, where the ants can come to drink. It is also necessary to dampen the nest or the soil that is in the aquarium.

It may be difficult to determine the food source of your ants. We have tried to indicate the food sources of ants throughout this book, but many times the food source of individual species is unknown, or there may be geographical or seasonal variation in the preferred food. Thus it may be necessary to provide your ants with a small cafeteria, containing several different foods, until you discover what they like.

Pet ants will provide you with many rewards. They do not eat much, are quiet and are fascinating to watch. If you obtain a queen, your nest may be with you for several years. More than one species of ants are often found nesting together. Sometimes these involve enslavement, occasionally one of the species is a thief on the contents of the nest of a second species, and often they probably simply tolerate each other. It is interesting to study the interactions of such mixed species nests in home colonies, and you may be able to discover an interaction that is completely unknown!

The remainder of the book includes keys to the genera and spe-

cies. You will find ant identification to be difficult at first, at least until you learn the vocabulary. Once you begin to learn the genera, you will consider them to be old friends when you see them again. It will be especially exciting when you see them alive in the field or in the nest in your home. As you gain experience with the genera, begin tackling the keys to species. Start out with genera that only have a few species in New Mexico, are common and are relatively easy to identify, such as *Liometopum*, *Solenopsis* (larger species) or *Pogonomyrmex*. Some of the genera, such as *Camponotus* and *Formica* are extremely difficult, wait until you have some experience before tackling them.

A large mass of important information on ants is available on the Internet, and is updated regularly. There are currently more than 5000 websites covering ants. General information on ants can be found at <http://www.mymecology.org>, <http://www.antcolony.org>, <http://www.angelfire.com/hi/redant/index.html>, <http://members.xoom.com/Myrm>, <http://members.aol.com/dinarda/ant/index.htm>. The major website for social insects is maintained by Dr. Donat Agosti and is available at [http://research.amnh.org/entomology/social\\_insects/](http://research.amnh.org/entomology/social_insects/).

Information on introduced ants can be found at <http://www.acusd.edu/~tmcglynn/exotic.htm>. Dr John Longino maintains a site for keys to the ants of Costa Rica at [http://www.evergreen.edu/user/serv\\_res/research/arthropod/AntsofCostaR](http://www.evergreen.edu/user/serv_res/research/arthropod/AntsofCostaR). Help with the identification of North American ants to species can

be found at <http://www.utep.edu/leb/antgenera.htm>. The International Union for the Study of Social Insects can be accessed at <http://www.birkhauser.ch>. A website on army ants can be found at [http://geocities.com/entomology\\_ants](http://geocities.com/entomology_ants). Bibliographic references on ants can be obtained from <http://www.cmav.usda.ufl.edu/~formis>. Web pages on pest ants and ant control would include <http://www.ianr.ini.edu/ianr/lanco/enviro/pest/factsheet>. Fossil ants can be purchased from <http://www.americawest.com>, it is worth it to visit the site to look at the nice, colored pictures of fossil ants.

We have avoided most of the systematic details, mentioning only synonyms (species know by more than one name) that may be confusing. Check with Bolton (1995) for details on the synonyms of ants. We have included information on the principal characters of each of the species, and have compared them with closely related species. Additional illustrations are provided for some of the species, in addition to the illustrations in the keys. Distribution maps are included for each of the species, allowing rapid evaluation of the spatial position of each of the species. Notes are included on the habitat and biology of each of the species. Unfortunately we know little about most of the species.

The following key will allow you to identify the species to genus. We have attempted to use characters that are relatively easily seen. You will initially need a dissection microscope, but after some experience, you may be able to use it to identify ants in the field using a hand lens.

## Key to the Genera of Ants of New Mexico

1. Petiole and postpetiole present (Fig. 12) ..... 2

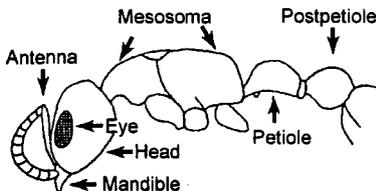


Fig. 12. Lateral view of a worker of *Pseudomyrmex apache*.

- Petiole present, but postpetiole not well separated from remainder of gaster (Fig. 13) ..... 4

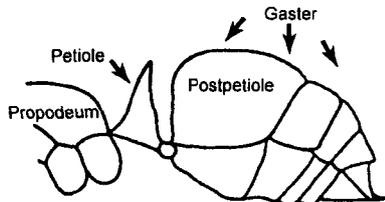


Fig. 13. Lateral view of the propodeum, petiole and gaster of a worker of *Odontomachus clarus*.

2(1). Frontal carinae (singular carina) positioned close to each other and do not cover insertions of antennae, which are located near base of mandibles (Fig. 14) ..... 3

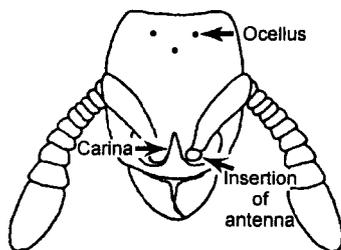


Fig. 14. Head of a *Cerapachys agustae* worker showing the exposed insertions of the antennae (where they connect to head).

- Frontal carinae not positioned near each other and with lobes which partially or completely cover insertions of antennae (Fig. 15) (Subfamily Myrmicinae) ..... 11

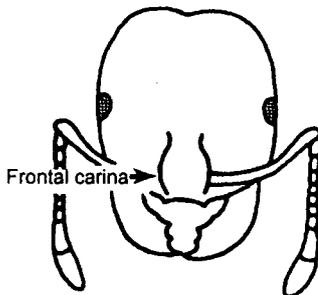


Fig. 15. Head of a *Solenopsis xyloni* worker, showing the insertions of the antennae covered by the frontal carina.

3(2). Eyes very large, covering large portion of head (Fig. 16); 3 ocelli usually present (Fig. 14, ocellus is singular); body long, slender



Fig. 16. Head of a worker *Pseudomyrmex apache*, showing the large eye.

(Fig. 12) (Subfamily Pseudomyrmecinae) ..... *Pseudomyrmex*  
 - Eyes absent or extremely small (Fig. 17) (Subfamily Ecitoninae) ..... *Neivamyrmex*

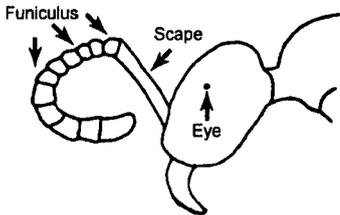


Fig. 17. Head of a worker of *Neivamyrmex harrisi*, showing the tiny eye.

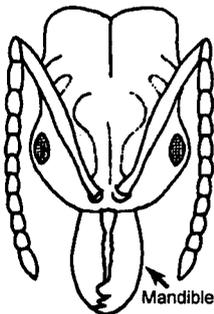


Fig. 18. Full face view of head of a worker of *Odontomachus clarus*.

4(1). Mandibles very long with 3 teeth at apex (Fig. 18), or constriction present between postpetiole and remainder of gaster (Fig. 19); or, integument hard; sting well developed; uncommon ..... 5

- No (or slight) constriction between postpetiole and remainder of gaster (Fig. 13); mandibles never elongate; integument soft; sting absent or rudimentary; very common ants ..... 10

5(4). Mandibles elongate (Fig. 18) with 3 teeth at apex; antennae with 12 segments (Fig. 18); petiole sharply pointed above (Fig. 13);

gaster with very weak constriction between first 2 terga (upper 1/2 of gastral segments - Fig. 13) .....  
 ..... *Odontomachus*

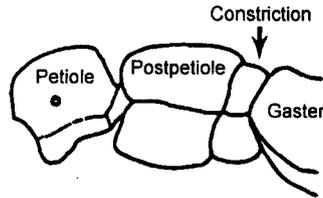


Fig. 19. Lateral view of *Cerapachys augustae* worker showing the petiole, postpetiole, and gaster, as well as the constriction between the postpetiole and gaster.

- Mandibles not elongated (Fig. 14) gaster with well-developed constriction between first 2 terga (Fig. 19) ..... 6

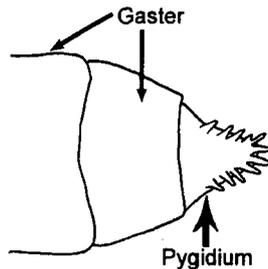


Fig. 20. Pygidium of a worker of *Acanthostichus punctiscapus*, as seen from above.

6(5). Antennae with 11 segments, last one forming club whose length is approximately as long as preceding 4 segments (Fig. 14); 3 ocelli present; rarely collected ..... *Cerapachys*

- Antennae with 12 segments (Fig. 18), the last one not forming a club; ocelli usually absent ..... 7

7(6). Eyes absent or extremely small; pygidium (dorsum of last segment of gaster) bordered laterally

by small spines (Fig. 20) .....  
 ..... *Acanthostichus punctiscapus*  
**Mackay**

- Eyes normally present and often large; pygidium not bordered laterally by small spines ..... **8**  
**8(7).** Subpetiolar process with blunted, angled anteroventral corner and 2 distinctly angular posteroventral acute teeth, situated side by side (Fig. 21); anteriorly the subpetiolar process has circular or oval "thin spot" or fenestra, visible in transmitted light (Fig. 21) .....  
 ..... *Ponera pennsylvanica* **Buckley**

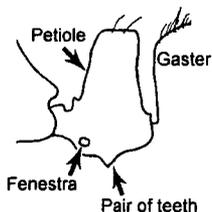


Fig. 21. Petiole of a worker of *Ponera pennsylvanica*, showing the fenestra and the paired teeth on the ventral surface of the petiole.

- Subpetiolar process simple lobe, never with fenestra or paired posterolateral teeth ..... **9**

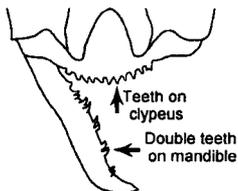


Fig. 22. Clypeus and mandible of a worker of *Amblyopone pallipes*.

**9(8).** Anterior border of clypeus with teeth; mandibles large with irregular, paired teeth (Fig. 22) .....  
 .. *Amblyopone pallipes* (**Haldeman**)  
 - Anterior border of clypeus without teeth; mandible relatively

small (Fig. 23) ..... *Hypoponera*

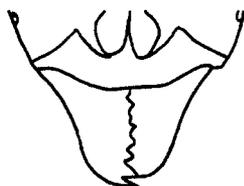


Fig. 23. Clypeus and mandibles of a worker of *Hypoponera inexorata*.

**10(4).** Acidopore absent, no ring of hairs at apex of gaster (Fig. 24) (Subfamily Dolichoderinae) ..... **33**

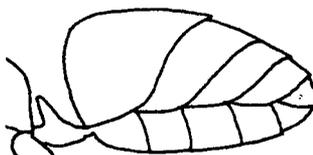


Fig. 24. Gaster of worker of *Liometopum apiculatum*, showing a lack of the acidopore.

- Acidopore at apex of gaster round and usually surrounded by ring of hairs (Fig. 25) (Subfamily Formicinae) ..... **37**

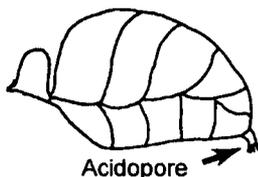


Fig. 25. Gaster of a worker of *Myrmecosyctus depilis*, showing the acidopore.

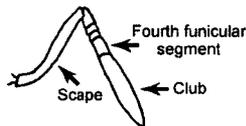


Fig. 26. Antenna of a worker of *Strumigenys*.

**11(2).** Antennae with 6 segments

(Fig. 26); unknown from New Mexico .. *Strumigenys louisianae* Roger  
 - Antennae with more than 6 segments (Fig. 27) ..... 12

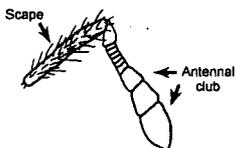


Fig. 27. Antenna of a worker of *Tranopelta* sp.

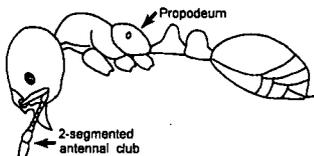


Fig. 28. Side view of a worker of *Solenopsis xyloni*, showing the 10 segmented antenna with 2 segmented club and the propodeum without spines.

12(11).Antennae with 10 segments, last 2 forming club (Fig. 28); propodeum without spines (Fig. 28); either dimorphic species or very small monomorphic species .....

*Solenopsis*

- Antennae with 11 or 12 segments, if only 10 segments present, antennal club formed from last 3 segments (Fig. 27) ..... 13

13(12).Antenna consisting of 10 or 11 segments (Fig. 27) ..... 14

- Antenna consisting of 12 segments ..... 21

14(13).Antenna with 3 segmented club (Fig. 27); propodeum without spines (Fig. 29); mesosoma mostly smooth, shining .....

*Tranopelta*

- Antenna with or without 3 segmented club; propodeum with spines or teeth (Fig. 30); mesosoma not smooth and shining ..... 15

15(14).Postpetiole connected to dorsal surface of gaster (Fig. 30); gaster, when seen from above, heart shaped

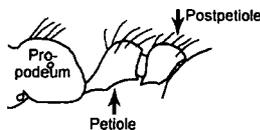


Fig. 29. Propodeum, petiole, postpetiole and gaster of a worker of *Tranopelta* sp.

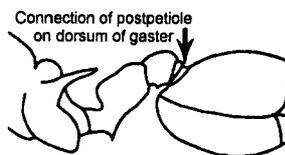


Fig. 30. Propodeum, petiole, postpetiole and gaster of a worker of *C. larreae*.

with pointed apex; pronotum without spines or bumps .... *Crematogaster*  
 - Postpetiole not connected to upper surface of gaster (Fig. 29); gaster not heart shaped .....16

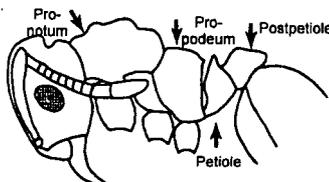


Fig. 31. Side of body of a worker of *Cyphomyrmex wheeleri*.

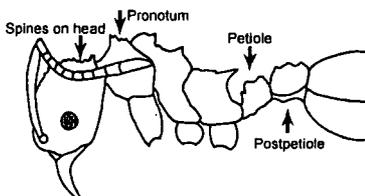


Fig. 32. Side of body of a worker of *Trachymyrmex smithi neomexicanus*.

16(15).Pronotum with bumps or spines (Figs. 31 & 32).....17

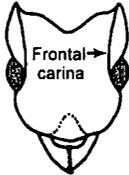


Fig. 33. Head of a worker of *Cyphomyrmex wheeleri*, showing the frontal carina.

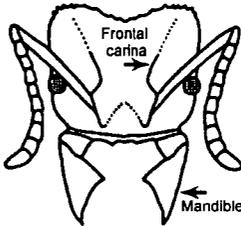


Fig. 34. Head of a worker of *Trachymyrmex smithi*, showing the frontal carina.

- Pronotum without bumps or spines ..... 20

17(16).Frontal carina extends to posterior border of head (Figs. 33 & 34); dark red or grayish black ants; monomorphic ..... 18

- Frontal carina does not extend more than 1/2 distance from posterior border of clypeus to posterior border of head (Fig. 35); poly-

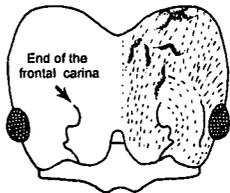


Fig. 35. Head of a worker of *Acromyrmex versicolor*, indicating the end of the frontal carina.

polymorphic red ants (2 - 6 mm) ...

*Acromyrmex versicolor* (Pergande)

18(17).Petiole and postpetiole with lateral spines (seen from above, Fig. 36); unknown from NM .....

..... *Cephalotes rohweri* Wheeler

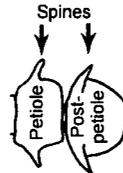


Fig. 36. Petiole and postpetiole of a minor worker of *Cephalotes rohweri*, as seen from above.

- Petiole and postpetiole without lateral spines ..... 19

19(18).Dorsum of mesosoma with distinct pointed spines (Fig. 32); greater than 3 mm in total length ..... *Trachymyrmex*

- Dorsum of mesosoma with bumps (Fig. 31); less than 3 mm in total length ..... *Cyphomyrmex*

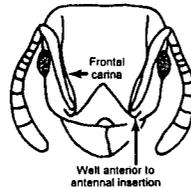


Fig. 37. Head of *Tetramorium spinosum* worker, showing the well anterior to the insertion of antenna and the frontal carina.

20(16).Clypeus elevated and forming well (sharp-edged carina) in front of antennal insertions (Fig. 37); frontal carinae extend to posterior border of head and form scrobes to receive antennae (Fig. 37) ..... *Tetramorium* (in part)

- Clypeus not forming welt; frontal carinae do not extend to posterior border of head (Fig. 38) .....  
 ..... *Leptothorax*

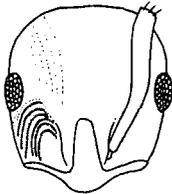


Fig. 38. Head of a worker of *Leptothorax cockendolpheri* showing a lack of a welt anterior to the insertion of the antenna (from Mackay, 2000).

21(13). Propodeum with 2 pairs of spines (Fig. 39); petiole with short peduncle (Fig. 39); legs short, femora and tibiae thickened; rarely collected .....  
 ..... *Myrmecina americana* Emery

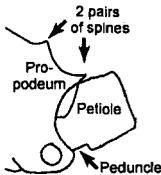


Fig. 39. Side view of the propodeum and petiole of a worker of *Myrmecina americana*.

- Without all of these characteristics; commonly collected ..... 22

22(21). Clypeus elevated and forming welt in front of antennal insertions (Fig. 37) ..... *Tetramorium*

- Clypeus not elevated in form of welt ..... 23

23(22). Middle and hind tibial spurs pectinate (with tiny hairs, Fig. 40, difficult to see without high magnification) ..... 24

- Middle and hind tibial spurs not pectinate ..... 26

24(23). Metanotal constriction (between mesonotum and propodeum) absent, propodeum often with spines, psammophore (long curved hairs on underside of head) usually present (Fig. 41); common in arid ecosystems ..... *Pogonomyrmex*

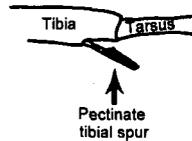


Fig. 40. Pectinate midial tibial spur of a worker of *Pogonomyrmex rugosus*.

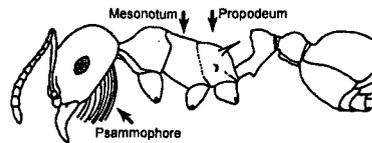


Fig. 41. Side view of a worker of *Pogonomyrmex rugosus* showing the mesonotum, propodeum and psammophore.

- Metanotal constriction present between mesonotum and propodeum (Fig. 42), which usually has spines (absent in *Manica*); psammophore absent; common in pine forests and mountainous areas ..... 25

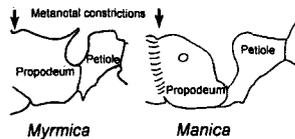


Fig. 42. Propodeal spines of a worker of *Myrmica lobifrons* and *Manica invidia*, showing the presence and absence of propodeal spines.

25(24). Propodeum with spines or teeth (Fig 42, left) ..... *Myrmica*

- Propodeum without spines or teeth (Fig. 42, right), although blunt protuberances may be present .....  
 ..... ***Manica invidia* Bolton 26(23)**. Propodeum without spines (Fig. 43); antennal club composed of 3 segments (Fig. 44); usually small, shiny, black ants ..... ***Monomorium***

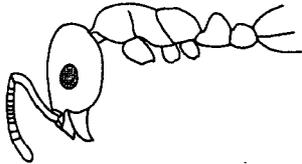


Fig. 43. Mesosoma of a worker of *Monomorium cyaneum*.

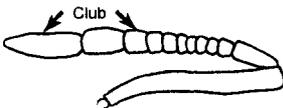


Fig. 44. Antenna of a worker of *Monomorium cyaneum*, with a 3 - segmented club.

- Propodeum with spines (Fig. 41), or if not, ants not small, shiny and black; antennal club configuration varies ..... 27  
 27(26). Antennal club composed of 3 segments (Figs. 44 - 46, 1 rare species, *Pheidole clydei*, with 4-segmented club) ..... 28

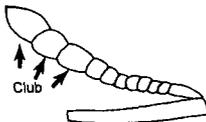


Fig. 45. Antenna of a worker of *Leptothorax* sp., showing a 3-segmented antennal club (from Mackay, 2000).

- Antenna without club or club with more than 3 segments ..... 32  
 28(27). Workers dimorphic or poly-

morphic; major with head longer than gaster (Fig. 46); petiole with long peduncle; scape of antenna of minor often extends past posterior border of head (Fig. 46); mandible with 2 well defined teeth at apex (Fig. 47); very common ants .....  
 ..... ***Pheidole***

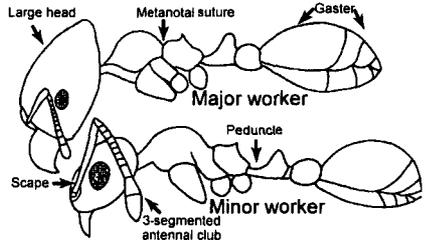


Fig. 46. Major and minor workers of *Pheidole tucsonica*.

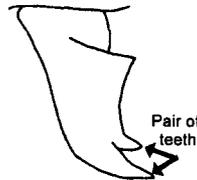


Fig. 47. Right mandible of an intermediate major worker of *Pheidole obtusospinosa*.

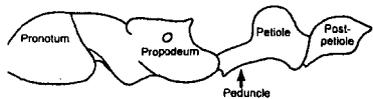


Fig. 48. Mesosoma, petiole and postpetiole of a worker of *Cardiocondyla ectopia*.

- Monomorphic species; scape does not extend past posterior lateral border of head (Fig. 50) ..... 29  
 29(28). Peduncle of petiole about as long as height of petiolar node (Fig. 48); mesosoma moderately to

strongly arched; promesonotal and metanotal suture often faintly indicated or absent; extremely rare, in arid and semiarid regions ..... 30

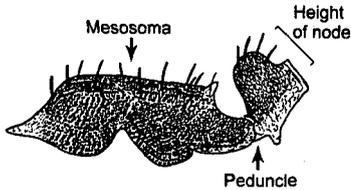


Fig. 49. Mesosoma and petiole of a worker of *Leptothorax emmae* (from Mackay, 2000).

- Peduncle generally much shorter than height of node of petiole (Fig. 49); mesosoma usually with flat dorsum (Fig. 49); common, especially in pine forests, but occurring in all habitats ..... *Leptothorax* (and *Formicoxenus*)

30(29). Eyes with fewer than 50 ommatidia (Fig. 50); antennal club longer than remainder of funiculus; anteroinferior pronotal angle present (Fig. 50) ..... *Rogeria*

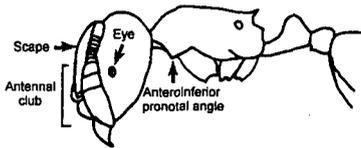


Fig. 50. Side view of worker of *Rogeria foreli*.

- Eyes with more than 50 ommatidia (Fig. 51); antennal club shorter than remainder of funiculus ..... 31

31(30). Clypeus strongly projecting or overhanging above mandibles (with head seen from side, Fig. 51) ... *Cardiocondyla ectopia* Snelling

- Clypeus not strongly projecting above mandibles (Fig. 52) ..... *Leptothorax pergandei* Emery

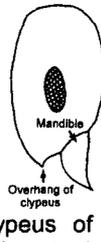


Fig. 51. Clypeus of a worker of *Cardiocondyla ectopia*, as seen from the side.



Fig. 52. Clypeus of a worker of *Leptothorax pergandei* as seen from the side.

32(27). Clypeus usually with pair of longitudinal carinae (Fig. 53); mesosoma thickened with little constriction between mesonotum and propodeum; rarely collected ants ..... *Stenamma*

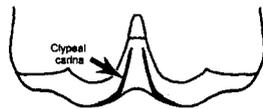


Fig. 53. Pair of carinae of the clypeus of a worker of *Stenamma snellingi*.

- Clypeus without carinae or with more than 1 pair; mesosoma

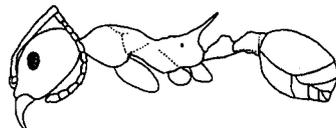


Fig. 54. Side view of a worker of *Aphaenogaster cockerelli*.

slender (Fig. 54); common ants in numerous habitats .. *Aphaenogaster* 33(10). Propodeum in form of cone (55); maxillary palps very long (Fig. 55) ..... *Dorymyrmex*

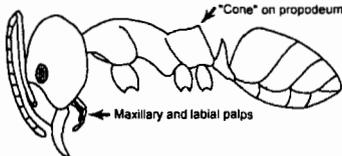


Fig. 55. Side view of a worker of *Dorymyrmex insanus*, showing the cone-like structure on the propodeum and the palps.

- Propodeum never in form of cone ..... 34 34(33). Node of petiole poorly developed (Fig. 56); monomorphic ants, widely distributed in mesic areas of state ..... *Tapinoma sessile* (Say)

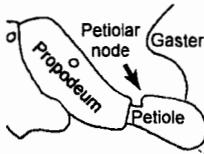


Fig. 56. Petiole of a worker of *Tapinoma sessile*.

- Node of petiole obvious, although it may be small (Fig. 57); common ants ..... 35 35(34). Workers polymorphic; mesosoma in profile without impression before posterior edge of propodeum (Fig. 57); ocelli present at least in larger workers; gaster with gray pubescence; nests usually in oak trees

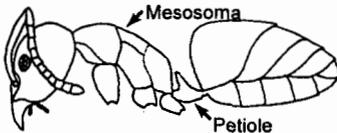


Fig. 57. Side view of a worker of *Liometopum apiculatum*.

or under stones in mountainous areas ..... *Liometopum*  
- Workers monomorphic; ocelli absent; nesting in soil ..... 36

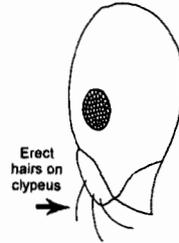


Fig. 58. Side view of the head of a worker of *Forelius pruinosus*, showing the long, erect hairs on the clypeus.

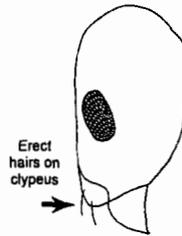


Fig. 59. Side view of the head of a worker of *Linepithema humile*, showing the short, erect hairs on the clypeus.

36(35). Erect hairs on clypeus long, extending to near tips of mandibles, when mandibles are shut (Fig. 58); pronotum with at least 1 pair of long, erect hairs (may be missing in some specimens in nest series); most common in desert regions (also common in urban areas) .... *Forelius*

- Erect hairs on clypeus short, not extending to near tips of mandibles (Fig. 59); pronotum without long, erect hairs; rarely collected in New Mexico, occurring in mesic and urban areas ..... *Linepithema humile* (Mayr)

**37(10).** Antenna with 9 segments (Fig. 60); small, light colored, inconspicuous ants, not commonly collected ..... *Brachymyrmex depilis* Emery

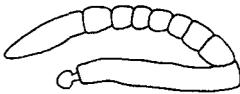


Fig. 60. Antenna of a worker of *Brachymyrmex depilis*.

- Antenna with more than 9 segments; common ants ..... **38**  
**38(37).** Mandibles long, sickle shaped (Fig. 61); red ants, not commonly collected ..... *Polyergus*

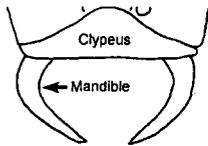


Fig. 61. Mandibles of a worker of *Polyergus breviceps*.

- Mandibles not long and sickle shaped, common ants ..... **39**  
**39(38).** Insertions of antennae located far from posterior border of clypeus (Fig. 62); mesosoma convex (except for *C. hyatti*) in profile (Fig. 63) ..... *Camponotus*

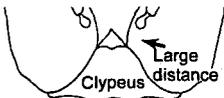


Fig. 62. Anterior portion of the head of a major of *Camponotus herculeanus*, showing the large distance between the insertions of the antennae and the posterior edge of the clypeus.

- Insertions of antennae located near posterior border of clypeus (Fig. 64); mesosoma not convex in profile

(Fig. 70) ..... **40**

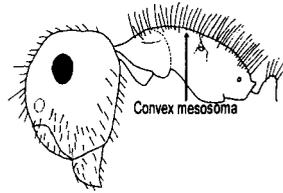


Fig. 63. Mesosoma of a major of *Camponotus mina*, showing the convex outline.



Fig. 64. Head of a worker of *Prenolepis imparis*.

**40(39).** Maxillary palps very long, segment 4 as long as segments 5 and 6 combined (Fig. 65); psammophore present ..... *Myrmecocystus*

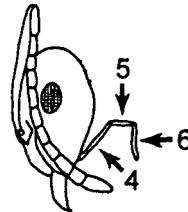


Fig. 65. Head of a worker of *Myrmecocystus depilis*, showing the last 3 segments of the maxillary palps.

- Maxillary palps shorter, segment 4 not unusually long; psammophore absent ..... **41**

**41(40).** Frontal carinae prominent, lateral margins slightly reflected upward; ocelli often distinct (Fig. 66); mostly large, polymorphic. *Formica*

- Frontal carinae poorly marked, lateral margins flat; ocelli indistinct or absent; smaller monomorphic ants ..... **42**

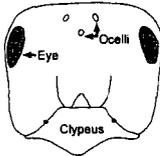


Fig. 66. Head of a worker of *Formica obscuripes*.

**42(41).**Antennal scapes surpassing posterior margin of head by at least  $\frac{1}{3}$  their length (Fig. 67), often much longer; erect hairs often coarse, long and usually black in color and are especially noticeable on dorsum of pronotum (Fig. 67) ..... **43**

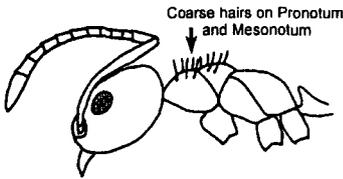


Fig. 67. Side view of a worker of *Paratrechina terricola*.

- Antennal scapes not surpassing posterior lateral margin, or at least not by amount greater than length of first funicular segment; erect hairs not coarse, are short and golden ..... **44**

**43(42).**Mesosoma (seen from above) with mesonotum strongly compressed or narrowed (Fig. 68), swollen in front and behind constriction; scapes and tibiae without erect hairs; most or all of eye posterior to middle of head (Fig. 64); generally larger

ants (most workers nearly 4 mm in total length) .....

..... *Prenolepis imparis* (Say)

- Mesosoma (from above) only slightly constricted at mesonotum; scapes and tibiae usually with erect hairs; most or all of eyes at or anterior to middle of head (Fig. 67); generally smaller ants (most workers less than 3 mm total length) .....

..... *Paratrechina*

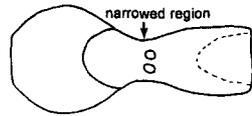


Fig. 68. Top of the mesosoma of a worker of *Prenolepis imparis* showing the strong constriction.

**44(42).**Maxillary palps short and composed of 3 segments (Fig. 69), difficult to see ..... *Acanthomyops*



Fig. 69. Maxillary palp of a worker of *Acanthomyops* sp.

- Maxillary palps longer and composed of 6 segments, very obvious (Fig. 70) ..... *Lasius*

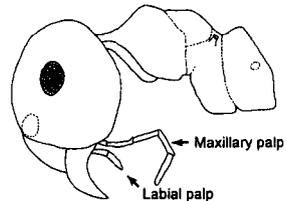


Fig. 70. Head and mesosoma of a worker of *Lasius pallitarsis*, showing the maxillary and labial palps.

# List of the ants of New Mexico

## SUBFAMILY PONERINAE

Ants of this subfamily are rarely collected in New Mexico (Cole, 1953a). This is primarily a tropical genus. Most species nest under stones or in the soil. All of the workers have well-developed stingers and some can deliver a painful sting. The petiole is developed, but the postpetiole forms part of the gaster. Most are thought to be predators, but relatively little is known of their natural history.

These ants can be distinguished from those of other subfamilies using the following characteristics: the petiole is developed, the postpetiole is fused with gaster and usually not very differentiated from it; the stinger is well developed; the pygidium is never surrounded by teeth; and the integument is hard and

sclerotized. Workers of this subfamily can be separated from those of Cerapachyinae by the lack of teeth on the pygidium, and from Ecitoninae by the large, well-developed eyes (usually), and the lack of a well separated postpetiole, and from Formicinae and Dolichoderinae by the hard integument and the stinger. They are easily separated from the Myrmicinae and Pseudomyrmecinae as both of these have a well-developed postpetiole. These characteristics would usually separate the females from those of the other subfamilies. Males are difficult to separate from those of many of the above mentioned subfamilies. Refer to Smith (1943a) if identification of males is necessary.

### Genus *Amblyopone*

(Key: Lattke, 1991)

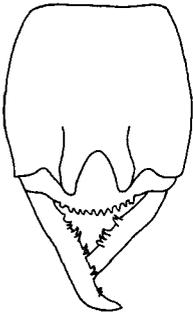


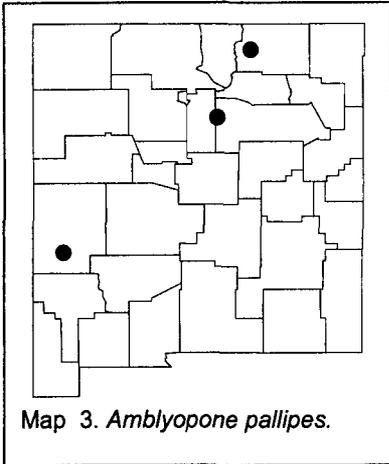
Fig. 71. Head of a worker of *A. pallipes*.

Only one species of this genus occurs in New Mexico. The genus can be recognized in having numerous teeth on the anterior border of the clypeus and the mandibles are covered with individual pairs of well-developed teeth (Fig. 71). The antenna has 12 segments and the scape reaches about half way to the posterior edge of the head. The eyes are very small. They are large ants (4 - 7 mm total length). The form of the mandibles and the large size separate

them from all others in the subfamily.

***Amblyopone pallipes***  
(Haldeman)

Figs. 22, 71; Map 3



**Discussion.** This is a very easily recognizable species as it is

the only one in New Mexico that has denticles on the anterior border of the clypeus and pairs of teeth along the mandible (Fig. 71).

**Distribution.** USA: eastern North America (Ontario south to Florida) west to OK, CO, TX, AZ; NM: **Catron Co.**, Snow Lake, **Colfax Co.**, Cimarron (Cole, 1953a), **San Miguel Co.**, Beulah (Sapello Canyon) (Cole 1953a).

**Habitat.** Pine forests or deciduous canyon forests.

**Biology.** This species nests under stones in moist areas. Colonies apparently consist of only a few workers. They prey primarily on chilopods. These secretive ants are rarely collected, but well worth the search. Their behavior is very non ant-like, and will give any myrmecologist a thrill.

Wheeler, 1900a; Haskins, 1928; Creighton, 1940a; Gregg 1963

## Genus *Hypoponera*

(Key: Creighton, 1950)

These ants are not common in New Mexico. They are usually found in woodlands or riparian habitats nesting under stones, although they also occur in desert habitats. They are apparently predaceous, although we know little about them. They are small ants (2 - 4 mm total length). The mandibles are small and not remarkable. This separates them from the other two genera on the subfamily Ponerinae that occur in New Mexico: *Amblyopone* and *Odontomachus*. In addition, the eyes

are small, consisting of only a few ommatidia; the antenna has 12 segments. The females are similar to the workers, but have larger eyes. The males may be normal, but in some species the males are worker-like, almost indistinguishable from the workers. Such males can be distinguished from the workers by their 13 segmented antennae, and the presence of genitalia.

This genus could be confused with the genus *Ponera*, but can be separated as these ants lack a round,

nearly transparent region on the ventral surface of the petiole (compare Figs. 21 and 73). It also lacks the angles on the ventral surface of the petiole, which are present in *Ponera* (Fig. 77). We may have only four species of this genus in New Mexico. This is a difficult genus that is in need of revision.

**Key to the workers of  
*Hypoponera***

1. Dorsum of first tergum of gaster with 4 or more erect hairs (Fig. 72); dorsum of pronotum with at least 1 erect hair (Fig. 72); petiole with apex about same width as base near peduncle (Fig. 72) ..... 2

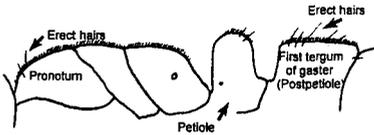


Fig. 72. Mesosoma, petiole and first gastral tergum of a worker of *H. punctatissima*.

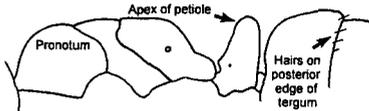


Fig. 73. Mesosoma, petiole and first gastral tergum of a worker of *H. opacior*.

- Dorsum of first tergum without erect hairs (or with fewer than 5), excluding obvious hairs restricted to posterior edge (Fig. 73); dorsum of pronotum without erect hairs; apex of petiole somewhat narrower than width near dorsum of peduncle (Fig. 73) ..... *opacior* (Forel)  
2(1). Erect hairs on pronotum mostly relatively long (0.05 mm), smaller hairs decumbent or ap-

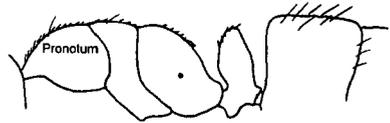


Fig. 74. Side view of a worker of *H. opaciceps*.

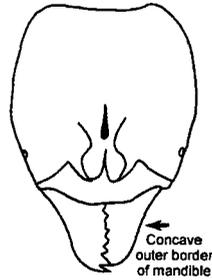


Fig. 75. Head of a worker of *H. inexorata*.

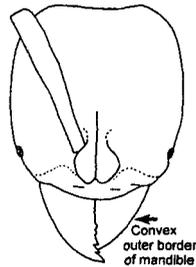


Fig. 76. Head of a worker of *H. opaciceps*.

pressed (Fig. 74) ..... 3  
- Erect hairs on pronotum of 2 distinct lengths, densely covered with short (less than 0.01 mm), bristly hairs with scattered longer (0.03 - 0.05 mm) hairs (Fig. 72) ..... *punctatissima* (Roger)  
3(2). Outer border of mandible distinctly concave (Fig. 75) .....

..... *inexorata* (Wheeler)  
 - Outer border of mandible  
 convex (Fig. 76) . *opaciceps* (Mayr)

### *Hypoponera inexorata* (Wheeler)

Figs. 23, 75

**Discussion.** This species is easily recognized by the outline of the outer margin of the mandible, which is concave (Fig. 75). The dorsum of the gaster has abundant, erect hairs.

**Distribution.** Eastern USA, west to TX and AZ, south to Central America. We have no records of this species from NM, but expect it to occur there.

**Habitat.** Dry to moist forests.

**Biology.** This species nests under stones in dry, rocky forests.

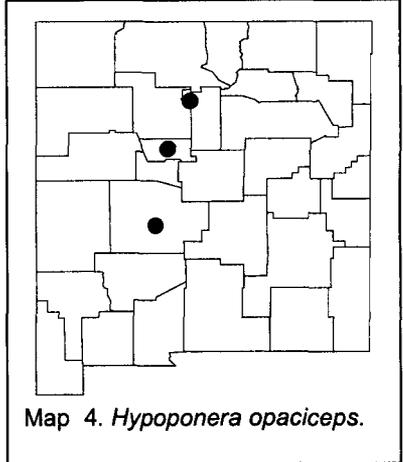
Wheeler, 1908

### *Hypoponera opaciceps* (Mayr)

Figs. 74, 76; Map 4

**Discussion.** The workers of this species are difficult to separate from those of *H. opacior*. In the majority of cases, the 2 can be separated as *H. opaciceps* has several hairs on the dorsum of the pronotum, and on the dorsum of the first tergum of the gaster, whereas *H. opacior* nearly always has no erect or suberect hairs on either of these surfaces (posteriorly directed hairs are present on posterior edge of tergum). The shape of the petiole is a less reliable character, but the petiole of *H. opaciceps* is nearly always has a convex ante-

rior face, whereas that of *H. opacior* usually has a concave anterior face (compare Figs. 73 & 74). Females have abundant, erect hairs on the dorsum of the pronotum and dorsum of the gaster, which are much more numerous than they are in females of *H. opacior*.



Map 4. *Hypoponera opaciceps*.

**Distribution.** USA: eastern United States west to CO, TX, AZ south to Argentina. This species may not be native to the New World; NM: **Bernalillo Co.**, Albuquerque (Fagerlund, pers. comm.), **Los Alamos Co.**, at edge of Rio Grande River, **Socorro Co.**, Bosque del Apache.

**Habitat.** Cottonwood-willow forests, riparian habitats and sagebrush, urban areas.

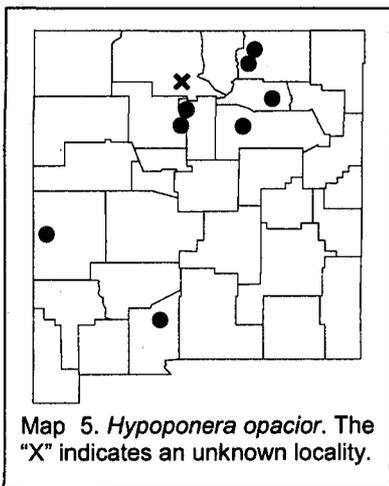
**Biology.** This ant nests under stones. The specimens in Albuquerque were collected on sandbars along the Rio Grande river in pitfall traps (Fagerlund, pers. comm.).

Wheeler, 1908; Smith, 1927a; Kempf, 1960; Gregg, 1963

## *Hypoponera opacior* (Forel)

Fig. 73; Map 5

**Discussion.** The workers of this species are nearly identical to those of *H. opaciceps*, but usually have no erect hairs on the pronotum or dorsum of the first tergum of the gaster. The petiole nearly always has a concave anterior face (see discussion of *H. opaciceps* for details on how to separate them). Occasionally specimens are encountered which are relatively more hairy, and impossible to identify with any certainty. Females usually have a few erect hairs on the pronotum and dorsum of the gaster.



**Distribution.** CANADA: Quebec; USA: Most of the country including TX, CO, AZ, south to Chile and Argentina; NM: **Catrón Co.**, 2 mi. N Frisco Hot Springs, **Colfax Co.**, Cimarron (Cole 1953a), **Doña Ana Co.**, 45 k NE Las Cruces (Jornada Long Term Ecological Re-

search Site), **Mora Co.**, 2 k E Wagon Mound, **Rio Arriba Co.**, without locality, **Sandoval Co.**, Bandelier National Monument, **San Miguel Co.**, Las Vegas; south to Chile and Argentina.

**Habitat.** Ranges from Chihuahuan Desert mixed basin bajada to short grass prairie, sagebrush into areas of pinyon-juniper, alligator bark juniper, Chihuahua pines, ponderosa pine and emery oak.

**Biology.** These ants nest under stones, primarily in shady areas with abundant stones.

Dennis, 1938; Cole, 1940; Mallis, 1941; Potts, 1948; Gregg, 1963

## *Hypoponera punctatissima* (Roger)

Fig. 72

**Discussion.** This is a small (less than 2.5 mm total length), pale brown species, which is easily recognized by the plush, fine vestiture of erect hairs on the dorsum of the pronotum (Fig. 72), which also has scattered, erect hairs. The petiole is especially thickened (Fig. 72), somewhat globose in shape.

**Distribution.** USA: CA east to FL, Smith lists NM, south to Central America, possibly introduced into New World. We know of no specific records for New Mexico.

**Habitat.** Riparian zones in arid habitats.

**Biology.** This species nests under stones or in the soil.

## Genus *Odontomachus*

(Keys: Brown, 1976, 1977)

This genus is very rarely collected in New Mexico, although it is more common in Arizona, Texas and Chihuahua. These ants nest under logs or stones or simply in the ground. Colonies are usually small, although some of the Neotropical species have large nest populations. This genus is predaceous, and the elongate mandibles are held open (perpendicular to long axis of head) when the forager is approaching a prey. When the prey is in the proper position, or touch hairs at the base of the mandibles, they snap shut, trapping the prey.

This genus is easily recognized by the elongate mandibles. In addition the eyes are large and only the petiole is well developed; the postpetiole is fused to the remainder of the gaster with little or no noticeable constriction between the two.

The only other ant with similar mandibles in New Mexico belongs to the genus *Strumigenys* which is a member of the Myrmicinae and has the postpetiole well developed. The females are similar to the workers and are thus easily recognized. The males have a long, curved process that extends from the dorsum of the gaster and are also easily recognized. The mandibles of males are not elongate as in the workers and females.

There is only one species that

occurs in the southwest (Brown, 1976).

### *Odontomachus clarus*

Roger

Figs. 13, 18

**Discussion.** This is a rare, but easily recognized species, as it is the only ponerine that may occur in New Mexico with elongate, linear mandibles (Fig. 18).

It superficially resembles the genus *Strumigenys*, but can be easily separated as the postpetiole is not well separated from the gaster.

**Distribution.** USA: AZ, TX; NM: Smith (1979) mentions that *O. clarus* (= *O. desertorum*) occurs in NM, but we have no specific records; MEXICO: Chihuahua, Nuevo León south to Guerrero, Clarion Island (Pacific, off coast of México).

**Habitat.** Semi-desert areas, especially in riparian areas.

**Biology.** This ant nests under stones, and may be locally common, although they are rarely collected. These ants are fascinating predators which snap the elongated mandibles shut on prey. When placed in a vial, they can snap the mandibles together with such force they can flip completely out of the vial.

Wheeler, 1900, 1908;  
Haskins and Enzmann, 1938

## Genus *Ponera*

This is a predominantly Old World and tropical genus, with two species found in North America. It can be easily recognized by the fenestra or thin oval-shaped impression (Fig. 77) on the ventral part of the petiole.

It resembles the genus *Hypoponera*, but can be separated by the fenestra. The petiole also has a pair of ventral angles, which are not present in *Hypoponera*. The mesosoma is little impressed along the dorsal margin.

It is usually found in moist, mesic forests, nesting under stones. Little is known of the biology of this genus.

### *Ponera pennsylvanica* Buckley

Figs. 21, 77; Map 6

**Discussion.** The worker of this species is a small, black ant and is the only species in New Mexico, in which there is a round, thin, nearly transparent region or fenestra located below the petiole (Fig. 77). Posterior

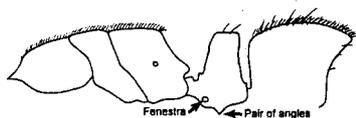
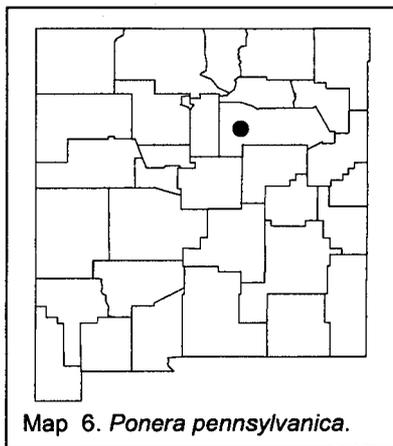


Fig. 77. Side view of the mesosoma, petiole and first gasteral tergum of a worker of *P. pennsylvanica*.

to this region there is a pair of angles or posteriorly directed teeth (Fig. 77).

It could be confused with species of the genus *Hypoponera*, but these ants lack the fenestra (Fig. 73). *Ponera exotica* occurs as far east as western Texas (Big Bend National Park, Jeff Davis Co., see Mackay and Anderson, 1991). It is smaller (less than 2.5 mm total length, vs. over 3 mm in *P. pennsylvanica*) and pale brown or yellow (vs. dark brown in *P. pennsylvanica*).



Map 6. *Ponera pennsylvanica*.

**Distribution.** USA: Eastern North America west to the Four Corners, southwest CO; NM: San Miguel Co., Las Vegas Hot Springs (Taylor, 1967). See Mackay and Anderson (1991) for further details on the distribution of this species.

**Habitat.** Mesic habitats including deciduous forest, pinyon-cedar woodland, cottonwood-willow forest, urban habitats.

**Biology.** This species nests under stones or logs; usually only a few workers are found in a nest.

Gregg, 1963

## SUBFAMILY CERAPACHYINAE

Ants of this subfamily nest in the soil and are primarily subterranean in habit, thus rarely collected. They are predaceous, especially on other ant species and termites. Workers can be distinguished from all other genera in the state as the pygidium is surrounded on both lateral sides by a row of teeth or denticles (Fig. 20); the petiole is well developed, the postpetiole is fused with the gaster, but is somewhat differentiated from the gaster and the eyes are tiny, consisting of only a few facets, or completely absent. Additional characteristics would include: clypeus short, antennae situated very close to mandibles; insertions of antennae exposed, antenna with 11 or 12 segments. Males can be distinguished from those of all other genera as they are small (4 - 5 mm total length) and the subgenital plate is

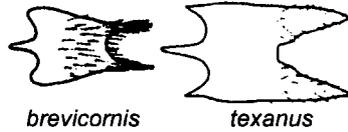


Fig. 78. Subgenital plates of a males of *A. brevicornis* and *A. texanus* (from Mackay, 1996).

well developed, but delicate with two long teeth (Fig. 78).

Males could only be confused with those of *Neivamyrmex*, which are larger (8 mm total length or larger) and have more robust subgenital plates with either two or three teeth.

Females are for the most part unknown or very rarely collected as they only occur with the colony. They may be either subdichthadiform (large wingless form) or the normal winged form.

### Genus *Acanthostichus*

(Key: Mackay, 1996)

Collections of this genus are extremely rare, due to the subterranean habits of colonies. Males of this genus are commonly collected at lights in the tropics; males of North American species are either very rare or are not attracted to lights. The males and females are known for only one of the species that occurs in the United States: *A. texanus*. The workers of this genus are easily separated from most other genera in the United States as they have a number of denticles or teeth on the dorso-

lateral edges of the pygidium of the worker (Fig. 20).

This genus can be separated from the closely related *Cerapachys* (which also has denticles on the pygidium of the worker) as it has a 12 segmented antenna (11 segmented in *Cerapachys*).

There are three species of this genus found in the United States, which are easily separated with the following key:

**Key to the workers of  
*Acanthostichus* in the United  
States**

1. Eyes relatively large (Fig. 79); southeastern Texas and north-eastern Mexico ..... *texanus* Forel

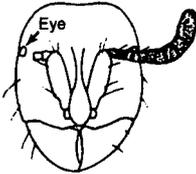


Fig. 79. Head of a worker of *A. texanus* (from Mackay, 1996).

- Eyes tiny (Fig. 80); Arizona and New Mexico ..... **2**  
**2(1)**. Scapes with numerous tiny punctures (Fig. 80); New Mexico ..... *punctiscapus* Mackay

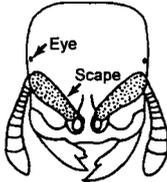


Fig. 80. Head of a worker of *A. punctiscapus* (from Mackay, 1996).

- Scapes smooth and shining (Fig. 81); Arizona ..... *arizonensis* Mackay

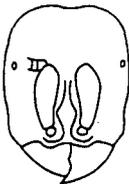


Fig. 81. Head of a worker of *A. arizonensis* (from Mackay, 1996).

***Acanthostichus  
arizonensis* Mackay**

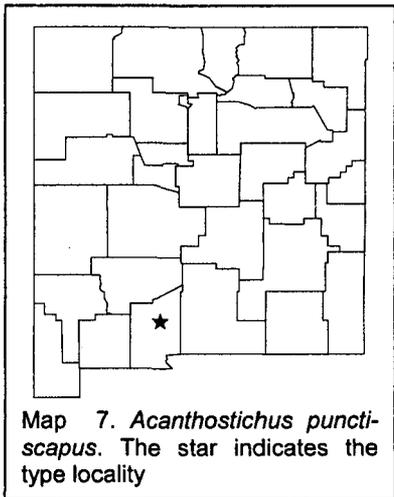
Fig. 81

**Discussion.** This species is easily separated from other species of *Acanthostichus* found in the United States by the smooth surface of the scape and by the tiny eye.

**Distribution.** USA: southeastern Arizona, may be found in southwestern New Mexico and northern Sonora and Chihuahua in the future.

**Habitat.** Grasslands at the Santa Rita Experimental Range.

**Biology.** Workers of this species are often found associated with termites, which may be their principal or exclusive prey.



Map 7. *Acanthostichus punctiscapus*. The star indicates the type locality

***Acanthostichus  
punctiscapus* Mackay**

Figs. 20, 80; Map 7

**Discussion.** This small yellow ant is easily separated from all

other species in the genus by the roughened surface of the scape.

**Distribution.** USA: NM: **Doña Ana Co.**, 45 k NE Las Cruces (Jornada Long Term Ecological Research Site).

**Habitat.** Weedy bajada surrounded by creosotebush scrub.

**Biology.** This species is known only from a type series, which was collected in a nest of *Pogonomyrmex desertorum* at a depth of 70 cm. Only part of the nest was collected, as the queen was not found.

## Genus *Cerapachys*

(Key: Brown, 1975; males in Smith, 1942a)

Ants of this genus are rarely collected, due to their cryptic, subterranean habitats. Nests are found under stones, in the soil or under, and in logs and branches. Males are attracted to lights and can be collected in the New Mexican deserts in the summer. Workers have the pygidium surrounded by teeth as in *Acanthostichus*.

They can be easily separated from *Acanthostichus* as they have 11 segmented antennae with the ultimate segment enlarged into a club (Fig. 14). Males are very similar to those of *Acanthostichus*, but have 13 segmented antennae. *Acanthostichus texanus* males have an 11-segmented antenna, the others in the genus have 12 segmented antennae. *Acanthostichus texanus* males can be separated from males of *Cerapachys* as the teeth on the subgenital plate are thickened (Fig. 78). The female of *C. augustae* is the only one known of species that occur in the southwest.

This genus is in need of a revision.

The workers of *C. davisii* are unknown and thus a key is not provided. Males are occasionally col-

lected at lights and in some areas are very abundant. The following key will separate these males:

### Key to the males of *Cerapachys* in the United States

1. Larger (total length at least 4 mm); all funicular segments except first longer than wide (Fig. 82); distance between lateral ocellus and medial ocellus less than diameter of medial ocellus (Fig. 82); collected at black lights in southern New Mexico ..... *davisii* Smith

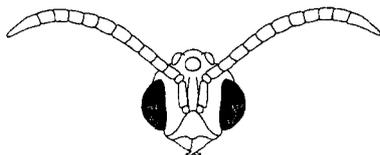


Fig. 82. Head of a male of *C. davisii*.

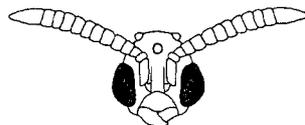


Fig. 83. Head of a male of *C. augustae*.

- Small (total length less than 4 mm); funicular segments wider than long (Fig. 83); distance between lateral ocellus and medial ocellus about equal to diameter of medial ocellus (Fig. 83); not recorded from New Mexico (AZ, TX) .....  
 ..... *augustae* Wheeler

***Cerapachys augustae*  
 Wheeler**

Figs. 14, 19, 83

**Discussion.** As this is the only species in the United States in which the workers are known, the characteristics given above will distinguish the genus from all others in New Mexico.

The workers of *C. davisii* would be expected to be similar and thus identifications should be made with caution. All records of *C. davisii* have come from arid desert habitats, collections of *C. augustae* that we are aware of come from mesic woodlands, thus the species may be separated on the basis of habitat.

**Distribution.** USA: AZ, TX; NM: we have no records, but it may occur in the state; MEXICO: Nuevo León.

**Habitat.** This species is most commonly found in forests, usually in mesic areas.

**Biology.** Nests are unorganized and individuals are found in the litter and under stones, or in branches imbedded in soil in moist habitats. These ants are rarely collected and are usually accidentally found when one is excavating the nest of another species.

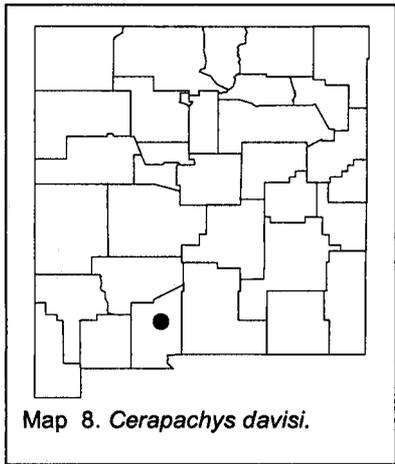
Wheeler, 1903a

***Cerapachys davisii*  
 M. Smith**

Fig. 82; Map 8

**Discussion.** This species is known only from males, which look like tiny, black wasps in the field.

They can be distinguished from those of *C. augustae* with characteristics in the key. Workers are unknown, but would be expected to occur only in arid habitats, and thus should not be confused with those of *C. augustae*, which are more common in mesic habitats.



Map 8. *Cerapachys davisii*.

**Distribution.** USA: west TX; NM: Doña Ana Co., 45 k NE Las Cruces (Jornada Long Term Ecological Research Site); MEXICO: Chihuahua.

**Habitat.** Creosote bush scrub and other desert vegetation.

**Biology.** Males can be occasionally collected in the southwest at blacklights. They are very abundant at some localities, especially in the state of Chihuahua, México.

## SUBFAMILY PSEUDOMYRMECINAE

*Pseudomyrmex* in North America nest only in plant cavities, which range from hollow stems, twigs and branches to tree trunks. Apparently the cavities already occur in the plants or are constructed by other insects. The species in the United States are moderately aggressive, unlike their extremely pugnacious tropical relatives. They are not commonly collected in the southwest and are apparently rare.

Ants of this genus are easily recognized. They are slim, elongate ants with very large eyes (Fig. 12). The pedicel consists of two segments, the petiole and postpetiole. The frontal carinae are closely placed and expose the insertions of the antennae. These characteristics separate this genus from all others. *Pseudomyrmex* is the only genus in this subfamily that occurs in New Mexico.

### Genus *Pseudomyrmex*

(Key: Ward, 1985)

This is an easily recognized genus due to the presence of a petiole and postpetiole and the extremely large eyes (Fig. 84). The frontal carinae and bases of the scapes are located in close proximity (Fig. 85). This genus is rarely collected in New Mexico. Nests are found in hollow stems of various desert shrubs and in branches of relatively large trees (especially oak trees) in arid and semi-arid habitats. Ten species of this genus are found in the United States,

only 2 of these would be expected to be found in New Mexico.

#### Key to workers of *Pseudomyrmex*

1. Scape relatively long, approximately equal to maximum eye diameter (Fig. 84) ..... *apache* **Creighton**
- Scapes only about  $\frac{3}{4}$  as long as maximum eye diameter (Fig. 85) ..... *pallidus* **(Smith)**

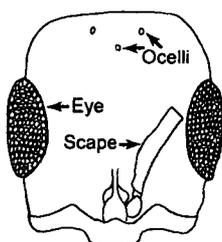


Fig. 84. Head of a worker of *P. apache*.



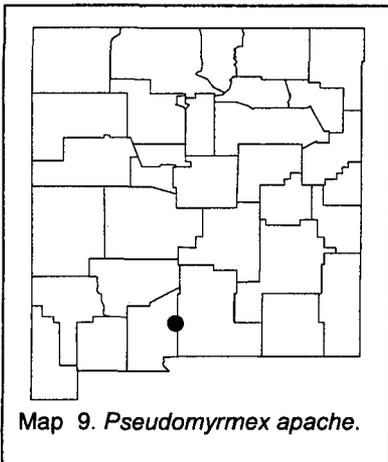
Fig. 85. Head of a worker of *P. pallidus*.

### *Pseudomyrmex apache* Creighton

Figs. 12, 16, 84; Map 9

**Discussion.** The worker of this species is the larger of the two species found in southwestern United States, usually being greater than 5 mm in total length (*P. pallidus* is usually less than 4 mm in length). In addition to the characters in the key, this species often has several erect hairs on the pronotum, and dorsum of the petiole and postpetiole, whereas *P. pallidus* usually has a single pair of hairs on the pronotum and postpetiole, and lacks hairs on the petiole.

**Distribution.** USA: southern CA, AZ, TX; NM: Doña Ana Co., 40 k E Las Cruces.



Map 9. *Pseudomyrmex apache*.

**Habitat.** Desert habitats, especially oak and mesquite areas.

**Biology.** This ant nests in oak trees and large mesquites, usually in the largest and most inaccessible dead branches that have living tissue at the base. Most of the galler-

ies are constructed by wood boring beetles. These ants are unusual for the genus as they are not very aggressive and the sting is not very painful.

Creighton, 1952a, 1954, 1963; Wheeler and Wheeler, 1973

### *Pseudomyrmex pallidus* (F. Smith)

Fig. 85

**Discussion.** The worker of this species is the smaller of the 2 species found in the southwestern United States, usually being less than 4 mm in total length (*P. apache* workers are greater than 5 mm total length). In addition to the characters in the key, this species usually has a single pair of hairs on the pronotum and on the postpetiole, and no erect hairs on the petiole (*P. apache* usually has several erect hairs on the pronotum, petiole and postpetiole).

**Distribution.** USA: CA east to NC, south to Central America; NM: We have no records, but it could occur in the arid part of the state.

**Habitat.** Desert habitats.

**Biology.** These ants nest in hollow stems, twigs and branches of a variety of plants. It apparently does not nest in the large trunks and branches of living trees, as does *P. apache*. This species is more aggressive than *P. apache* and the sting is more painful, even though it is the smaller species.

Mitchell and Pierce, 1912; Wheeler, 1932; Wheeler and Wheeler, 1973

## SUBFAMILY ECITONINAE

This is the subfamily of army ants, which forage in columns and prey on a number of arthropods and other animals. Our species belong to the genus *Neivamyrmex* and prey primarily on other species of ants, and termites.

Important morphological characteristics of the workers of this subfamily include: the eyes are tiny, consisting of only a few facets; the frontal carinae are closely placed, the insertions of antennae are exposed, the clypeus is short, the antennae are inserted close to the mandibles, the antenna has 12 segments, the promesonotal suture is poorly marked, the propodeum is without spines or angles (for USA species), both the petiole and postpetiole are well formed (USA only), the stinger is well developed, and the pygidium is without tubercles.

The males can be recognized as they are typically large and wasp like, winged individuals. The subgenital plate is well developed and has two or three teeth. They are commonly attracted to lights.

### **Genus *Neivamyrmex***

(Keys: Watkins, 1985, Ward, 1999)

This is a genus of native army ants, which raid the nests of other ant species. These ants have diffuse nests, usually in arid ecosystems in the United States. They are usually encountered under stones or other similar materials. Foragers can be found on the surface during cool

The workers of this subfamily could only be confused with those of the subfamily Cerapachyinae, based on the tiny eyes. They do not have the toothed or tuberculate pygidium of the subfamily Cerapachyinae. Workers of the subfamily Cerapachyinae have only the petiole well developed, the postpetiole is fused with the gaster (Fig. 19). The males could only be confused with those of the subfamily Cerapachyinae, due to the well-developed and toothed subgenital plate. They differ in that the subgenital plate is robust with large teeth (2 or 3), whereas the subgenital plate of males of the subfamily Cerapachyinae are delicate and the teeth are long and slender (Fig. 78).

A number of species of the genus *Neivamyrmex* occur in New Mexico. Keys are presented for the workers and also the males as they are commonly collected at lights, and are the most common caste collected in New Mexico. Cole (1953a) includes this subfamily in his paper.

evenings and at night. Males are commonly attracted to lights and can be captured in blacklight traps.

Members of this genus can be easily separated from all other genera, based on the characteristics mentioned above in the description of the subfamily Ecitoninae, and is the only

genus of the subfamily found in New Mexico. In addition, the following characteristics may be helpful in distinguishing workers of this genus: the workers are polymorphic; the scape usually does not extend past the posterior edge of head; the mesonotum is generally lower than pronotum; the petiole is usually longer than postpetiole. Males can be easily distinguished using the characteristics listed in the discussion of the subfamily. The eyes of the males are covered with bristly, erect hairs (Fig. 100). *Neivamyrmex californicus* (Mayr) is specifically excluded from New Mexico (Ward, 1999).

**Key to the workers of  
*Neivamyrmex***

(See Watkins, 1985)<sup>1</sup>

1. Anteroventral tooth of petiole with prominent, acute spine directed downward and posteriorly (Fig. 86); usually entire ant black or dark brown ..... *pilosus* F. Smith

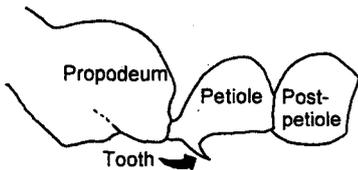


Fig. 86. Propodeum, petiole and postpetiole of a worker of *N. pilosus mexicanus*.

<sup>1</sup> Note the following species, known only from the males, are not included in the worker key: *N. andrei*, *N. minor*, *N. macrop-terus* *N. pilosus mandibularis*, and *N. swainsonii*.

- Petiole without well developed spine (Fig. 93); never completely black ..... 2  
2(1). Mesosoma reddish brown, head and gaster black; concave portion of posterior of head margin slightly narrower than greatest width of pronotum (as seen obliquely from the anterior part of ant, see Fig. 87) ..... *melanocephalus* (Emery)

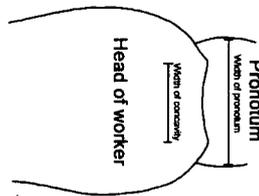


Fig. 87. Head and pronotum of a worker of *N. melanocephalus*.

- Mesosoma about same color as head and gaster; concave portion of posterior head margin as wide or wider than greatest width of pronotum (Fig. 88) ..... 3

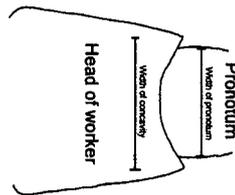


Fig. 88. Posterior margin of head and pronotum of a worker of *N. rugulosus*.

3(2). Head densely granulated (i.e., texture similar to sandpaper) ..... 4

- Head not densely granulated (often nearly smooth and glossy), but may have numerous punctures .... 6

4(3). Basal margin of mandible with a straight edge, which forms

angular corner at junction with masticatory surface (Fig. 89, left); petiolar node only slightly longer than wide, as seen from above (Fig. 92, left) ..... *rugulosus* Borgmeier

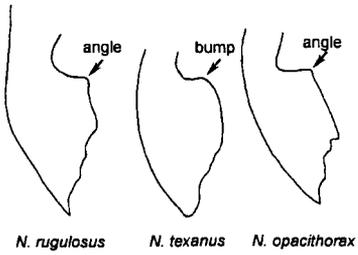


Fig. 89. Right mandibles of workers of *N. rugulosus*, *N. texanus*, and *N. opacithorax*. The arrows indicate the angles or bumps on the basal margin.

- Basal margin of mandible with convex edge, which curves into masticatory border without forming angular corner (Fig. 89, middle), although bump may be present; length of node about 1.5 times width (Fig. 92, right) ..... 5

5(4). Posterior face of propodeum forming somewhat angular corner with dorsal surface (Fig. 90, top) ..... *texanus* Watkins

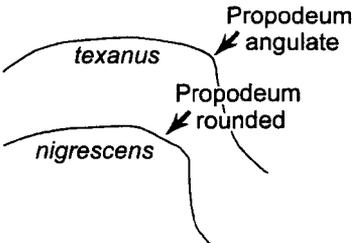


Fig. 90. Propodia of workers of *N. texanus* and *N. nigrescens*.

- Posterior face of propodeum forms rounded corner with dorsal surface (Fig. 90, bottom) ..... *nigrescens* (Cresson) 6(3). Node of petiole (as seen from above) elongate, at least 1.3 X as long as wide (Fig. 91, left) ..... 7

- Node of petiole nearly square (Fig. 91, right) ..... 8

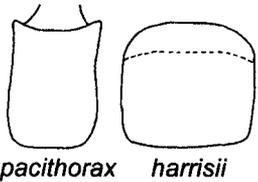


Fig. 91. Petioles of workers of *N. opacithorax* and *N. harrisii* as seen from above.

7(6). Suture between promesonotum and mesopleuron of larger workers complete and distinct; dorsum of petiole more elevated posteriorly than anteriorly ..... *agilis* Borgmeier

- Suture between promesonotum and mesopleuron of larger workers complete and distinct; dorsum of petiole more elevated posteriorly than anteriorly ..... *agilis* Borgmeier

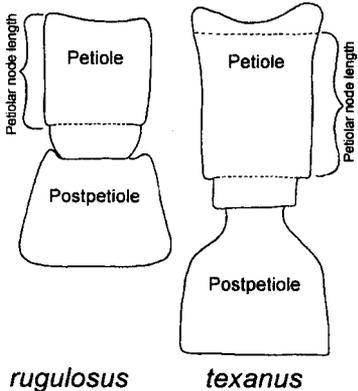


Fig. 92. Petiole and postpetiole of workers of *N. rugulosus* and *N. texanus*, showing the relative lengths of the petiolar nodes.

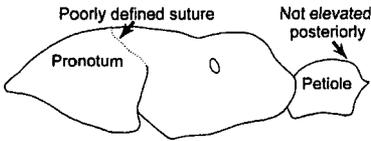


Fig. 93. Mesosoma and the petiole of a worker of *N. opacithorax*.

tum and mesopleuron of larger workers incomplete (Fig. 93); dorsum of petiole not more elevated posteriorly than anteriorly (Fig. 93) ..... *opacithorax* (Emery)

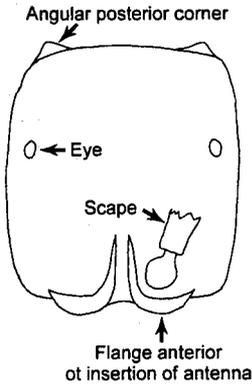


Fig. 94. Head of a worker of *N. harrisii*.

8(6). Eye ocellus-like, with distinct, convex cornea (Fig. 94) ..... 9  
- Eye poorly formed and without distinct cornea, or absent ..... 10

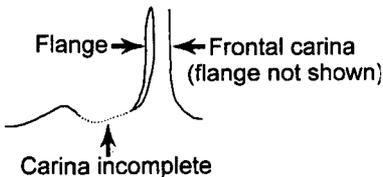


Fig. 95. Frontal carinae (including flange on left side of figure) of a worker of *N. carolinensis*.

9(8). Total length of largest workers greater than 4 mm; head with angular posterior corners (Fig. 94); frontal carina curves in front of antennal fossa to form broad lamella, which gradually narrows laterally (Fig. 94) ..... *harrisii* (Haldeman)

- Total length of largest workers less than 4 mm; head with rounded posterior corners; frontal carina abruptly narrows in front of antennal fossa to form narrow lamella, which may be incomplete (Fig. 95) ..... *carolinensis* (Emery)  
10(8). Frontal carina continues completely around front of antennal fossa as broad, upturned lamella, causing rim of fossa to be almost as high in front as along sides (Fig. 96); dorsal face of propodeum longer than posterior face .....  
..... *leonardi* (Wheeler)

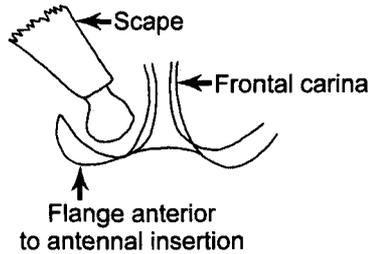


Fig. 96. Frontal carina and flanges anterior to the insertions of the antennae of a worker of *N. leonardi*.

- Frontal carina abruptly narrowed and does not form upturned lamella around front of antennal fossa; posterior face of propodeum longer than dorsal face .....  
..... *fallax* Borgmeier

**Key to the males of  
*Neivamyrmex***

(See Watkins, 1985)<sup>2</sup>

1. Mandible spatulate, with distal half as broad or broader than basal portion (Fig. 97) ..... 2

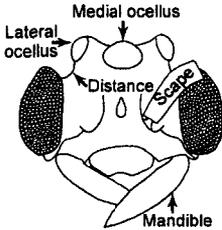


Fig. 97. Head of a male of *N. harrisii*, with spatulate mandibles.

- Mandible usually sickle-shaped (Fig. 98), at least slender and gradually tapered distally (Note: *N. pilosus mexicanus* has convex area along inner median portion of mandible, see Fig. 105) ..... 5

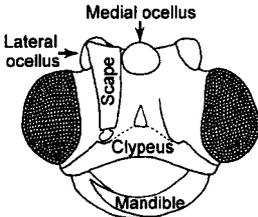
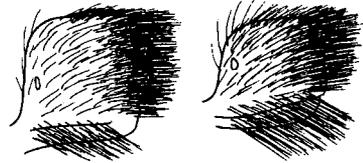


Fig. 98. Head of a male of *N. swainsoni*, with sickle-shaped mandibles.

2(1). Distance from lateral ocellus to margin of compound eye about equal to or less than diameter of median ocellus (Fig. 97) .....  
..... ***harrisii* (Haldeman)**

<sup>2</sup> Note that the following species, known only from the workers, are not included in the key: *N. agilis*, *N. fallax*, *N. melanocephalus*, and *N. rugulosus*.

- Distance from lateral ocellus to margin of compound eye at least 2 times diameter of median ocellus (Fig. 102) ..... 3



*nigrescens*                      *texanus*  
Fig. 99. Petioles of males of *N. nigrescens* and *N. texanus*.

3(2). Gaster black to blackish-brown; white hairs on ventral surface of petiole shorter than greatest width of posterior femur, slanted posteroventrally (Fig. 99, left); prominent transverse swelling present posterior to antennal fossa (Fig. 100) ...  
..... ***nigrescens* (Cresson)**

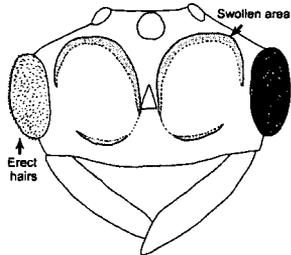


Fig. 100. Head of a male of *N. nigrescens*. The stippled region indicates a swollen area.

- Gaster reddish-brown; golden hairs on ventral surface of petiole longer than greatest width of posterior femur, erect (Fig. 99, right); transverse swelling above antennal fossa weak or absent (Fig. 101) .. 4

4(3). Mandible usually about equally wide along its entire length to a tapered apex (Fig. 101); dorsum of head mostly finely punctate and

dull; total length 11 - 15 mm .....  
 ..... *texanus* Watkins

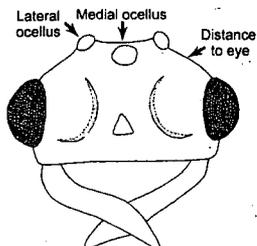


Fig. 101. Head of a male of *N. texanus*. The stippled region indicates a swollen area.

- Distal  $\frac{2}{3}$  of mandible usually slightly convex along inner margin (Fig. 102); much of dorsum of head smooth and glossy; total length 10 - 13 mm ..... *opacithorax* (Emery)

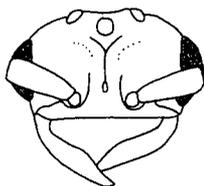


Fig. 102. Head of a male of *N. opacithorax* (modified from Borgmeier, 1955).

5(1). Distance from lateral ocellus to margin of compound eye less than diameter of median ocellus (Fig.

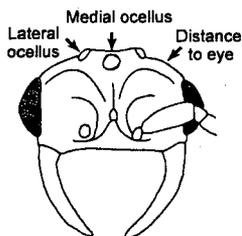


Fig. 103. Head of a male of *N. carolinensis* (from Borgmeier, 1955).

104) ..... 6  
 - Distance from lateral ocellus to margin of compound eye about 1.5 to 3 times diameter of median ocellus (Fig. 103) .....  
 ..... *carolinensis* (Emery)  
 6(5). Part of head between lateral ocellus and compound eye (as seen from front) forming rounded, convex corner (Fig. 104); rarely collected in New Mexico .....  
 ..... *macropterus* Borgmeier

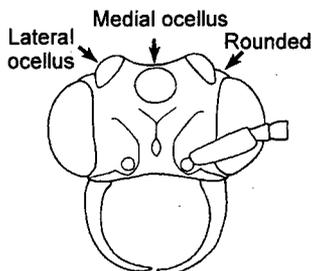


Fig. 104. Head of a male of *N. macropterus*, showing the rounded corner (from Borgmeier, 1955).

- Area between lateral ocellus and compound eye not forming rounded corner (Fig. 105); commonly collected in New Mexico ... 7

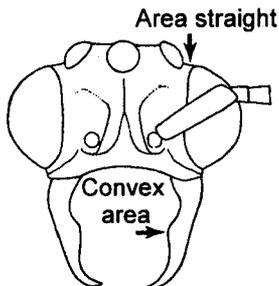


Fig. 105. Head of a male of *N. pilosus mexicanus* (from Borgmeier, 1955).

7(6). Mandible with a slightly (*N. pilosus mandibularis*) to moderately

(*N. pilosus mexicanus*) convex area along inner medial surface (Fig. 105); posterior lateral margin of head distinctly upturned into a sharp flange (Fig. 107) ..... *pilosus* (F. Smith)

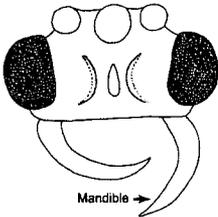


Fig. 106. Head of a male of *N. swainsonii*. The stippled region indicates a swollen area.

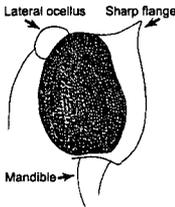


Fig. 107. Side of the head of a male of *N. pilosus mexicanus*, showing the upturned flange on the posterior lateral margin of the head.

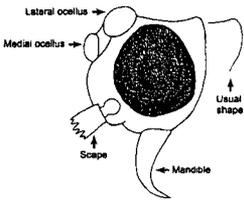


Fig. 108. Side of the head of a male of *N. minor*. The inset shows the normal shape of the posterior part of the head.

- Mandible distinctly sickle-shaped, distally curved upward and gradually tapered to sharp apex (Fig. 106); posterior lateral margin of head not upturned, or if upturned, formed into dull swelling (Fig. 108) ..... 8

8(7). Front coxa about as wide as long (Fig. 109, left) ..... *andrei* (Emery)  
 - Front coxa longer than wide (Fig. 109, right); very common in New Mexico ..... 9

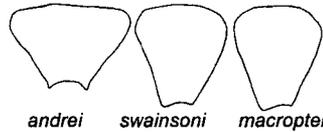


Fig. 109. Front coxae of males of *N. andrei* (left), *N. swainsonii* (middle), and *N. macropterus* (right).

9(8). Total length 7 - 9 mm; length of mandible about equal to height of compound eye (Fig. 110, left) ..... *minor* (Cresson)  
 - Total length 7 - 16 mm; length of mandible distinctly longer than height of compound eye (Fig. 110, right) ..... 10

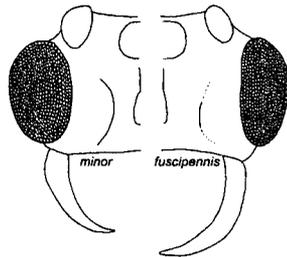


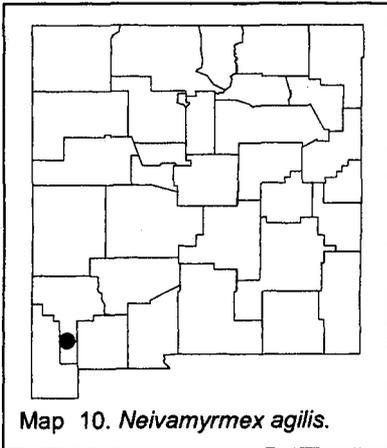
Fig. 110. The heads of males of *N. minor* and *N. fuscipennis* showing the relative lengths of the mandibles.

10(9). Total length 11 - 16 mm; most of dorsum of gaster dull and punctate; common ..... *swainsonii* (Shuckard)  
 - Total length 7 - 11 mm; entire dorsum of gaster smooth and glossy; rarely collected ..... *fuscipennis* (Smith)

***Neivamyrmex agilis***  
**Borgmeier**

Map 10

**Discussion.** Only the worker is known. The worker may be recognized by the elongate petiole (as seen from above), the complete suture between the promesonotum and the mesopleuron, and the dorsum of the node of the petiole is more elevated posteriorly.



**Distribution.** USA: AZ (southern); NM: Grant Co., 3.8 mi. E Separ (1/4 mi. S I-10); MEXICO: Chihuahua, Jalisco.

**Habitat.** Chihuahuan Desert, often in riparian areas.

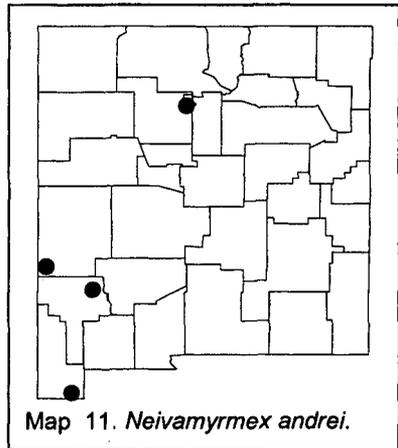
**Biology.** Workers forage in columns, several meters long, searching in the leaf litter and holes in the habitat.

Borgmeier, 1953

***Neivamyrmex andrei***  
**(Emery)**

Fig. 109; Map 11

**Discussion.** Only the male is known, which can be easily recognized as the front coxa is about as wide as long (Fig. 109), whereas the coxae of the other species are longer than wide. This character will separate *N. andrei* from all of the other species.



**Distribution.** USA: AZ; NM: Catron Co., 5 mi. N Glenwood (San Francisco River), Grant Co., 100 k NE Silver City, Hidalgo Co., Alamo Hueco Mts. (Wood Canyon), Sandoval Co., Bandelier National Monument; MEXICO: Chihuahua.

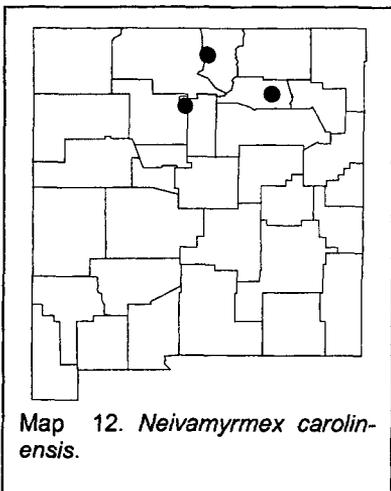
**Habitat.** These ants are usually collected in forests, often in mesic sites.

**Biology.** Males were collected from late June to August. Baldrige et al., 1980

***Neivamyrmex  
carolinensis* (Emery)**

Figs. 95, 103; Map 12

**Discussion.** All castes are known. The dorsum of the head of the worker is smooth and glossy, with scattered piligerous (hair bearing) punctures. The mesosoma, petiole, and postpetiole are mostly smooth, and some areas are distinctly glossy. The node of the petiole is nearly square in shape, as seen from above. The eye is ocellus-like, with a definite cornea.



Map 12. *Neivamyrmex carolinensis*.

This species could be confused with *N. harrisii*, but differs in that the posterior corners of the head are rounded, not angulate (as in Fig. 94), and the frontal carinae diverge posteriorly, but do not curve in front of the antennal fossa (Fig. 95). Additionally much of mesosoma is smooth, whereas it is mostly sculptured in *N. harrisii*. This last character would also separate it from *N. opacithorax* (at least the top of the

pronotum is sculptured in the latter species).

The male can be easily recognized by the presence of the sickle-shaped mandibles and the long distance between the lateral ocellus and the compound eye (at least 1.5 times the diameter of the median ocellus, see Fig. 103). It can be separated from all other New Mexico species on the basis of these 2 characters.

**Distribution.** USA: southeastern United States west to AZ, KS, NM: Mora Co., 12 k N Wagon Mound, Sandoval Co., Bandelier National Monument (Pippin and Pippin, 1984), Taos Co., 14 k S Tres Piedras; MEXICO: Chihuahua.

**Habitat.** Pine forests.

**Biology.** This species nests in the soil or under stones on rocky hillsides. Nests are large, up to 50,000 workers. Foragers are rarely seen above the ground, as they are active nocturnally. Flights occur in May and June. Trail pheromones are used in foraging. This is the only species known to be polygynous (multiple queens in a nest). Workers in laboratory nests with gynes present live longer than workers without the gyne.

Dennis, 1938; Watkins, 1964; Watkins and Rettenmeyer, 1967; Rettenmeyer and Watkins, 1978; Baldrige et al., 1980

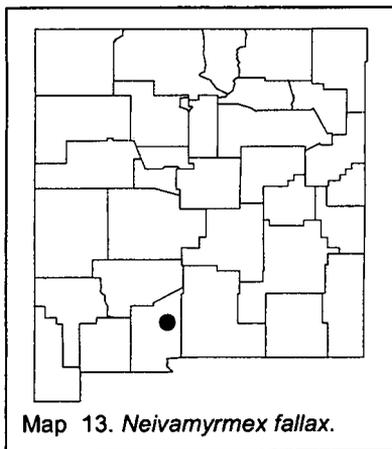
***Neivamyrmex fallax*  
Borgmeier**

Map 13

**Discussion.** Only the worker has been described, which can be

recognized as the head and dorsum of the mesosoma are predominantly smooth and glossy, the sides are coriaceous, but moderately shining. The tooth on the basal border of the mandible is well developed. The node of the petiole is square-shaped as seen from above. The eyes nearly absent, and difficult to find. The posterior face of the propodeum is about as long as the dorsal face.

This species could be confused with *N. leonardi*, but can be separated by the shape of the propodeum. This species may be the worker of *N. swainsonii*.



Map 13. *Neivamyrmex fallax*.

**Distribution.** USA: AZ, TX, KS, LA; NM: workers assignable to this taxon were collected at **Doña Ana Co.**, 45 k NE Las Cruces (Long Term Ecological Research site); MEXICO: Jalisco, Veracruz, Michoacán, Tabasco; GUATEMALA.

**Habitat.** Various habitats.

**Biology.** This species nests in the soil.

### *Neivamyrmex fuscipennis* (Smith)

Fig. 110, 111; Map 14

**Discussion.** The males of this species are small, pale brown specimens with long, sickle-shaped mandibles.

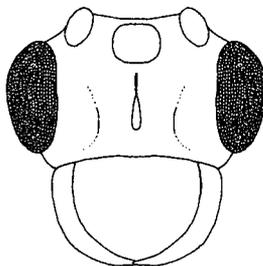
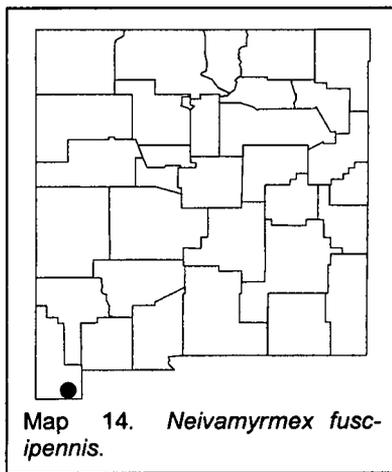


Fig. 111. Head of a male of *N. fuscipennis*.



Map 14. *Neivamyrmex fuscipennis*.

Males would most likely be confused with *N. minor*, due to their small size. The elongate mandibles would easily separate them. The pale colored mesosoma would separate them from other species, which have small males, such as *N. carolinensis*

and *N. opacithorax* (which have the mesosoma dark brown or black).

**Distribution.** USA: KS, TX (eastern), AZ (Chiricahua Mts.); NM: **Hidalgo Co.**, Alamo Hueco Mts. (Wood Canyon, data from R. and G. Snelling, pers. comm.). This is the first record from New Mexico.

**Habitat.** Desert riparian canyons with oaks, pines and junipers.

**Biology.** The habits of this ant are unknown, except that males are attracted to lights. Flights occur from June to August.

### *Neivamyrmex harrisii* (Haldeman)

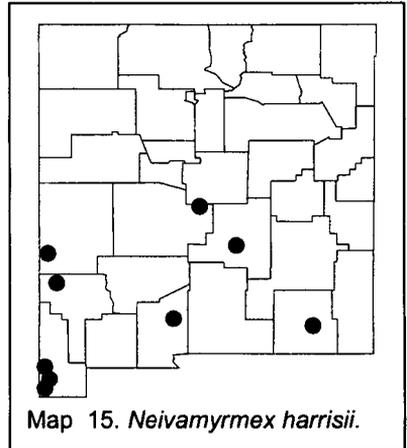
Figs. 17, 91, 94, 97; Map 15

**Discussion.** All castes are known. The basal border of the mandible of the worker is nearly straight, with a poorly developed bump. The dorsum of the head is smooth and glossy, with scattered piligerous punctures (hair bearing). The mesosoma, petiole, and postpetiole are granulate. The node of the petiole is nearly square in shape, as seen from above (Fig. 91). The eye is ocellus-like, with a definite cornea.

This species could be confused with *N. carolinensis*, but differs in that the posterior corners of the head are angulate (Fig. 94), and the frontal carinae curve in front of the antennal fossa (Fig. 94).

The males are easily recognized by the spatulate mandibles and the short distance between the lateral ocellus and the compound eye, which is less than the diameter of the median ocellus (Fig. 97).

Other New Mexican species that have spatulate mandibles (*N. nigrescens*, *N. texanus*, and *N. opacithorax*) have a wider distance between the lateral ocellus and the compound eye, at least twice the diameter of the median ocellus.



Map 15. *Neivamyrmex harrisii*.

**Distribution.** USA: AZ, TX, OK; NM: **Catrón Co.**, 5 mi. NE Glenwood (Whitewater Creek), **Doña Ana Co.**, 45 k NE Las Cruces (Jornada Long Term Ecological Research Site), **Eddy Co.**, Waste Isolation Pilot Plant, Site 14 (32°23'N 103°51.4'), **Grant Co.**, 100 k NW Silver City, **Hidalgo Co.**, Gray Ranch (Up Shaw Camp), Peloncillo Mts., San Simon Marsh (Ciénega, 12 mi. N, 1.6 mi. W Portal Rd. and Highway 80), **Lincoln Co.**, 5 mi. W Capitán, **Socorro Co.**, Gran Quivira; MEXICO: northern part of country.

**Habitat.** Creosotebush scrub up to foothills thorn scrub.

**Biology.** This species raids nests of *Pheidole xerophila*. Males were collected at lights from June to the first part of October. They were especially abundant in late July.

Flights begin about 19:00 and extend to after 05:00 the next morning, and peaks between 23:00 and 04:00.

Watkins and Cole, 1966; Watkins et al., 1967; Baldrige et al., 1980

### *Neivamyrmex leonardi* (Wheeler)

Fig. 96

**Discussion.** Only the workers are known, which can be recognized as shiny, polymorphic yellow ants with brown mandibles. The head and most of the mesosoma are smooth and glossy. The tooth on the basal margin of the mandibles is well developed. The node of the petiole is square, as seen from above. The eyes are insignificant spots. The dorsal face of the propodeum is longer than the posterior face.

This species could be confused with *N. fallax*, but can be separated by the shape of the propodeum.

**Distribution.** USA: OK, TX, CA; this species may occur in New Mexico; MEXICO: Baja California (Norte and Sur), Durango, Tamaulipas.

**Habitat.** Creosotebush scrub, *Sporobolus* grassland.

**Biology.** This species is primarily subterranean, and raids nests of *Pheidole obtusospinosa* (= *subdentata*).

Watkins and Cole, 1966; Watkins, Cole and Baldrige, 1967; Rojas-Fernández and Fragoso, 1994, 2000

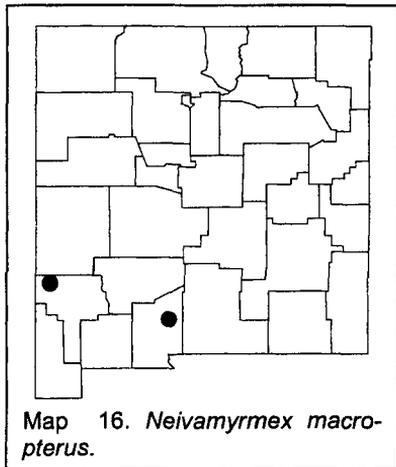
### *Neivamyrmex macropterus* Borgmeier

Figs. 104, 109; Map 16

**Discussion.** Only the male is known. It can be easily recognized by the sickle-shaped mandibles and the short distance between the lateral ocellus and the compound eye. This region is often somewhat angulate, although this is a poor characteristic.

Unfortunately it is usually necessary to remove the genitalia to separate this species from several others, including *N. pilosus*, *N. andrei*, *N. minor*, and *N. swainsonii*. It is usually larger than the small *N. minor*, without the dense pubescence of *N. swainsonii* and *N. pilosus*. The front coxa is small (Fig. 109), but it does not have the peculiar shape found in males of *N. andrei* (see Fig. 109).

**Distribution.** USA: AZ, TX; NM: Doña Ana Co., 45 k NE Las



Cruces (Jornada Long Term Ecological Research Site), Grant Co., 100 k NW Silver City; MEXICO:

Chihuahua, Durango, Oaxaca, Puebla.

**Habitat.** Creosotebush scrub.

**Biology.** Flights occur from May to the first part of August.

Baldrige et al., 1980

***Neivamyrmex melanocephalus* (Emery)**

Fig. 87

**Discussion.** Only the worker is known. This is an easily recognized species as the head and gaster are dark brown or black and the remainder of the ant is light or reddish brown. The concave portion of the posterior margin of the head is slightly narrower than the greatest width of the mesosoma, as obliquely backward as seen from above (Fig. 87). The scape usually extends to the posterior margin of the head. The dorsum of the head is smooth and glossy, the mesosoma is coarsely sculptured and granulate. The tooth on the anterior ventral surface of the petiole is small and directed downwards.

**Distribution.** USA: southern AZ, may occur in western New Mexico; MEXICO: Hidalgo, Jalisco, Durango, Michoacán, Nayarit south to COSTA RICA.

**Habitat.** Grasslands, and rarely in desert scrub.

**Biology.** This species nests in the soil, and raids nests of *Pheidole hyatti*. It is the host of the staphylinid beetle *Crematoxenus aenigma*.

Borgmeier, 1955; Rojas-Fernández and Frago, 1994, 2000

***Neivamyrmex minor* (Cresson)**

Figs. 108, 110, 112; Map 17

**Discussion.** Only the male is known, which is one of the smallest species (7 - 9 mm total length, most of the males of the other species are larger than 9 mm total length). The mandible is about as long as the maximum diameter of the eye (Fig. 112).

These characters will separate this species from all of the others, except *N. fuscipennis*, from which it differs in being smaller and having smaller mandibles (see key to males).

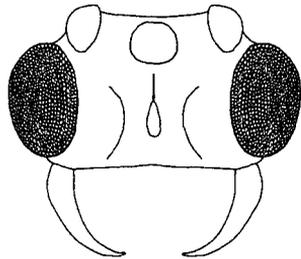
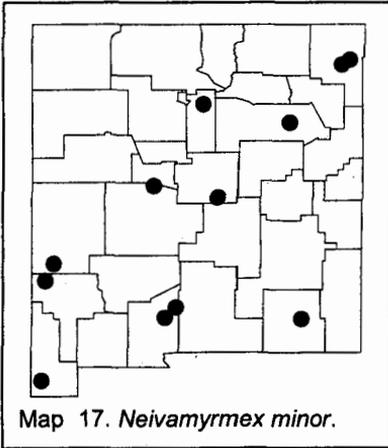


Fig. 112. Head of a male of *N. minor*.

**Distribution.** USA: CA, NV, KS, OK, AZ, TX; NM: **Catrón Co.**, Mogollon Mts., **Doña Ana Co.**, Aguirre Springs, 45 k NE Las Cruces (Jornada Long Term Ecological Research Site), **Eddy Co.**, Waste Isolation Pilot Plant (32°23'N 103°51.4'), **Grant Co.**, 100 k NW Silver City, **Hidalgo Co.**, Gray Ranch (Upshaw Camp), **San Miguel Co.**, Mosquero, **Santa Fe Co.**, Santa Fe, **Socorro Co.**, Sevilleta National Wildlife Refuge, **Torrance Co.**, 5 mi. NE Corona, **Union Co.**, Clayton, near Clay-

ton (15 mi. W & 15 mi. S Dellinger Ranch); MEXICO: Baja Calif. Sur, Isla del Carmen, Coahuila.



Map 17. *Neivamyrmex minor*.

**Habitat.** Creosotebush scrub.

**Biology.** Males are commonly collected in blacklight traps, from late May to early September.

Baldrige et al., 1980

### *Neivamyrmex nigrescens* (Cresson)

Figs. 90, 99, 100; Map 18

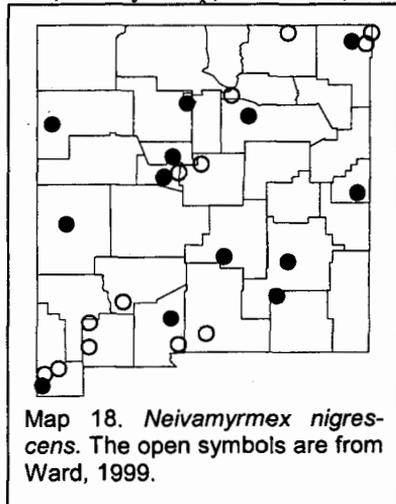
**Discussion.** All castes are known. The worker can be recognized as the dorsum of the head, the mesosoma, petiole and postpetiole are punctate, with shiny bottoms.

There is no angle along the basal margin of the mandible, which would separate workers from those of *N. rugulosus*. It can be separated from the similar *N. texanus* as the posterior face of the propodeum is only weakly concave or straight and the two faces of the propodeum form a rounded face (Fig. 90).

The males have a dark brown or black gaster (whole ant usually

dark) with unusual, prominent lobes present posterior to the antennal fossa (Fig. 100). Additionally the mandible is spatulate and the distance between the lateral ocellus and the compound eyes greater than the diameter of the median ocellus. These characters easily separate this species from all others.

**Distribution.** USA: TX, AZ, CO, TX, most of southern part of country; NM: **Bernalillo Co.**, NW Albuquerque, **Catrón Co.**, Pueblo Park, **Chaves Co.**, 20 mi. W Hope (on Route 83), Roswell, **Curry Co.**, Clovis, **Doña Ana Co.**, 45 k NE Las Cruces (Jornada Long Term Ecological Research Site), **Eddy Co.**, Los Medanos, **Hidalgo Co.**, Gray Ranch (UpShaw Camp), **Lincoln Co.**, Alto, **Los Alamos Co.**, Los Alamos near Rio Grande, **McKinley Co.**, 8 mi. S Gallup, **San Miguel Co.**, Kearny's Gap, **Union Co.**, R 30



Map 18. *Neivamyrmex nigrescens*. The open symbols are from Ward, 1999.

E T 24N, **Valencia Co.**, Belén; MEXICO: Sonora, Nayarit, Oaxaca.

**Habitat.** Pinyon-juniper woodlands, sagebrush, creosotebush scrub, grasslands.

**Biology.** Workers were found under stones or dung, males were attracted to light from August to November. This is a very common species that feeds primarily on the brood of other ant species. This species has a nomadic-statory life cycle like most other species in the subfamily. Most of the nomadic phase activity occurs at night, but activity may begin in the afternoon, especially on cloudy days. After about three weeks of nomadic activity, the larvae pupate and activity changes to the statory phase, which lasts about 18 days until the eclosion of the callows from the pupal stage. During this time the bivouac is subterranean, especially in the nest of a raided ant species. Collectors usually find such bivouacs under stones. Small raids may still occur during this stage. Workers follow trail pheromones in the laboratory, and will follow trails of other army ant species.

Wheeler, 1900b; Smith, 1927b; Schneirla, 1958; Gregg, 1963; Watkins, 1964; Watkins et al., 1967; Baldrige et al., 1980

### *Neivamyrmex opacithorax* (Emery)

Figs. 89, 91, 93, 102; Map 19

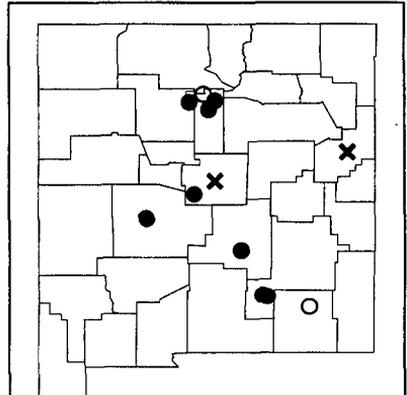
**Discussion.** All castes are known. The worker can be recognized by the angular corner or small tooth found along the basal border of the mandible (Fig. 89), and by the shiny dorsum of the head. The side of the pronotum is often smooth and

glossy. The node of the petiole is elongate, as in Fig. 91. It is pale to medium brown in color.

Workers can be separated from those of *N. rugulosus* by the relatively smooth dorsum of the head (granulate in *N. rugulosus*) and the lighter brown color (*N. rugulosus* is darker brown).

The male is recognized on the basis of the spatulate mandible and the distance between the lateral ocellus and the compound eyes is greater than the diameter of the median ocellus (Fig. 102). Additionally, the gaster is brown, and the golden hairs on the ventral surface of the petiole are longer than the width of the posterior femur.

Males could be confused with *N. texanus*, but can be separated as much of the dorsum of the head is smooth and glossy (finely punctate and dull in *N. texanus*).



Map 19. *Neivamyrmex opacithorax*. The open symbol is from Ward, 1999, the "X's" indicate unknown localities.

**Distribution.** USA: Most of United States, including AZ, TX; NM: Chaves Co., 12 mi. W Hope

(on Route 83), 15 mi W Hope (Cole, 1953a), **Lincoln Co.**, 5 mi. W Capitán, **Los Alamos Co.**, Los Alamos, **Quay Co.**, without locality, **Santa Fe Co.**, Hyde State Park (Little Tesuque Canyon) (Cole, 1953a), Santa Fe, **Socorro Co.**, 7 mi W Socorro (Cole, 1953a), **Torrance Co.**, 10 mi S Mountainair (Cole, 1953a), without locality.

**Habitat.** Grasslands, dry, stony semidesert, juniper forests, up to pine and spruce forests.

**Biology.** This is a relatively common species in which workers can be found under stones and logs, or nesting in wood, males are attracted to lights from September to December. Brood was found in a nest in August. Workers follow trail pheromones in the laboratory, and will follow trails of other species, with no significant preference for their own trails.

Smith, 1924; Watkins, 1964; Watkins et al., 1967

### ***Neivamyrmex pilosus mandibularis* (M. Smith)**

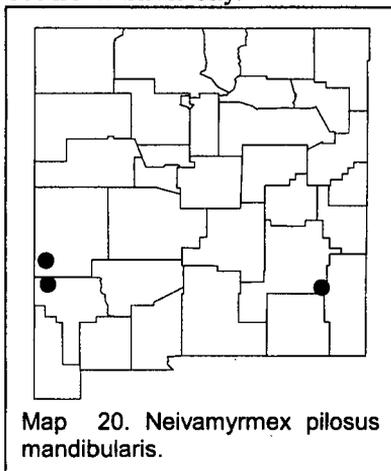
Map 20

**Discussion.** Only the male is known. It can be recognized by the sickle-shaped mandibles, the short distance between the lateral ocellus and the compound eye.

It can be separated from *N. pilosus mexicanus* (which also occurs in New Mexico) as the area along the inner medial surface of the mandible is only slightly convex.

**Distribution.** USA: AZ; NM: **Catron Co.**, 5 mi. NE Glenwood (Whitewater Creek), **Chaves**

**Co.**, 9.5 mi. W Caprock, **Grant Co.**, 100 k NW Silver City.



Map 20. *Neivamyrmex pilosus mandibularis*.

**Habitat.** Oak forests, alligator juniper, pines.

**Biology.** The flights occur in July and August.

Baldrige et al., 1980

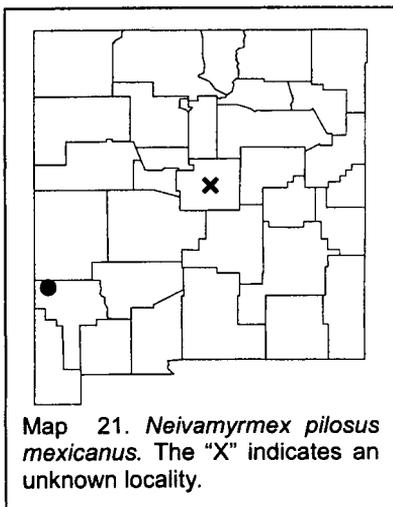
### ***Neivamyrmex pilosus mexicanus* (F. Smith)**

Figs. 86, 105, 107; Map 21

**Discussion.** All castes are known. The worker can be recognized as being a concolorous dark brownish-black specimen with a prominent, acute spine on the ventral surface of the petiole, which is directed posteroventrad (Fig. 86). No other species in New Mexico has these 2 characters.

The male is nearly identical to that of *N. pilosus mandibularis*, except that the area along the inner medial surface of the mandible is moderately convex (Fig. 105), instead of only slightly convex, as is found in *N. pilosus mandibularis*.

**Distribution.** USA: CA east to MS; NM: **Grant Co.**, 100 k NW Silver City, **Torrance Co.**, without locality; south to COLOMBIA (South America).



Map 21. *Neivamyrmex pilosus mexicanus*. The "X" indicates an unknown locality.

**Habitat.** Oak forests.

**Biology.** Flights occur from May to late August, with the peak occurring from June to July. Nests were found to not be common in Mississippi, but the columns were large (about 1 - 1.2 cm wide, about 50 meters long). They prey on *Crematogaster ashmeadi*. Workers do not follow trails of other species of army ants.

Smith, 1924; Watkins et al., 1967; Baldrige et al., 1980

### *Neivamyrmex rugulosus* Borgmeier

Figs. 88, 89, 92

**Discussion.** Only the worker is known, which can be recognized by the presence of an angle along the basal margin of the mandible (Fig.

89). In addition, the dorsum of the head, mesosoma, petiole and post-petiole are completely granulate and dull. The node of the petiole is only slightly longer than wide (dorsal view, see Fig. 92).

This species would be easily separated from similar species, including *N. nigrescens*, and *N. texanus* by the angle on the basal border of the mandible. If the mandibles are closed, the head may be removed and the mandibles opened by holding the head with one insect pin, and prying the mandibles open with a second pin. Otherwise, this species can be separated from the common *N. nigrescens* as the posterior face of the propodeum is concave (straight or only weakly concave in *N. nigrescens*). The punctures on the dorsum of the head are poorly defined, whereas in both *N. nigrescens* and *N. texanus* they are well defined with shiny bottoms. It can be separated from *N. opacithorax*, which has a similar tooth on the mandible, by the darker color (*N. opacithorax* is pale to medium brown) and by the granulate surface of the head (shiny in *N. opacithorax*).

**Distribution.** USA: southern AZ (Chiricahua Mts.); NM: Not reported from New Mexico, but may occur there; MEXICO: Jalisco, Sonora, Nayarit.

**Habitat.** Pine-oak-juniper transition near 1600 meters.

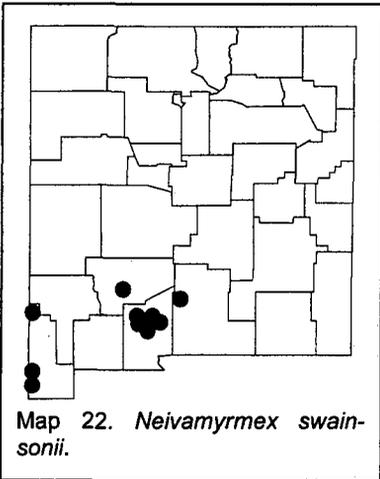
**Biology.** Unknown.

### *Neivamyrmex swainsonii* (Shuckard)

Figs. 98, 106, 109; Map 22

**Discussion.** Only the male is known. It is a large species (total length greater than 1.1 cms) covered with appressed, golden hairs. The sickle-shaped mandibles are longer than the greatest diameter of the eyes. The front coxa is longer than broad (Fig. 109).

**Distribution.** USA: CA east to LA, including AZ, TX; NM: **Doña Ana Co.**, Fort Selden State Park, Las Cruces, 45 k NE Las Cruces (Long Term Ecological Research



site), Mesilla, Organ Mts., **Hidalgo Co.**, Gray Ranch, Rodeo, Virden, **Otero Co.**, White Sands National Monument, **Sierra Co.**, Caballo State Park; MEXICO: much of country, south to ARGENTINA.

**Habitat.** Desert grasslands and creosotebush scrub.

**Biology.** Males are commonly collected in blacklight traps, from mid June until the first part of September. The number of males flying extends from 21:00 to 05:00 the next morning, peaking at 01:00 - 04:00.

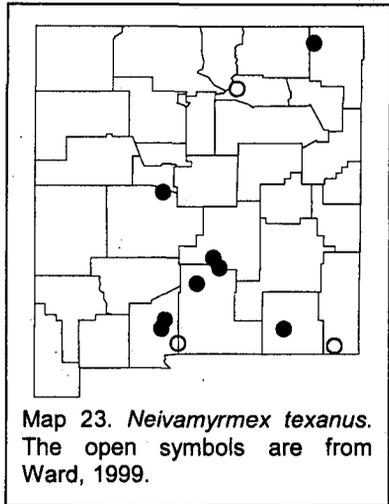
Baldrige et al., 1980; Rojas and Fragoso, 2000

### ***Neivamyrmex texanus* Watkins**

Figs. 89, 90, 92, 99, 101; Map 23

**Discussion.** All castes are known. The worker can be recognized by the punctate surfaces of the head, mesosoma, petiole and post-petiole. The posterior face of the propodeum forms a concave and slightly angular corner with the dorsal face (Fig. 90).

This character would separate



the workers from those of the common *N. nigrescens*. The lack of an angle along the basal border of the mandible (Fig. 89), and a relatively long (Fig. 92) petiolar node (1.5 X width in dorsal view) would separate it from the similar *N. rugulosus*.

The males can be separated as the mandible is spatulate and the distance between the lateral ocellus and the compound eyes is greater

diameter of the median ocellus (Fig. 101). The gaster is reddish-brown, and the ventral surface of the petiole has long, white hairs (Fig. 99). It is similar to *N. opacithorax*, but differs as most of the head is finely punctate and dull (smooth and glossy in *N. opacithorax*).

**Distribution.** USA: AZ east to FL, north to CO, VA; NM: **Doña Ana Co.**, 45 k NE Las Cruces (Long Term Ecological Research site), Isaac's Lake, **Eddy Co.**, Los Meda-

nos, **Lincoln Co.**, Alto, 2 mi. SE Alto, **Otero Co.**, 8 mi. NE Tularosa, **Socorro Co.**, Sevilleta National Wildlife Refuge, **Union Co.**, Capulin National Monument; MEXICO: Chihuahua, Hidalgo, Jalisco, San Luis Potosí.

**Habitat.** Oak forests, urban habitats.

**Biology.** Flights occur from September to November.

Baldrige et al., 1980

## SUBFAMILY MYRMICINAE

The clypeus usually extends posteriorly between the frontal carinae, the frontal area or triangle is well defined. The frontal carinae are well developed, and have lobes that cover the insertions of the antennae. The eyes are usually well developed, containing numerous ommatidia, the ocelli are nearly always absent in the workers (well developed in the females and males). The antennae have 6 - 12 segments (usually 11 or 12) in the workers and females, 13 in the males. An antennal club is often present, with 1 - 5 segments. The metanotal suture is often depressed below the level of the remainder of the mesosoma. The propodeum usually has a pair of angles or spines. The pedicel of these ants consists of 2 segments: the petiole and the postpetiole (Fig. 113). The stinger is usually well developed, but has become secondarily modified in a few genera

(i. e. *Crematogaster*) and no longer functions as a stinger, but usually continues to provide some defensive function. The cuticle of most species is hardened and sculptured.

This subfamily can be separated from most of the others by the presence of a well-defined postpeti-

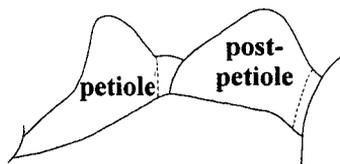


Fig. 113. Petiole and postpetiole of a worker of *A. punctaticeps*.

ole. It could be confused with Pseudomyrmecinae, but can be separated in having smaller eyes (compare Figs 15 and 16). It could be separated from Ecitoninae by having much larger eyes (compare Figs. 15 and 17).

## Genus *Acromyrmex*

(Key: Fowler, 1988)

This is a genus of fungus cultivating ants, in which the workers are polymorphic. The frontal carinae extend about  $\frac{1}{2}$  the length to the posterior lateral corner, and the posterior lateral lobes are covered with coarse rugae (Fig. 35). The mesosoma has numerous spines and the gaster is covered with tubercles. Ants of this genus have 11 segmented antennae, in which the insertion is hidden by the lobes of the frontal carinae. Most tubercles and spines have a curved, coarse hair.

It could only be confused with *Trachymyrmex*, from which it differs in being polymorphic. *Atta* also occurs in the United States (southern AZ, southern TX), and is similar to *Acromyrmex*, but differs in that the dorsum of the gaster is smooth (no tubercles).

This genus is primarily Neotropical, only one species may occur in New Mexico.

### *Acromyrmex versicolor* (Pergande)

Fig. 35

**Discussion.** As this is the only species that would be found in New Mexico, it can be recognized by the characters listed for the genus.

**Distribution.** USA: CA, AZ; NM: This species has not been reported from New Mexico, but would be expected to be found in the southern part of the state; MEXICO: Chihuahua, Durango.

**Habitat.** Creosotebush scrub.

**Biology.** This species nests in the soil, and forages in columns, collecting leaves and pieces of leaves ranging from mesquite (*Prosopis* spp.), *Jatropha dioica*, creosotebush (*Larrea tridentata*), buffalo gourd (*Curcubita foetidissima*) to composite seeds. Nests are large, with probably several thousand workers. Mating flights occur in the morning, and the females cooperate in the formation of the first nests.

Wheeler, 1907, 1917; Weber, 1972; Rissing et al., 1986; Rojas-Fernández and Frago, 1994, 2000

## Genus *Aphaenogaster*

(Key: Creighton, 1950)

This is a genus of elongate, slender ants, which are very fast and agile in the field. Most species nest in the soil under stones or logs, some of the desert species nest in the soil

with the nest entrance surrounded by pebbles. These ants are carnivorous, and collect dead insects, as well as tend Homoptera or collect nectar. The colonies are moderately large to

very large. This is a common genus in New Mexico and occurs in all habitats, but is especially common in desert regions.

These ants can usually be easily distinguished by their elongate, slender habitus (general appearance). Their head is usually longer than broad, eye large, convex and placed at the middle of the head. The mesonotum of the worker is elongate and depressed, the propodeum usually has a pair of spines or small teeth. The workers could be confused with the minor workers of *Pheidole*, but differ in usually being much larger (over 3 mm total length, usually less than 3 mm in *Pheidole*), and that the antennal club is poorly defined and consists of four segments (well defined in *Pheidole* and usually consisting of three segments).

**Key to the workers of  
*Aphaenogaster***

1. Large ants (10 - 12 mm total length), if smaller, metanotal suture faint or absent (Fig. 114); propodeal spines very long (Fig. 114); usually in arid or semiarid habitats ..... 2

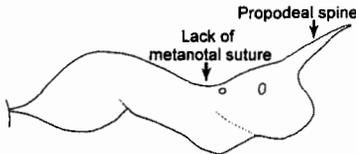


Fig. 114. Outline of the mesosoma of a worker of *A. albisetosa*, showing the lack of a metanotal suture and the long propodeal spines.

- Smaller ants (less than 4 mm

total length); thoracic dorsum with metanotal suture well marked (Fig. 115); propodeal spines usually poorly or only moderately defined (Fig. 115); most common in mesic habitats ..... 3

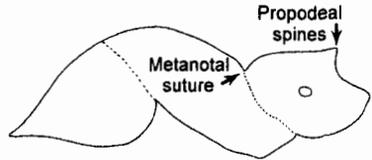


Fig. 115. Outline of the mesosomal outline of a worker of *A. uinta*, showing the metanotal suture and the short propodeal angles or spines.

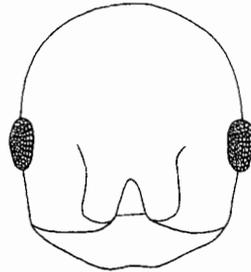


Fig. 116. Head of a worker of *A. albisetosa*.

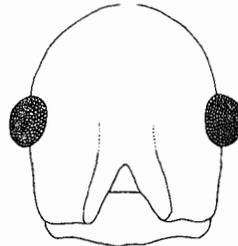


Fig. 117. Head of a worker of *A. cockerelli*.

2(1). Head (excluding mandibles) slightly longer than broad (Fig 116), with wavy, longitudinal rugae extending almost to posterior lateral

border, the posterior lateral area granulose ..... *albisetosa* Mayr  
 - Head (excluding mandibles) at least  $1\frac{1}{3}$  times as long as broad (Fig. 117) with wavy longitudinal rugae well developed only in anterior half of head; posterior half with feeble rugae which are replaced towards posterior border with fine, coriaceous sculpture. *cockerelli* André 3(1). Antennal scape of largest worker (not always true of minim) surpassing posterior lateral lobe margin by less than length of first 2 funicular segments (or rarely equal to, Fig. 118, left); sculpture of head fine ..... 4

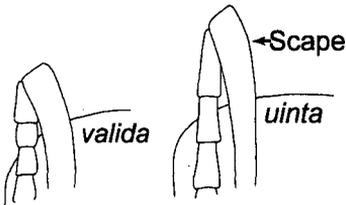


Fig. 118. Outline of the posterior lateral corners of workers of *A. subterranea valida* (left), and *A. uinta* (right) showing the antennal scape extending less than two funicular segments past the posterior lateral corner.



Fig. 119. Outline of the posterior lateral corner of a worker of *A. texana*, showing the antennal scape extending 3 funicular segments past the posterior lateral corner.

- Antennal scapes of all workers surpassing posterior lateral mar-

gin by greater than length of first 2 funicular segments (Fig. 118, right, 119) in workers of all sizes; dorsum of head with coarse rugae, or completely punctate ..... 5  
 4(3). Bicolored, head and mesosoma orange yellow or red, gaster dusky red to deep brown; head with very feeble intrarugal sculpture ..... *uinta* Wheeler  
 - Concolorous castaneous brown; head with abundant, fine punctures between longitudinal rugae ..... *subterranea valida* Wheeler

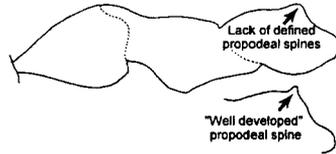


Fig. 120. Outline of the dorsum of the mesosoma of a worker of *A. boulderensis smithi*, showing the lack of propodeal spines on the propodeum. The inset shows an exceedingly well developed propodeal spine.

5(3). Propodeum without spines, rounded or angular, or with poorly developed spines (Fig. 120); bicolored (head and mesosoma red, gaster black) .. *boulderensis smithi* Gregg

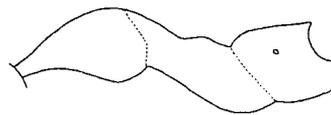


Fig. 121. Outline of the dorsum of the mesosoma of a worker of *A. punctaticeps*, showing the presence of propodeal spines on the propodeum.

- Propodeum with distinct teeth or spines (Fig. 121); color variable, sometimes bicolored ..... 6

6(5). Base of antennal scape with small, angular lobe which projects forward (Fig 122, right); propodeum armed with short, triangular teeth .. 7

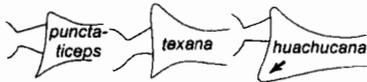


Fig. 122. The base of the scape of workers of *A. punctaticeps*, *A. texana*, and *A. huachucana* (the arrow indicates the lobe).

- Base of antennal scape without such lobe (Fig. 122, left and middle); propodeal armature variable ..... 8

7(6). Concolorous light reddish brown ..... *huachucana huachucana* Creigh.

- Darker, head mesosoma and legs reddish brown, gaster black ....  
..... *huachucana crinimera* Cole

8(6). Anterior edge of mesonotum rising abruptly above adjacent portion of pronotum (Fig. 123), transverse welt thus formed distinctly concave in middle; propodeal spines at least as long as posterior face of propodeum and directed upwards; not recorded from NM. *fulva* Roger

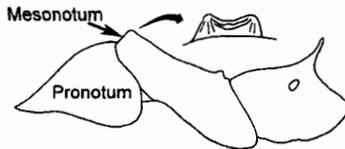


Fig. 123. Outline of the mesosoma of a worker of *A. fulva*, showing the metanotal welt from the side and from the front (inset).

- Mesonotum not abruptly elevated above pronotum, or if higher, anterior edge not forming transverse welt (Fig. 121); propodeal spines

rarely as long as posterior face of propodeum, usually directed backward ..... 9

9(8). Head of largest workers (Fig. 124) not more than one sixth longer than broad (excluding mandibles); head of smaller workers approximately one-fifth longer than broad ..... *picea rudis* Enzmann



Fig. 124. Outline of the head of a worker of *A. picea rudis*.

- Head of worker, regardless of size, approximately one-third longer than broad (Figs. 125, 126) ..... 10

10(9). Dorsum of head with prominent, coarse rugae (Fig. 125) ..  
..... *texana* Wheeler

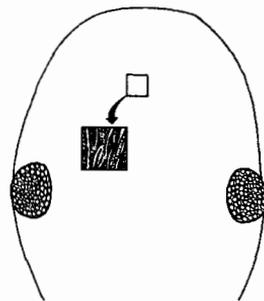


Fig. 125. Outline of the head of a worker of *A. texana*, showing part of the coarse sculpturing.

- Dorsum of head without prominent coarse rugae (Fig. 126), a

few poorly defined rugae present posterior to frontal area, remainder of head punctate (Fig. 126) .....  
 ..... *puncticeps* Mackay

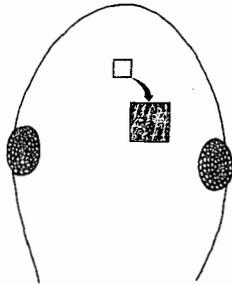
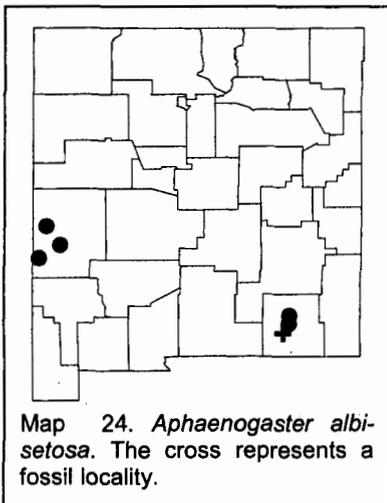


Fig. 126. Outline of the head of a worker of *A. puncticeps*, showing part of the punctate sculpturing.

***Aphaenogaster albisetosa***  
 Mayr

Figs. 114, 116; Map 24

**Discussion.** This is the second most common species of the ge-



Map 24. *Aphaenogaster albisetosa*. The cross represents a fossil locality.

nus in New Mexico. It can be distinguished from all others except *A. cockerelli* by the elongate body, long legs and well-developed spines on the propodeum (Fig. 114). Most workers can be distinguished from the closely related *A. cockerelli* as it has a less elongate head (Fig. 116). Specimens of these 2 species are often difficult to separate.

**Distribution.** USA: TX, AZ; NM: **Catrón Co.**, Catwalk, Frisco Hot Springs, 20 k N Glenwood, **Eddy Co.**, 12 mi. N Carlsbad, 10 mi. S Carlsbad, Last Chance Canyon (fossil); MEXICO: Chihuahua.

**Habitat.** Areas ranging from Chihuahuan Desert to oak forests. When it is found in arid ecosystems, it is usually found in the bottoms of arroyos or in areas near water. The soil is often rocky with boulders.

**Biology.** Nests are usually found under stones with the entrance surrounded by gravel. These ants are very aggressive, although they cannot sting, their bite is irritating.

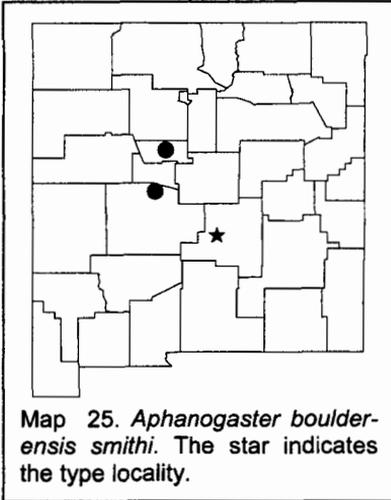
Wheeler, 1910a; Cole, 1934a; Creighton, 1955 (as *Novomessor*)

***Aphaenogaster boulderensis smithi*** Gregg

Fig. 120; Map 25

**Discussion.** This is not a common subspecies in New Mexico. It can be separated from all other *Aphaenogaster* sp. in New Mexico by the lack of propodeal spines (Fig. 120), although tiny bumps may be present. It is very similar to *A. boulderensis boulderensis* and could perhaps be synonymized, but differs in that it is a red ant with a black gaster,

which is a color pattern that we have never seen in *A. boulderensis boulderensis* (which occurs in AZ, NV and possibly TX, and could also be found in New Mexico).



**Distribution.** USA: NM: **Bernalillo Co.**, Petroglyph Park, **Lincoln Co.**, near Carrizozo (Malpais Lava Beds of Tularosa Basin, type locality), **Socorro Co.**, Sevilleta Wildlife Refuge.

**Habitat.** Creosotebush scrub.

**Biology.** Unknown.

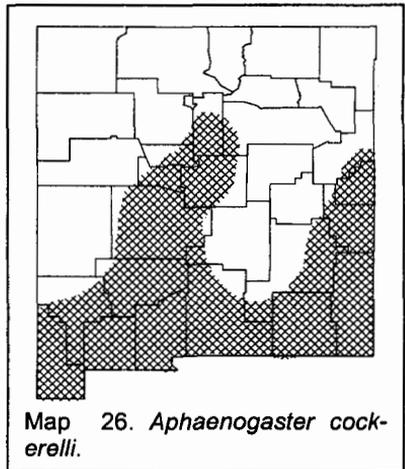
### *Aphaenogaster cockerelli* André

Figs. 54, 117; Map 26

**Discussion.** This ant is easily distinguished, as it is a large, elongate species with long legs and two well-developed spines on the propodeum (Fig. 54). Its elongate head (Fig. 117) usually distinguishes it from the closely related *A. albise-*

*tosa*, although the two species can be difficult to separate.

**Distribution.** USA: southern CA, NV, AZ, TX, NM: **Doña Ana Co.**, Aguirre Springs, 45 k NE Las Cruces (Long Term Ecological Research site), 18 k E Las Cruces, 1.5 m W Mesilla, **Eddy Co.**, Carlsbad, Carlsbad Caverns, Brantly Lake State Park, **Grant Co.**, 100 k N Silver City, 60 k E Silver City, **Lea Co.**, 20 mi. WSW Hobbs, **Luna Co.**, near Deming, 40 k W Deming, **Otero Co.**, Lake Lucero, **Quay Co.**, Logan/Ute Lake, **Sierra Co.**, 4 k W Hillsborough, Truth or Consequences, **Socorro Co.**, Sevilleta National Wildlife Refuge; MEXICO: Sonora, Chihuahua, Coahuila, Durango, Nuevo León.



**Habitat.** Creosotebush scrub, in the most arid of habitats, fluff grass, open areas with annuals, usually at elevations below 1500 m.

**Biology.** This is the most common member of this genus in New Mexico. Nests are usually found in the soil with the entrance

surrounded by a circle of pebbles

Even nests under stones usually have the entrance surrounded by pebbles. Most nests are found in rocky soil, although they may nest in sandy soils, even dunes. Individual foragers are usually found during early morning and late afternoon or evening, and occasionally during the night. Foraging occurs throughout the day during the cool part of the year or even on cloudy days during the summer. These ants are omnivorous. Prey usually consists of dead or dying insects, parts of plants and seeds. This species is very aggressive, but cannot sting; the bite is very fastidious when large numbers are attacking.

Wheeler, 1910a; Wheeler and Creighton, 1934; Cole, 1934a, 1953; Mallis, 1941; Creighton, 1955 (as *Novomessor*); Whitford and Etter-shank, 1975; Rodríguez, 1986; Rojas-Fernández and Frago, 1994, 2000

***Aphaenogaster fulva*  
Roger**

Fig. 123

**Discussion.** This species is easily separated from all other species in the genus by the form of the mesonotum, which is abruptly elevated above the level of the pronotum (Fig. 123). This structure is actually a welt which is concave in the middle (as seen from behind - Fig. 123), or may appear as two broad tubercles.

**Distribution.** USA: Eastern United States west to CO. Not re-

ported from NM, but may occur in the northern part of the state.

**Habitat.** Mesic forests and meadows.

**Biology.** This species nests in logs and stumps or under stones. It is a temporary host of other members of the genus.

***Aphaenogaster*  
*huachucana huachucana*  
Creighton**

Fig. 122

**Discussion.** This species is difficult to recognize. The antennal scapes are long, extending more than 2 funicular segments past the posterior lateral corners. The head is elongate (head width / head length about 0.67). The propodeal spines are short and broad at the base. The key character, the small, angular lobe at the base of the antennal scape (Fig. 122), projects forward, but is difficult to see. Fortunately this species is not common anywhere and has not been reported from New Mexico.

**Distribution.** USA: SE AZ, central and extreme SW CO; west Texas, east of El Paso (fossils, see Mackay and Elias, 1992); NM: Not yet reported from New Mexico, but would be expected to occur in the state.

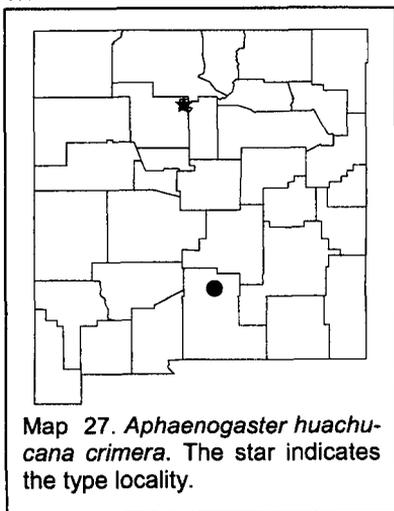
**Habitat.** Oak, alligator bark juniper, and pinyon-cedar woodlands.

**Biology.** This ant nests under stones, and is uncommon.

***Aphaenogaster  
huachucana crinimera***  
**Cole**

Map 27

**Discussion.** This species differs from the typical *A. huachucana huachucana*, in having a black gaster. It is similar to the situation with *A. boulderensis smithi*, which also has a black gaster, and will continue to be considered as a subspecies.



**Distribution.** USA: NM: Otero Co., 5 mi S Mescalero (Cole 1953b), Sandoval Co., Bandelier National Monument (type locality).

**Habitat.** Grassy areas with dense pines and scrub oak, south facing slope to a densely shaded stream in an area of large pines (Cole, 1953c).

**Biology.** This species nests under stones. The workers are very active and agile. Sexualls were present in nests in late July.

Cole, 1953c

***Aphaenogaster picea rudis***  
**Enzmann**

Fig. 124

**Discussion.** Workers of this species have shortened heads (head width / head length about 0.81), the scapes extend more than two funicular segments past the posterior lateral corners, and have moderately sized propodeal spines.

It can be separated from *A. fulva* by the lower level of the mesonotum, the top of which is at about the level of the pronotum. The propodeal spines are more developed than those in *A. huachucana*. *Aphaenogaster rudis rudis* Emery occurs in eastern United States.

**Distribution.** USA: Eastern United States west to CO, may occur in northern New Mexico.

**Habitat.** Mesic forest sites.

**Biology.** This species nests in a variety of sites, from soil, under stones, to hollow plant stems.

***Aphaenogaster  
punctaticeps*** Mackay

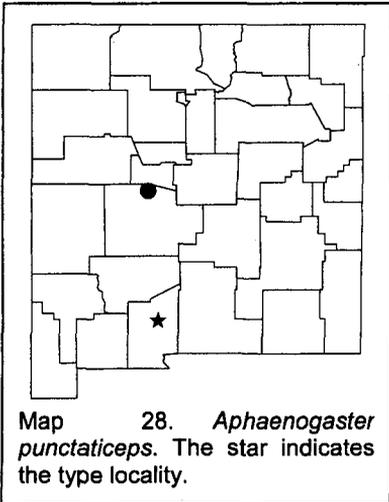
Figs. 113, 121, 122, 126; Map 28

**Discussion.** The head of this species is elongate (head width / head length 0.71), and nearly completely covered with punctures. Most of the mesosoma has similar sculpture. The propodeal spines are small.

This species is similar to *A. texana*, but differs in that the posterior border of the head is moderately pointed (rounded in *A. texana*) and the dorsum of the head is primarily

punctate (rugose with punctures in the intrarugal spaces in *A. texana*).

**Distribution.** USA: TX (Sabine Co., Smith Co.), SE AZ (Cochise Co.); NM: **Doña Ana Co.**, 45 k NE Las Cruces (Jornada Long Term Ecological Research Site, type locality), **Socorro Co.**, Sevilleta National Wildlife Refuge.



Map 28. *Aphaenogaster punctaticeps*. The star indicates the type locality.

**Habitat.** Creosotebush scrub.

**Biology.** This ant nests in kangaroo rat mounds (Cover, pers. comm.) or in prairie dog towns (Fagerlund, pers. comm.). It apparently steals seeds from the rodents

***Aphaenogaster  
subterranea valida*  
Wheeler**

Fig. 118

**Discussion.** The workers of this species are small, medium brown ants in which the scape extends past the posterior lateral border by about two funicular segments. The mesopropodeum is a single,

convex unit, with the promesonotal suture poorly marked. The dorsum of the propodeum is level and straight, the propodeal spines are poorly developed. The apices of the petiole and postpetiole are rounded and similar in shape.

This species can be easily confused with members of the genus *Stenammas*. It differs in that the eyes are of a normal size (small to tiny in *Stenammas*) and the scapes extend past the posterior lateral corners, although usually less than the first two funicular segments (barely reach the posterior lateral corners in *Stenammas*). It could be confused with minor workers of *Pheidole*, but can be separated by the similar shapes of the petiole and postpetiole. Also, the scape is shorter than that of the minors of most species of *Pheidole*. This subspecies intergrades with *A. subterranea occidentalis* and is undoubtedly a synonym. Creighton (1950) separates this subspecies from *A. subterranea occidentalis* on the basis of the larger workers (6 mm in length versus 4.5 mm in length in *A. subterranea occidentalis*), larger females (8 mm in length versus 6.5 mm in length) and darker color (castaneous brown versus piceous brown). None of these characters appear to be reliable. We have several series of *A. subterranea occidentalis* from northern California with workers ranging from 2.8 - 5 mm, and specimens of *A. subterranea valida* from Utah which are as small as 5 mm. The queens of two series of *A. subterranea occidentalis* are nearly 8 mm in length. Specimens of *A. subterranea valida* from Utah are often medium brown, much lighter than

the darker *A. subterranea occidentalis*.

*Aphaenogaster subterranea subterranea* occurs in Europe. Emery separated *A. subterranea occidentalis* using minor differences including a longer head and thinner scapes (see Creighton, 1950:149). Comparison of workers from Czechoslovakia and Spain with specimens of *A. subterranea occidentalis* from California shows them to be essentially identical, and both of the subspecies in the United States may be found to be synonyms of the typical *A. subterranea* from Europe.

**Distribution.** USA: Canada south to CO; NM: This ant has not been collected in New Mexico, but occurs throughout the western half of Colorado as far south as La Plata Co. near the New Mexico border, and would be expected to occur in the northwestern part of the state.

**Habitat.** Moist, shady foothill canyons.

**Biology.** This ant nests under stones. Creighton (1950) suggests that the nesting habits are considerably more flexible than those of *A. subterranea occidentalis*, and that colonies are often in areas of moderately heavy cover, although it prefers open and rather dry nest sites.

### ***Aphaenogaster texana* Wheeler**

Figs. 119, 122, 125

**Discussion.** Workers of this species have elongate heads (head width / head length about 0.77), the scapes of the largest workers extend about 4 funicular segments past the

posterior lateral border. The head has rugae mixed with punctures, and the posterior lateral border is rounded. The propodeal spines are weakly or moderately developed.

This species could be confused with *A. punctaticeps*, but can be separated on the basis of the sculpture of the head (punctate in *A. punctaticeps*) and the rounded posterior lateral border (more pointed in *A. punctaticeps*). The head is much more elongate than that of *A. rudis* (compare Figs. 124 and 125).

**Distribution.** USA: eastern United States west to AZ. It has not been reported from New Mexico, but may occur there.

**Habitat.** Riparian deciduous forests, pine forests (Apache, ponderosa, and Chihuahua), oak forests (*Quercus emoryi*), grassy forests.

**Biology.** This species nests under stones, in moist, rocky soil. Brood was found in nests in April. All nests had only a single queen.

### ***Aphaenogaster uinta* Wheeler**

Figs. 115, 118

**Discussion.** The scapes of the workers of this species extend past the posterior lateral corner by about 2 funicular segments. The rugae on the dorsum of the head are weakly developed and the spaces between the rugae are weakly shining. The head is relatively short (head width / head length about 0.8). The propodeal spines are poorly developed and weak at the base.

**Distribution.** USA: ID, UT to SW CO; NM: We have no records

from the state, but occurs in Montezuma Co., of the extreme SW corner of Colorado, and may occur in the NW corner of New Mexico.

**Habitat.** Arid regions, Creighton (1950) reports that it is

one of the few ants that thrives in the vicinity of the Great Salt Lake.

**Biology.** Unknown.

Wheeler, 1917; Creighton, 1950; Gregg, 1963

## Genus *Cardiocondyla*

(Key: Mackay, 1995)

Figs. 48, 51

This is a genus of small, inconspicuous ants, which have not been reported from New Mexico. Most or all of the New World species have been introduced. We have recently found one species (*C. ecto-*

*pia* Snelling) in El Paso, and a desert habitat in west Texas near Van Horn. It is also reported from Arizona. Thus it is likely that this species will be found in New Mexico.

## Genus *Cephalotes*

(Key: de Andrade and Baroni-Urbani, 1999)

Ants of this genus are among the most interesting that we have, due to their curious habitus (Fig. 127), which also makes them easily distinguished from all other genera. The genus is primarily South American, and due to the large number of species, and confusion with the previously recognized genera *Cryptocerus*, *Zacryptocerus*, and *Paracryptocerus*, makes these ants difficult to identify. Only one species of this genus would be expected in New Mexico.

### *Cephalotes rohweri* (Wheeler)

Figs. 36, 127, 128, 129

**Discussion.** This ant is easily distinguished from all others in the southwest by numerous spines on the mesosoma (Fig. 127, 128) and the shape of the head (Fig. 129). The frontal carinae extend to the posterior corners of the head, and provide

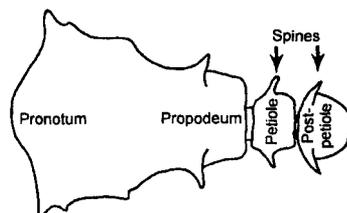


Fig. 127. Top view of the mesosoma, petiole and postpetiole of a minor worker of *C. rohweri*.

a cavity into which the scape rests. The antenna has 11 segments without a well-defined club. The mesosoma has a number of lateral spines or tubercles, and the petiole and postpetiole have lateral spines.

It could be confused with *Trachymyrmex*, but can be distinguished as it is somewhat flattened, the pronotal spines are directed to the sides, and it lives in trees (*Trachymyrmex* is not flattened, the pronotal spines are directed vertically, and it lives in the soil).

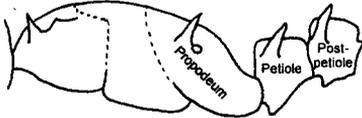


Fig. 128. Side view of the mesosoma, petiole and postpetiole of a minor worker of *C. rohweri*.

**Distribution.** USA: Southern AZ, may occur in western NM; MEXICO (Smith, 1979).

**Habitat.** Oak forests.

**Biology.** These ants nest in branches and limbs of oaks (*Quercus* spp.). Large numbers of branches have to be searched to find this rare ant, but the chance to see this fascinating ant is well worth the search. Food consists of honeydew and

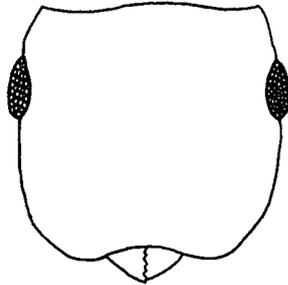


Fig. 129. Head of a minor worker of *C. rohweri*.

small arthropods.

Smith, 1947a; Creighton and Nutting, 1965; Creighton, 1967

## Genus *Crematogaster*

(See Buren, 1968)

This genus is the most easily recognized among those found in New Mexico. The gaster is heart shaped (as seen from above) and the postpetiole attaches to the dorsum of the gaster (Fig. 130). When a nest is disturbed, workers wave the gaster above the body, exuding a drop of liquid from the tip. Thus they are commonly referred to as acrobatic ants. In addition, the antenna is 11 segmented with a three segmented club (two segmented in two New

Mexican species, *C. arizonensis* and *C. minutissima*). The propodeum has a pair of spines. The dorsal face of the petiole is flattened and somewhat concave in all species except *C. ari-*

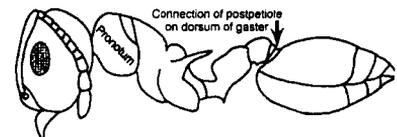


Fig. 130. Side view of a worker of *C. larreae*.

*zonensis* and *C. minutissima* (best

seen from above); the postpetiole has two lateral lobes separated by a longitudinal furrow (lacking in *C. arizonensis* and *C. minutissima*). No other genus in New Mexico has this combination of characters.

The genus is most common in arid areas, although species occur in essentially all habitats in New Mexico. Most species nest under stones or occasionally in logs. Some nest in trees (especially cottonwoods and oaks) and hollow stems or roots of desert plants. They tend Homoptera and feed on dead animals. These ants are docile and cannot sting, individuals in a colony will sometimes attack an intruder, but such behavior is rarely threatening.

This is an extremely difficult group for identification to species, due to the similarity among species and variability within species. A good series will consist of 10 or more workers. It is difficult to identify a single ant or even a series of two or three specimens. Much of the identification depends on the numbers of hairs on the mesosoma, or on subtle differences in sculpture of the mesosoma. These hairs are apparently broken during normal activities of the ant. Thus it is not unusual to find workers in a series with the numbers of hairs ranging from none to several. In this case, use the ant with the most hairs to key the series. Buren (1968) presented a key to the North American species, but due to the variability within species, use of the key does not always result in correct identifications. A number of "species", such as *C. cerasi*, may be species complexes. Others appear to be synonyms. The New World spe-

cies are currently under review by Cynthia Batkin.

The following key will hopefully be adequate for identification of the New Mexican species.

**Key to the workers of  
*Crematogaster***

- 1. Postpetiole without trace of median, elongate depression (Fig. 131, left), sub-oval and entire; pronotum predominantly smooth and shining ..... 2

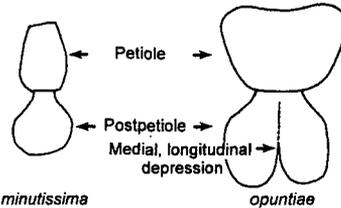


Fig. 131. Petiole and postpetiole of a worker of *C. minutissima*, as seen from the top, showing the postpetiole without a median depression, and of a worker of *C. opuntiae*, showing the postpetiole with a medial depression.

- Postpetiole divided by a median, longitudinal depression (Fig. 131, right), forming 2 lateral lobes; pronotum usually with sculpture ... 3
- 2(1). Concolorous (single color) yellow ..... *minutissima* Mayr
- Concolorous dark brown ..... *arizonensis* Wheeler
- 3(1). Erect hairs numerous on the dorsum of mesosoma (Fig. 132), usually 10 or more on pronotum, 2 or more (usually 6 or more) on the mesonotum; one or more on the propodeum or propodeal spines ..... 4
- Erect hairs not numerous on

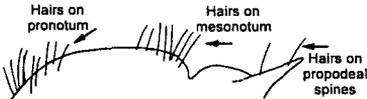


Fig. 132. Mesosoma of a worker of *C. punctulata*. The arrows indicates the numerous hairs on the pronotum, mesonotum, and propodeal spines.

dorsum of mesosoma (Fig. 133) and rarely present on mesothorax or propodeum, usually restricted to 1 - 4 on pronotum, often completely absent on pronotum ..... 6

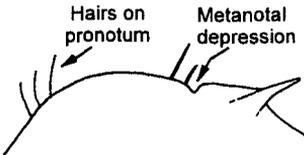


Fig. 133. Mesosoma of a worker of *C. hespera*, showing the sparse erect hairs.

4(3). Thoracic punctures fine (Fig. 134), surface shining to subopaque, especially obvious on sides of pronotum ..... *navajoa* Buren



Fig. 134. Mesosomal punctation of a worker of *C. navajoa*.

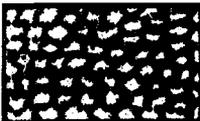


Fig. 135. Mesosomal punctation of a worker of *C. punctulata*.

- Sides of mesosoma with

coarse punctures (Fig. 135), surface subopaque ..... 5  
5(4). Dorsal surface of mesosoma punctate; relatively common .....

..... *punctulata* Emery

- Dorsal surface of mesosoma rugose or striate; unknown from New Mexico ..... *lineolata* (Say)

6(3). Posterior face of propodeum and entire head strongly punctate; erect hairs numerous on gaster (normally more than 20) .....

..... *dentinodis* Forel

- Posterior face of propodeum smooth and usually glossy; at least central portion of dorsum of head relatively smooth; erect hairs sparse on gaster (rarely more than 10 in total) .....

..... 7

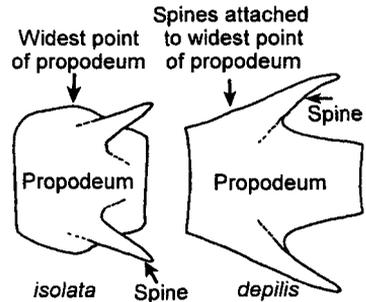


Fig. 136. Propodea and propodeal spines of workers of *C. isolata* and *C. depilis*. The arrow indicates that the spines of *C. isolata* do not originate at the widest point of the propodeum, but they do in *C. depilis*.

7(6). Propodeal spines not inserted at widest point of propodeum (Fig. 136 left); nests in oak branches .....

..... *isolata* Buren

- Metanotal impression shallow; propodeal spines inserted at widest point of propodeum (Fig. 136, right); rarely nesting in oaks .....

..... 8

8(7). Mesosoma densely punctate; erect hairs of mesosoma restricted to a single hair on each pronotal shoulder (Fig. 137), or completely absent (pronotal hairs similar in all members of a nest series) ..... 9

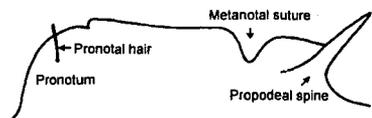


Fig. 137. Mesosoma of a worker of *C. dentinodis*.

- Mesosoma either with some other type of sculpture, or else 2 or more erect hairs present on each pronotal shoulder (on at least some members of a nest series) ..... 14

9(8). Mesosoma without erect hairs ..... 10

- Pronotum with single erect hair (Fig. 138) on each shoulder (caution: may be broken and missing on 1 or both shoulders, look at as many specimens as possible. Some specimens have 1 hair on 1 side, 2 on the other) ..... 11

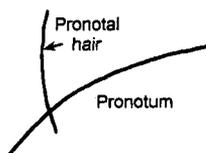


Fig. 138. Pronotal hair of a worker of *C. colei*.

10(9). Head and mesosoma red, gaster black; nests in and among roots of various plants ..... *depilis* Wheeler

- Concolorous dark brown or black; nests in roots of creosotebush ..... *larreae* Buren

11(9). Possessing most or all of following characteristics: hemilobes of

postpetiole somewhat angulate to very angulate behind (Fig. 139); subpeduncular process well developed and lobe like (Fig. 139); propodeal spines not thickened at base (Fig. 139) ..... *colei* Buren

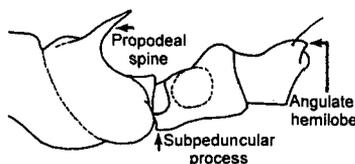


Fig. 139. Propodeum, petiole and postpetiole of a worker of *C. colei*, indicating the propodeal spines, which are not thickened at the base, the process on the ventral surface of the petiole, and the angulate hemilobes of the postpetiole.

- Without all of these characteristics (Fig. 140); postpetiole not sharply angulate posteriorly, as seen in profile (Fig. 140) ..... 12

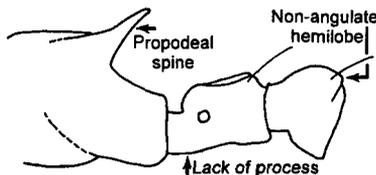


Fig. 140. Propodeum, petiole and postpetiole of a worker of *C. cerasi*, indicating the propodeal spines, the lack of a process on the peduncle, and the non-angulate (blunt) hemilobes of the postpetiole.

12(11). Hairs suberect on scapes (Fig. 141) and head, rather long on body ..... *californica* Wheeler

- Hairs appressed on scapes (Fig. 142) and head and shorter, and less noticeable on all surfaces ..... 13

13(12). Mesosoma opaque with strong puncturing on all surfaces except posterior face of propodeum;



Fig. 141. Antennal scape of a worker of *C. californica*.

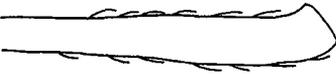


Fig. 142. Antennal scape of a worker of *C. opuntiae*.

often associated with cholla .....  
 ..... *opuntiae* Buren  
 - Mesosoma sub-shining,  
 punctures shallow, except on lower  
 mesopleuron; rarely collected and  
 unknown from New Mexico .....  
 ..... *nocturna* Buren  
 14(8). Lower half of mesopleuron  
 with distinct striae (Fig. 143) .....  
 ..... *mormonum* Emery

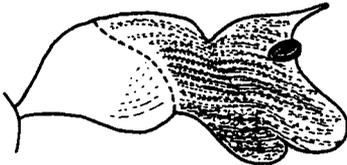


Fig. 143. Mesopleuron of a worker of *C. mormonum*.

- Lower half of mesopleuron  
 without distinct striae (Fig. 144) .. 15

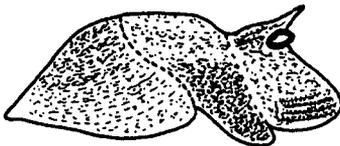


Fig. 144. Mesopleuron of a worker of *C. hespera*.

15(14). Head and mesosoma red;  
 mesosoma shining, but with fine,  
 distinct longitudinal striae; without  
 distinct declivity at rear of mesono-

tum, usually nest in cottonwoods  
 ..... *hespera* Buren

- Without this combination of  
 characteristics ..... 16  
 16(15). Mesosomal hairs short and  
 straight, with 4 - 6 in a clump on  
 pronotal shoulder, plus 1 or 2 pairs at  
 rear of mesonotum (Fig. 145); often  
 constructs carton structures under  
 stones, especially in mountainous  
 areas ..... *emeryana* Creighton

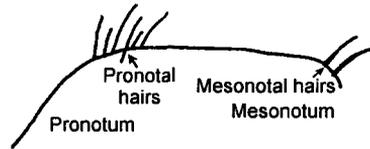


Fig. 145. Mesosoma of a worker of *C. emeryana*.

- Mesosomal hairs longer and  
 flexuous, with clump of 1 - 3 hairs  
 on each pronotal shoulder, remainder  
 of mesosoma usually without erect  
 hairs ..... 17  
 17(16). Propodeal spines very short,  
 straight or slightly to moderately in-  
 curved; petiole barely wider than  
 postpetiole; rarely collected, usually  
 in mountainous areas .....  
 ..... *browni* Buren

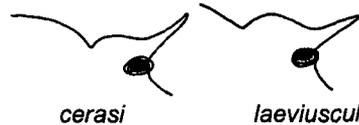


Fig. 146. Propodeal spines of workers of *C. cerasi* and *C. laeviuscula*.

- Propodeal spines well devel-  
 oped, thickened at base; process on  
 ventral surface of peduncle of petiole  
 very poorly developed or absent;  
 widely distributed, usually found in  
 more arid areas ..... 18

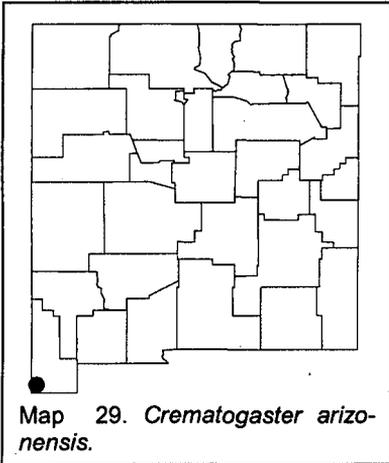
**18(17).** Sides of pronotum usually distinctly punctate, dorsum of mesosoma striate; propodeal spines often curved upwards (Fig. 146, left); commonly collected . *cerasi* (Fitch)

- Sides of pronotum and dorsum of pronotum and mesonotum smooth and shining; propodeal spines usually straight (Fig. 146, right); not known from New Mexico ..... *laeviuscula* Mayr

### ***Crematogaster arizonensis*** **Wheeler**

Map 29

**Discussion.** This species is easily recognized by the shape of the petiole (sides almost parallel, dorsum



slightly convex) and the lack of distinct hemilobes of the postpetiole. The postpetiole is basically shaped like a laterally elongate sphere (see Fig. 131). It is concolorous dark brown and has only a few erect hairs on the gaster, characters, which distinguish it from the closely related *C.*

*minutissima*. This species is closely related to the Neotropical species *C. ampla* (as well as *C. brevispinosa*), and may be a synonym of *C. ampla*.

**Distribution.** USA: southeastern Arizona, NM: **Hidalgo Co.**, Guadalupe Canyon.

**Habitat.** Oak forests, or areas with desert shrubs.

**Biology.** This species nests in the soil, in mistletoe and branches of oak trees, mesquite trees or palo verde trees, or under roots of cottonwood trees. Some of the workers are larger and specialized for producing unfertilized eggs, which are fed to the queen or brood, or develop into males. The specimens from New Mexico were collected under oaks along a trail.

Wheeler, 1908, 1912; Heinze et al., 1995

### ***Crematogaster browni*** **Buren**

**Discussion.** This is a rarely collected species that can be recognized by the tiny propodeal spines and the presence of a few erect hairs on the pronotum and none on the mesonotum. The petiole is only slightly wider (maximum width) than the postpetiole.

**Distribution.** USA: southern AZ east to western TX; NM: We know of no records of this species from New Mexico.

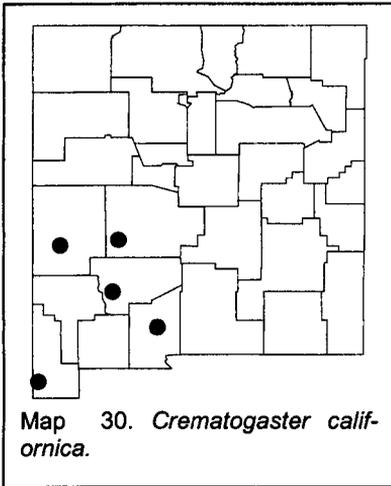
**Habitat.** Mountainous areas.

**Biology.** Nests are found under stones.

***Crematogaster californica*  
Wheeler**

Fig. 141; Map 30

**Discussion.** This species is closely related to *C. opuntiae*, which is probably a synonym. It is not unusual to find specimens with semierect hairs on one scape and appressed hairs on the other. Sometimes a single scape has semierect hairs on one section, and appressed hairs on the other. We will maintain them as separate species until they can be closely examined. Some specimens in New Mexico can be considered to be *C. californica* as recognized in Buren (1968). See the discussion of *C. opuntiae* for more details.



A small, pale, possibly undescribed species from **Catron Co.**, 20.6 k N Glenwood (33°30'23.2"N 108°54'6.4"W #s 16546, 16548), which nests under stones), keys to *C. californica*, and may represent incipient nests.

**Distribution.** USA: Buren (1968) states it occurs in southern California and Baja California; NM: **Catron Co.**, Catwalk, **Doña Ana Co.**, 45 k NE Las Cruces, (Long Term Ecological Research site), **Grant Co.**, Gila Mts. (Wright's Cabin), **Hidalgo Co.**, Clanton Draw (Gray Ranch), **Socorro Co.**, 8 mi. from H107 on H52.

**Habitat.** Arid areas, including grasslands (grama) and desert scrub (creosote) up to pinyon-juniper forests, Chihuahua pine and oak forests up to 2350 meters elevation. One nest was in a ponderosa pine, Douglas fir forest, but this is an unusual habitat for this species.

**Biology.** Nests are found at the bases of plants and in chollas (although Buren [1968] stated that it did not nest in cactus), or under stones (one nest at high elevation was under a log). Brood was found in nests in March. This ant tends coccids and aphids. One colony was nesting together with a species of *Camponotus*.

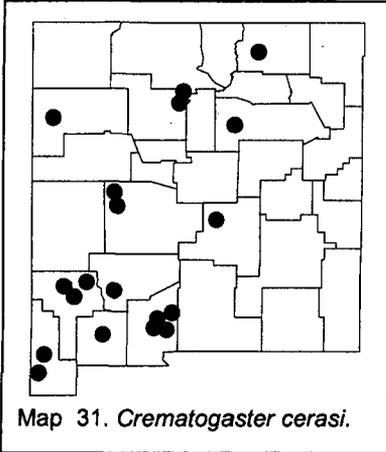
Mallis, 1941; Wheeler and Wheeler, 1973

***Crematogaster cerasi*  
(Fitch)**

Figs. 140, 146; Map 31

**Discussion.** Specimens of this species may be keyed with difficulty to *C. colei* using Buren (1968). The pronotum often has a single erect hair, a pair of hairs or three or more pairs of erect hairs. The hemilobes of the postpetiole are never sharply angulate as in *C. colei*. This species is even more difficult to

distinguish from *C. hespera*. Both are small, delicate species that are very similar. *Crematogaster cerasi* never has hairs at the rear of the mesonotum, *C. hespera* often has hairs in the same position. The dorsum of the promesonotum of *C. cerasi* is usually granulated, that of *C. hespera* has longitudinal striations in the same position. The basal face of the propodeum also has longitudi-



Map 31. *Crematogaster cerasi*.

nal striation. The characteristics in our key should allow separation of the two species.

**Distribution.** USA: eastern United States west to AZ; NM: Colfax Co., 41 k E Eagle Nest, Doña Ana Co., Aguirre Springs, Dripping Springs, 45 k NE Las Cruces (Jornada Long Term Ecological Research Site), Organ Mts., Soledad Canyon, Grant Co., Gila Mts. (Wright's Cabin), Mimbres, 100k NW Silver City, Hidalgo Co., SW Animas Mts., Coronado National Park (Clanton Draw), Lincoln Co., Valley of Fire State Park, Los Alamos Co. Los Alamos, near Rio Grande, Camp May, Luna Co., 14 mi. S Deming, McKinley Co., Zuni

Mts. (southeast of Gallup), San Miguel Co., Villanueva State Park, Socorro Co., Grassy Lookout, Magdalena Mts.

**Habitat.** Chihuahuan Desert along mountain slopes, grasslands, pinyon-juniper, oak, sagebrush, ponderosa pine, fir forests, and riparian habitats, up to 2350 meters elevation.

**Biology.** This species commonly nests under stones, or under a log (1 nest); brood and reproductives were found in nests from May to August. This is one of the most common *Crematogaster* spp. in mesic and xeric sites in New Mexico. Workers are sometimes aggressive when the nest is disturbed. Foragers are often found on vegetation, especially cholla (*Opuntia* spp.). This species may be polygynous, as multiple, dealate females are often encountered in nests. Two colonies were nesting with *Campopnotus festinatus*.

Gaige, 1914; Headley, 1943; Wheeler and Wheeler, 1944; Kanno, 1959; Kulman, 1965a; Smith, 1965

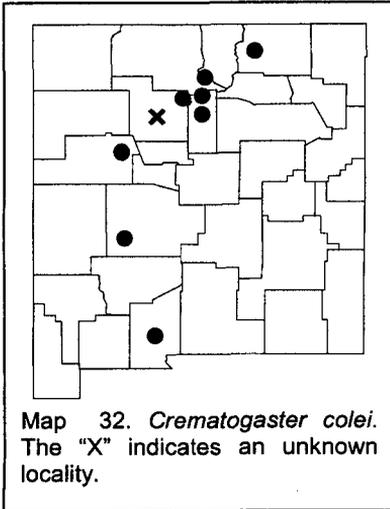
### *Crematogaster colei* Buren

Figs. 138, 139; Map 32

**Discussion.** Specimens of this species will often key to *C. depilis* using Buren (1968), as there are often no hairs present on the pronotum. It differs in that the hemilobes of postpetiole are always at least somewhat sharply angulate (rounded in *C. depilis*), the posterior part of the side of the pronotum is somewhat shiny and lightly punctated (heavily punctated in *C. depilis*), it is con-

colourous dark brown to yellowish brown (*C. depilis* is usually reddish brown with a black gaster) and the subpeduncular process is well developed (poorly developed in *C. depilis*). It could also be confused with *C. larreae*, but as far as is known, *C. larreae* nests only in creosotebush shrubs (*Larrea tridentata*), and is concolorous black.

**Distribution.** USA: AZ to W TX; NM: Cibola Co., Laguna, Colfax Co., 41 k E Eagle Nest, Doña Ana Co., 18 k E Las Cruces, Los Alamos Co., Los Alamos, Rio Arriba Co., 2 k N Dixon, Sandoval Co., without locality, Santa Fe Co., Santa Fe, 24 k NE Santa Fe, Socorro Co., Intersection Rd. 330 & 107, 33°48'32.2"N 107°22'57.2".



**Habitat.** Sagebrush, disturbed areas, grasslands.

**Biology.** This species is not common in New Mexico, it usually nests under stones.

### *Crematogaster dentinodis* Forel

Fig. 137

**Discussion.** This is one of the few species that is reasonably easy to recognize, as most of the surfaces of the head and mesosoma are densely punctate.

It may be confused with *C. punctulata*, but can be distinguished, as the descending face of the propodeum is also punctate, the same surface of *C. punctulata* is smooth and shining. The punctures of the head of *C. punctulata* is not as dense as it is in *C. dentinodis*, leaving parts of the middle of the head somewhat smooth and shining. Also the dorsum of the mesosoma of *C. dentinodis* has fewer hairs than occurs in *C. punctulata*.

**Distribution.** USA: AZ (including SE corner), may occur in New Mexico.

**Habitat.** Occurs in a number of different community types.

**Biology.** This species nests under stones.

### *Crematogaster depilis* Wheeler

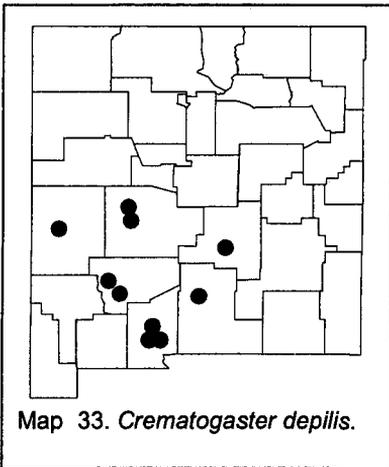
Fig. 136; Map 33

**Discussion.** This species, together with the closely related *C. larreae*, can be distinguished from others in the genus by the lack of any erect hairs on the pronotal shoulder and in being robust ants with a heavily punctated mesosomata.

Separating this species from *C. larreae* is difficult, and is based almost exclusively on color. *Cre-*

*matogaster depilis* is usually red or reddish brown with a darker gaster, whereas *C. larreae* is usually concolorous dark brown. Some specimens are brown with a slightly darker gaster. These specimens are usually impossible to separate into one of these species. If they were nesting in creosotebush, they are probably *C. larreae*, although *C. depilis* nests at the bases of creosotebushes. Specimens of *C. isolata* may key to *C. depilis*, but they nest in the branches of oaks, thus allowing their recognition.

A small, dark species with the side of the pronotum mostly smooth and shining and with small propodeal spines keys to *C. depilis*, but may represent an undescribed species. Two specimens were collected from Hidalgo Co., Clanton Draw (# 17937), nesting in beetle galleries in the oak *Quercus arizonica*.



Map 33. *Crematogaster depilis*.

**Distribution.** USA: S CA east to TX; NM: Catron Co., 18.9 k NW Old Horse Springs, Doña Ana

Co., Las Cruces, 45 k NE Las Cruces (Long Term Ecological Research site), 9 k E Las Cruces, Lincoln Co., 5 mi. W Capitán, Otero Co., Alamogordo, Sierra Co., 20.7 k SW Hillsboro, 12.5 mi. NW Winston, Socorro Co., Bear Mt. (11 k NW Magdalena, 17.6 k NW Magdalena), 33°48'32.2"N 107°22'57.2"W; MEXICO: Baja California, Chihuahua, Durango, and Nuevo León.

**Habitat.** Desert communities, except grasslands without shrubs, creosotebush scrub, mesquite forests, up into pinyon-juniper and oak woodlands (2100 meters elevation).

**Biology.** This species nests at base of desert shrubs (*Eriogonum*, *Larrea*, *Opuntia*, *Yucca*, *Dasyllirion*, *Hamatocactus*, *Franseria*, *Ephedra*) or in the branches of mesquite. Nests are occasionally found under stones or under cattle manure. Brood is present in nests in August and September. It is primarily an individual forager which collect nectar from flowers, or tends scale insects. They are often found foraging on cholla (*Opuntia* spp.), and occasionally on oaks.

Wheeler, 1908; Creighton, 1950; Wheeler and Wheeler, 1973; Rojas-Fernández and Fragoso, 1994, 2000

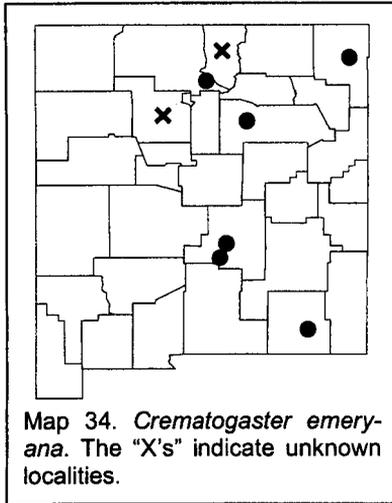
### *Crematogaster emeryana* Creighton

Fig. 145; Map 34

**Discussion.** This species can be recognized due to the presence of several erect hairs on the pronotal

shoulder, in addition to at least one pair on the rear of the mesonotum.

It may be confused with *C. hespera*, but the latter species has fewer erect hairs on the pronotum (1 - 3 versus 4 - 6 or more in *C. emeryana*). It can be separated from *C. browni* and *C. cerasi* as neither have any erect hairs on the rear of the mesonotum.



**Distribution.** USA: AZ, TX north to CO, UT; NM: Eddy Co., Hidden Cave, Lincoln Co., Nogal, Sacramento Mts. (2 mi. W Alto), Rio Arriba Co., Dixon, Sandoval Co., without locality, San Miguel Co., 20 k NW Las Vegas, Taos Co., without locality, Union Co., 15 mi. SW Clayton.

**Habitat.** Mountain forests, oak forests, riparian canyon forests, grasslands, urban habitats.

**Biology.** This ant nests under stones or logs (or in logs), with brood present in April and July, and sexuals present in nests in July and August. This species appears to be polygynous, with up to 9 dealate fe-

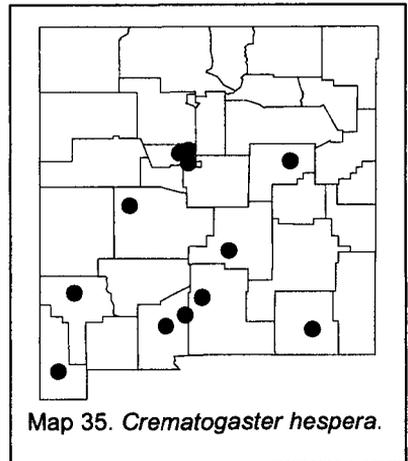
males found in a single nest. One colony was nesting together with *Lasius* sp. and *Tapinoma sessile*.

Gregg, 1963

### *Crematogaster hespera* Buren

Figs. 133, 144; Map 35

**Discussion.** This is a common species in New Mexico that can be recognized by having few (less than 4) long erect hairs on the pronotum, usually having at least one pair on the mesonotum and by the longitudinal striations on the dorsum of the mesosoma and basal face of the propodeum. See discussion of *C. cerasi* and *C. emeryana* for more details.



**Distribution.** USA: CA east to W TX north to UT; NM: Bernalillo Co., Embudo Canyon, Cibola National Forest (Pine Flat), Elena Gallego Mt., Doña Ana Co., Aguirre Springs, 45 k NE Las Cruces (Long Term Ecological Site), Eddy Co., Hidden Cave, Grant Co., 14 m N

Silver City, **Guadalupe Co.**, Santa Rosa, **Hidalgo Co.**, Animas Mts. (Black Bull Canyon), **Lincoln Co.**, Fort Stanton Cave Area, **Otero Co.**, White Sands National Monument, **Socorro Co.**, Magdalena Mts. (Water Canyon); MEXICO: Chihuahua.

**Habitat.** Chihuahuan Desert, creosotebush scrub up to pinyon-juniper forests (5600 ft.), occasionally in riparian areas.

**Biology.** This species nests in the soil, usually under stones. Brood was found in nests from May to August, sexuals in August. Foragers tend coccids on the roots of snake-weed (*Gutierrezia sarothrae*). They are attracted to baits, including rotten liver and tuna fish.

### *Crematogaster isolata* Buren

Figs. 136, 147; Map 36

**Discussion.** It is difficult to characterize this species. The only reasonable character is that the propodeal spines are not attached at the widest point of the propodeum (Fig. 136). Buren (1968) states that the metanotal suture is deep, but narrow on the dorsum of the mesosoma (Fig.

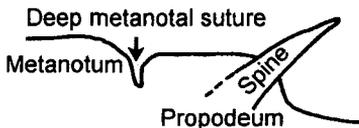
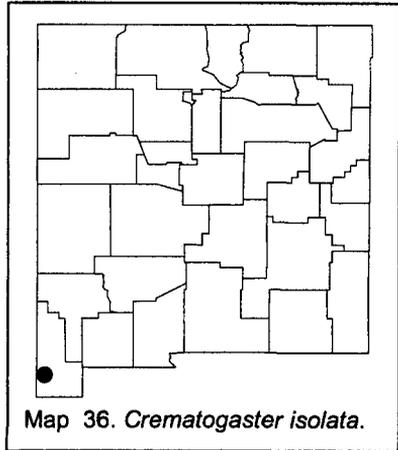


Fig. 147. The mesosoma and propodeum of a worker of *C. isolata*, showing the deep metanotal suture.

147), but this is a subjective character, and other species are similar. The fact that it is rarely collected in New

Mexico, and appears to nest only in oaks, makes misidentifications unlikely. If the couplet is missed, it will key to *C. depilis* (if there are no hairs on the pronotal shoulder, which is the most common situation), or to *C. opuntiae* (if there is a pair of hairs on the pronotal shoulder). Neither of these two latter species is known to nest in oaks.



Map 36. *Crematogaster isolata*.

**Distribution.** USA: S AZ west to W Texas; NM: **Hidalgo Co.**, Coronado National Forest (Cloverdale Creek).

**Habitat.** Mountainous areas.

**Biology.** This is a very rare species, collected from only 1 site in New Mexico. It nests in dead branches of oaks (*Quercus arizonica*), at altitudes over 1500m.

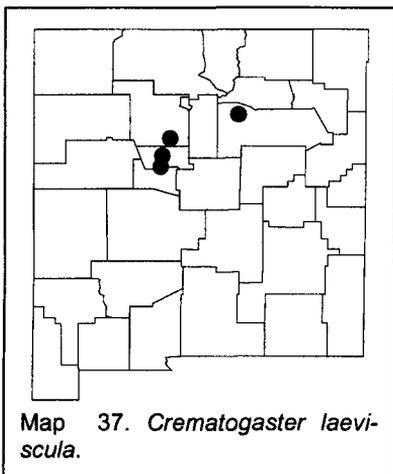
### *Crematogaster laeviuscula* Mayr

Fig. 146; Map 37

**Discussion.** The workers of this species are predominantly shiny, specifically the head and side of the pronotum are shiny and glossy, the

top of the pronotum is shiny, but finely sculptured. The mesopleuron and the sides of the propodeum are punctate or finely striate. The propodeal spines are well developed and long. It is generally light colored, with a pale reddish-yellow head and mesosoma and a darker gaster.

It is difficult to separate this species from *C. mormonum*, and it is possible that the latter species is a synonym. *Crematogaster laeviuscula* has the dorsum of the pronotum smooth or finely sculptured, whereas the top of the pronotum of *C. mormonum* is slightly more roughly sculptured. *Crematogaster laeviuscula* nests in oak galls or twigs, but also in logs and stumps, whereas nests of *C. mormonum* are usually found in the soil, often under stones. They were originally separated by the states of Arizona and New Mexico, but what appears to be both species occur in New Mexico.



Map 37. *Crematogaster laeviuscula*.  
**Distribution.** USA: Central part of country (Oklahoma, AR, MS, TX, Louisiana, extending south into México); NM: **Bernalillo Co.**, Al-

buquerque, RGNC, **Sandoval Co.**, Coronado State Park, **San Miguel Co.**, Gallinas Canyon; MEXICO: Chihuahua, Nuevo León.

**Habitat.** Riparian forests.

**Biology.** This species nests in wood, or under bark of dead logs (cottonwood), or in oak galls of the wasp *Holcaspis cinerosus*. Sexualls occur in nests in August. These ants are more aggressive than is typical for North American *Crematogaster*.

Wheeler, 1908

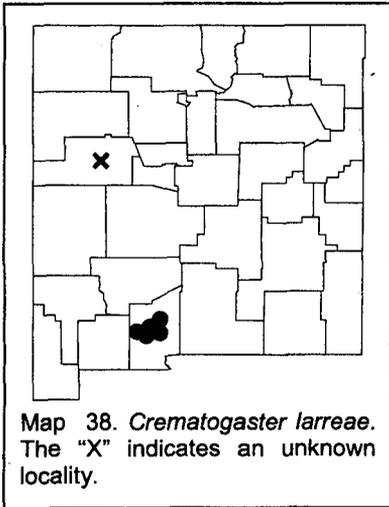
### *Crematogaster larreae* Buren

Figs. 30, 130; Map 38

**Discussion.** This is a common species that nests in the roots of the creosotebush (*Larrea tridentata*). It is concolorous dark brown or black, and the mesosoma is densely and evenly punctate. The pronotal shoulders are without erect hairs, in fact there are rarely any erect hairs on the dorsum of the mesosoma. The head is finely sculptured with a mixture of punctures and striae, some parts, especially the central region, are nearly smooth and shining.

This species is most likely to be confused with *C. depilis*. The two species can be usually be separated as *C. larreae* is concolorous, and *C. depilis* is bicolored. Also *C. depilis* apparently does not nest inside creosotebush roots. Occasionally specimens of *C. opuntiae*, which have lost the pronotal hairs, can be confused with *C. larreae*. The nesting sites of the two species are different, and thus ecological characteristics will separate them. The head of *C. opun-*

*tiae* has extensive areas which are smooth, whereas these areas are limited in *C. larreae*. The hairs on the scapes of *C. larreae* are usually slightly elevated from the surface, whereas they are usually completely appressed in *C. opuntiae* (this is a poor character with considerable variation).



**Distribution.** USA: CA west to W Texas; NM: Cibola Co., without locality, Doña Ana Co., Las Cruces, 0.4 mi. N Las Cruces, 4 mi. W Las Cruces, 4 mi. NW Las Cruces, 45 k NE Las Cruces (Jornada Long Term Ecological Research Site); MEXICO: Chihuahua.

**Habitat.** Creosotebush scrub.

**Biology.** This ant nests in the roots of the creosotebush, *Larrea tridentata*, in galleries of wood boring beetles. A nest occupies a single bush, but may be in various roots of the same plant. There is a single queen and a mean of 789 adult ants in a nest. The larval population peaks

in the fall and winter, pupae are found in the spring. Males are most commonly found in the nest in June, with flights occurring during the last 2 weeks of June and during July. Foragers are active 24 hours per day, with activity peaking in summer. They feed on nectar, honeydew and dead insects. They apparently cause no damage to the creosote, and may even form a mutualistic relationship with the shrub.

Mackay et al., 1984

### *Crematogaster lineolata* (Say)

**Discussion.** The workers of this species have numerous hairs on the pronotum, at least two on the mesonotum and usually at least two on the propodeum or propodeal spines. The side of the mesosoma is roughly sculptured with striae and punctures, most surfaces are dull, although the central region of the side of the pronotum may be weakly shining (but still is sculptured). The top of the mesosoma is roughly sculptured with striae / rugae and scattered punctures. The sides or the head are roughly sculptured with striae and scattered punctures, the central region is partially smooth, although is only moderately shining.

The numerous hairs on the pronotum would separate this species from most of the others that may occur in New Mexico. It is more roughly sculptured than is *C. navajoa*, and the hairs on the pronotum are shorter (about 0.01 mm in length, compared to about 0.25 mm in length in *C. navajoa*). The rugae

and/or striae on the dorsum of the mesosoma would separate this species from *C. punctulata*, which has dense punctures on the same surface.

**Distribution.** USA: eastern United States west to CO and TX; NM: Not yet collected in the state, but may occur in the northern or eastern parts of the state.

**Habitat.** Oak woodland, deciduous canyon forest, grasslands.

**Biology.** This species nests under logs and stumps or stones and is an occasional house pest. They feed on dead insects and tend Homoptera, especially on plant roots. This is an aggressive species with a annoying bite.

Wheeler, 1906a; Gregg, 1963  
Wheeler and Wheeler, 1963

### ***Crematogaster minutissima* Mayr**

Fig. 131; Map 39

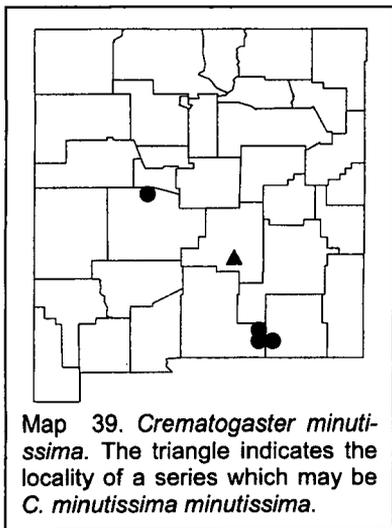
**Discussion.** This is a light colored species, which can be recognized by characters listed in the discussion of *C. arizonensis*.

It differs from *C. arizonensis* in color and in having more abundant hair on the gaster. There are three subspecies: *C. minutissima minutissima* Mayr, *C. minutissima missouriensis* Emery and *C. minutissima smithi* Creighton. *Crematogaster minutissima minutissima* Mayr occurs in eastern United States. Specimens of what appears to be *C. minutissima minutissima* were collected at Lincoln Co., 2.5 m NNE Ft, Stanton 6200 ft. *Crematogaster minutissima missouriensis* has been reported from New Mexico (Smith,

1979). *Crematogaster minutissima smithi* is known from SE Arizona.

This is a member of a group of subspecies belonging to the *brevispinosa* species complex, and is closely allied to *C. victima* (which perhaps should be considered as a separate species complex). This is a Neotropical group, with only a few taxa found in the Nearctic Region. It is the most difficult species complex in the genus. Of the 3 subspecies of *C. minutissima*, only *C. minutissima missouriensis* is relatively easily separated. It is not as closely related to the others, as the others are to each other, and is probably a valid species. It differs in that the propodeal spines are longer (about 1/2 the length of the distance between the bases of the spines) and are bend upwards. Thus it may be more closely related to *C. erecta*, which is structurally similar, but is dark brown and has shorter propodeal spines. The other 2 subspecies (*minutissima* and *smithi*) are nearly impossible to separate, and are possibly both the same thing. Both of these have short propodeal spines (1/4 - 1/3 the length of the distance between the bases of the spines). The propodeal spines may be directed slightly upwards, but not to the degree of *C. minutissima missouriensis* (possibly an optical illusion due to the shorter length of the spines). Most specimens of *C. minutissima smithi* have the dorsum of the pronotum smooth and polished, without any striae (there are striae on the sides). The propodeal spines are short, similar to most other members of the *brevispinosus* complex (including the dark brown *C. arizonen-*

sis, which is may be a synonym of *C. brevispinosa* var. *ampla*, although the pronotum of *C. arizonensis* is more smooth and polished). *Crematogaster minutissima smithi* is a western subspecies, ranging from Chihuahua north into southeastern Arizona, New Mexico and western Texas. *Crematogaster minutissima minutissima* is more eastern in distribution, ranging from the eastern seaboard west to central Texas. It usually has striae (often 2) in the central region of the top of the pronotum. All 3 subspecies are yellow, often with the head and the tip of the gaster brown.



Map 39. *Crematogaster minutissima*. The triangle indicates the locality of a series which may be *C. minutissima minutissima*.

**Distribution.** USA: Middle of United States south to NM and TX; NM: Eddy Co., Sitting Bull Falls, Otero Co., Guadalupe Mts. (41.4 km straight line NW Sitting Bull Falls, Bates Park Turnoff, N side of road), Socorro Co., Sevilleta; MEXICO: Chihuahua.

**Habitat.** Grassland, oak forests, and pinyon-juniper forests.

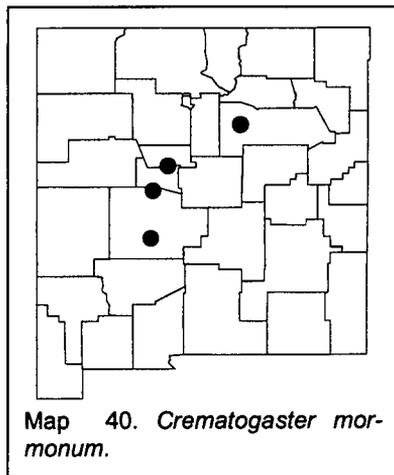
**Biology.** This ant nests under stones in the southwestern part of the United States. It usually nests in logs and twigs in the southeast. Workers were collected in a bait in vegetation. A single worker was found under a rock with *Pheidole vallicola* in the state of Chihuahua, Mexico. The series of *C. minutissima minutissima* were attracted to oatmeal/grape bait.

Gregg, 1963

### *Crematogaster mormonum* Emery

Fig. 143; Map 40

**Discussion.** The workers of this species can be recognized as the pronotum is nearly smooth and shining, the upper half of the mesopleuron has well defined rugae or striae,



Map 40. *Crematogaster mormonum*.

the lower half is punctate with the punctures lining up into striae, the side of the propodeum has striae with the background shining. The dorsum of the mesosoma has poorly defined striae with the background smooth

and shining. The head and the posterior face of the propodeum are predominantly smooth and shining. The pronotum has several erect hairs (approximately 3) on each pronotal shoulder.

The distinct striae on the lower half of the mesopleuron would separate this species from similar species, such as *C. hespera*, *C. emeryana*, *C. browni* and *C. cerasi*. It could be separated from species with many hairs on the pronotal shoulder or those with 1 pair or none, by the few hairs on this surface.

**Distribution.** USA: southern CA, ID, UT, NV; NM: **Bernalillo Co.**, Bosque Forest, Rio Grande, **San Miguel Co.**, Romeroville, **Socorro Co.**, Sevilleta National Wildlife Refuge, Bosque del Apache; MEXICO: Baja California.

**Habitat.** Arid ecosystems, creosotebush scrub, areas with woody shrubs.

**Biology.** These ants nest in rotten limbs in termite holes, as well as soil adjacent to the wood. Brood occurred in nests in April, sexuals in August.

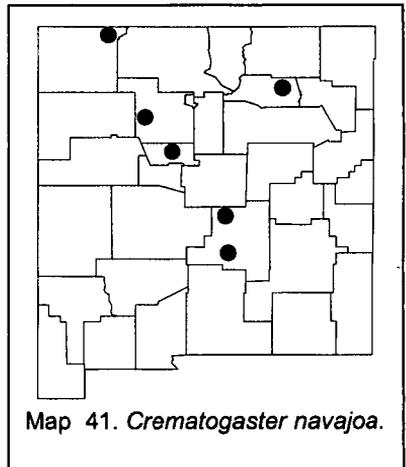
### *Crematogaster navajoa* Buren

Fig. 134; Map 41

**Discussion.** The workers of this species have abundant, long (about 0.25 mm), erect hairs on the pronotum and mesonotum, with somewhat fewer hairs on the dorsum of the propodeum and the propodeal spines. The side of the pronotum is finely sculptured with striae or

poorly defined punctures, but mostly smooth and shiny. The side of the mesosoma and propodeum are covered with striae intermixed with punctures.

This species could be confused with *C. punctulata*. It differs in that some of the smaller hairs on the head are suberect and the erect hairs on the pronotum are longer (0.25 mm) than they are in *C. punctulata*. The longer pronotal hairs would also separate this species from *C. lineolata*.



Map 41. *Crematogaster navajoa*.

**Distribution.** USA: AZ; NM: **Bernalillo Co.**, Albuquerque, **Lincoln Co.**, Cibola National Forest, Fort Stanton, **Mora Co.**, 2 k E Wagon Mound, **Sandoval Co.**, Ca-bezon, **San Juan Co.**, 4 k E Aztec.

**Habitat.** Arid grasslands, up to 6200 feet.

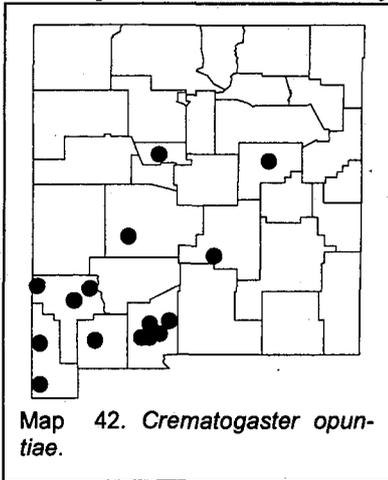
**Biology.** This species nests at the base of desert plants or under logs.

## *Crematogaster opuntiae* Buren

Figs. 131, 142; Map 42

**Discussion.** This species can be recognized by a single pair of hairs on the pronotal shoulder, and usually no other erect hairs on the dorsum of the mesosoma. The head is mostly shiny, the mesosoma coarsely punctate. The hemilobes of the postpetiole are blunt posteriorly. The pubescence on the head and scapes is mostly appressed.

Specimens of *C. isolata* may



Map 42. *Crematogaster opuntiae*.

key to *C. opuntiae*, but can be readily separated as they nest in the branches of oaks. Specimens of *C. cerasi*, which are missing all but 1 hair on the pronotal shoulder, would key to this species. The only way to avoid this error is to collect several workers from a nest, so that several specimens can be examined. If the series was collected under a stone or in the soil, it may be *C. cerasi* (but could also be *C. californica*).

Buren (1968) states that *C. opuntiae* differs from *C. californica* by its shorter pubescence, which is entirely appressed on the heads and scapes. The sculpturing, especially on the posterior half of the head, is weaker and the colors of living specimens are nearly always dark. He also states that *C. californica* is never associated with cactus. These seem to be poor characters, and *C. californica* does nest in cholla in southern California. Specimens of *C. californica* in New Mexico were collected on *Opuntia imbricata* (# 16793). Thus this species will probably be found to be a synonym of *C. californica*.

**Distribution.** USA: Southern AZ; NM: Bernalillo Co., NE Albuquerque, Doña Ana Co., Aguirre Springs, 45 k NE Las Cruces (Long Term Ecological Research site), 18 k E Las Cruces, 10 mi. W Las Cruces, 10 mi. W Organ Mts., Grant Co., 6 k E Mule Creek, Leopold Vista, 77 k E Silver City, 79 k E Silver City, Guadalupe Co., Santa Rosa Park, Hidalgo Co., Coronado National Park (Clanton Draw), Buren (1968) lists the area on route 89 near the Arizona border (Hidalgo Co.), Lincoln Co., Sacramento Mts. (2 mi. W Alto), Luna Co., 18.5 k NW Deming, Socorro Co., 33°48'2" 107°22'57.2".

**Habitat.** Chihuahuan Desert scrub and grasslands (especially grama grass), as well as transitional areas with the Sonoran Desert, up into pinyon-juniper forests, oak forests and ponderosa pine forests (up to 1380 meters elevation).

**Biology.** These ants nest in cholla cactus, especially *Opuntia*

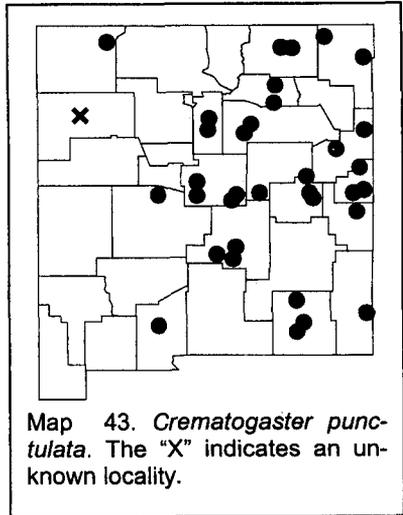
*fulgida*. Nests are also found in the soil or under stones or in rotten wood, including under the bark of a standing, dead tree, and in limbs of oaks (*Quercus* sp.). Brood was found from March to October, sexuals in nests in July - September. The crickets *Myrmecophila* sp. occur in nests.

***Crematogaster punctulata*  
Emery**

Figs. 132, 135; Map 43

**Discussion.** This species could be confused with *C. navajoa* and with *C. dentinodis*; see the discussions of these two species for distinguishing characteristics.

**Distribution.** USA: Eastern United States west to AZ; NM: Colfax Co., Jefferson, Jeffers Ranch, Curry Co., Clovis, near Clovis, Grady Roadside Park, De Baca Co., 2.5 m N Fort Sumner, 4 mi. N Taiban, Doña Ana Co., 45 k NE Las Cruces (Long Term Ecological Research site), Eddy Co., 5 mi. W Artesia, Carlsbad, Los Medanos, 32°20.3'N 103°50'W, Guadalupe Co., 25 mi. SE Vaughn, Lea Co., 20 m WSW Hobbs, Lincoln Co., 5 mi. E Red Cloud Campground, Nogal, Road Runner Ranch, McKinley Co., without locality, Mora Co., 12 k N Wagon Mound, 3 k E Wagon Mound, Quay Co., 6 mi. SW Nara Visa, 7 mi. S Quay, San Juan Co., 4 k E Aztec, San Miguel Co., Bernal, Las Vegas, Santa Fe Co., 34 mi. S



Map 43. *Crematogaster punctulata*. The "X" indicates an unknown locality.

Santa Fe, Galisteo, Socorro Co., Sevilleta, Torrance Co., Corona, 5 mi. NE Corona, 13 k NW Mountainair, 24 k S Mountainair, Union Co., Capulín National Monument, 6 mi. E Clayton; MEXICO: Chihuahua.

**Habitat.** Mesquite forests (including dunes), pinyon pine, juniper forests, shinnery oaks forests, cottonwood forests, grasslands.

**Biology.** These ants nest in the soil or under stones and logs. Brood was found in nests in August, sexuals were found from August to September. Flights were reported in May (Wheeler, 1908) at 11:00 MST. Foragers tend membracids on sunflowers, as well as coccids and aphids. They commonly forage on cholla (*Opuntia* sp.). Two nests were found together with *Lasius sitchensis*.

Gregg, 1963

## Genus *Cyphomyrmex*

(Key: Snelling and Longino, 1992)

This is a large genus with most species found in Latin America. Only two species may be found in New Mexico. These ants cultivate fungi in nests in the soil, using insect dung for fungal substrate. These ants are not commonly collected; they are probably rare or are rarely seen due to their secretive habits and dark color. Many of the species are difficult to identify, fortunately the two species that occur in the United States are easily separated.

Workers can be distinguished from other ants by the scrobes for the antennal scapes, which extend to the posterior borders of the head (Fig. 33), the numerous tubercles or bumps on the mesosoma (Fig. 31), and the numerous bumps on the gaster. This genus has an 11-segmented antenna, of which the insertion is completely hidden by the lateral lobes of the frontal carinae. The propodeum has a pair of bumps, tubercles or poorly developed spines. The body is covered with short, scale-like hairs. It is similar to *Trachymyrmex* and *Acromyrmex*, which have sharply pointed spines on the mesosoma. A number of other similar small ants in other genera occur in other states and in Latin America which may be similar to *Cyphomyrmex*, but as they do not occur in New Mexico and will not result in confusion.

### Key to the workers, females, and males of *Cyphomyrmex*

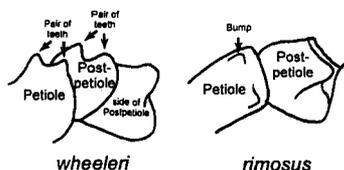


Fig. 148. Postpetiole of workers of *C. wheeleri*, and *C. rimosus*, as seen obliquely from the front and side.

1. Petiole and postpetiole with a deep, dorsal, longitudinal depression, with 2 lateral teeth on each (Fig. 148, left) ..... *wheeleri* Forel  
- Petiole and postpetiole without longitudinal depression, without lateral teeth (Fig. 148, right) ..... *rimosus* (Spinola)

### *Cyphomyrmex rimosus* (Spinola)

Fig. 148

**Discussion.** All three castes are easily separated from *C. wheeleri* by the lack of a strong longitudinal impression on the upper surface of the postpetiole. Otherwise they are nearly identical.

**Distribution.** USA: South-eastern United States west to CA, south to Brasil and Argentina; NM: we are not aware of any records from

New Mexico, but it probably occurs in the state.

**Habitat.** Usually found in mesic habitats.

**Biology.** This species cultivates yeast (*Tyridiomyces*, presently placed in the Fungi Imperfecti - See Weber, 1972) using caterpillar dung as a substrate, and nests in soil or under stones or logs.

Weber, 1972

### *Cyphomyrmex wheeleri* Forel

Figs. 31, 33, 148; Map 44

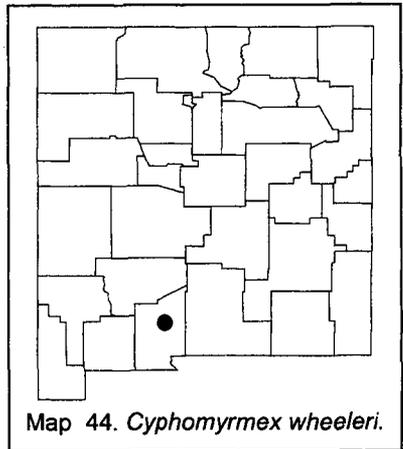
**Discussion.** All three castes are easily separated from *C. rimosus* by the strong longitudinal impression in the postpetiole, which forms a pair of blunt teeth (Fig. 148). This is the only species known to occur in New Mexico.

**Distribution.** USA: CA east to TX; NM: Doña Co., 45 k NE Las Cruces (Long Term Ecological Research site); MEXICO: Durango.

**Habitat.** Arid environments, desert shrublands and grasslands.

**Biology.** This species nests in the soil or under stones in creosote

bush scrub. Nests consist of a few dozen workers and a single queen. Fungal gardens can be located a few centimeters under the soil surface in small chambers a few centimeters in diameter. Workers forage primarily at night or on moderately warm days in the spring and fall. They move slowly and feign death and are thus difficult to see. These ants are most commonly collected under stones or



Map 44. *Cyphomyrmex wheeleri*.

in pitfall traps. Males are attracted to lights.

Wheeler, 1907; Mallis, 1941; Weber, 1972; Wheeler and Wheeler, 1973 Rojas-Fernández and Frago, 1994, 2000

## Genus *Formicoxenus*

(Key: Francoeur and Loisel, 1985)

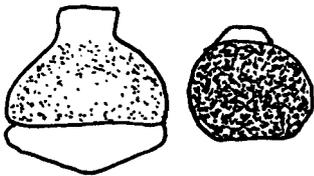
This genus is very similar to the subgenus *Leptothorax* of the genus *Leptothorax*. It can be easily separated as the eyes have several relatively long, erect hairs (Fig. 150)

and the hairs on the scape are suberect.

These ants are inquiline in the nests of the ants of the genera *Formica* and *Myrmica*.

**Key to the workers of  
*Formicoxenus***

1. Dorsum of postpetiole shining, sculpture consisting of widely spaced, small punctures (Fig. 149, left) with surface between them smooth or delicately shagreened ...  
..... *provancheri* (Emery)



*provancheri*      *hirticornis*

Fig. 149. Postpetioles of workers of *F. provancheri*, and *F. hirticornis*, as seen from above.

- Dorsum of postpetiole opaque or nearly so, surface densely punctate (Fig. 149, right) or punctate-granulose .....  
..... *hirticornis* (Emery)

***Formicoxenus hirticornis*  
(Emery)**

Fig. 149

**Discussion.** The eyes have several erect hairs and the clypeus of the worker is weakly depressed in the middle near the anterior border of the clypeus, and is without a medial carina, although several poorly developed lateral carinae are present. The propodeal spines are well developed, and thickened throughout. The anterior face of the petiole meets the dorsum in an angle, the posterior face is convex and rounded. The dor-

sum of the postpetiole is completely covered with punctures. The mesosoma has dense punctures.

The depressed clypeus could cause confusion only with *F. provancheri* and *Leptothorax muscorum*. It can be separated from *F. provancheri* as dorsum of the postpetiole is completely and roughly sculptured, whereas the dorsum of the postpetiole of *L. provancheri* is finely sculptured and predominantly smooth and shining. It can be separated from *L. muscorum* (and all of the other members of *Leptothorax* that occur in New Mexico) by the erect hairs on the eyes.

**Distribution.** USA: ND, SD south to CO, west to CA. May occur in northern New Mexico.

**Habitat.** Pine forests.

**Biology.** This ant nests in colonies of *Formica obscuripes* and possibly *F. integroides*.

Weber, 1935; Wheeler and Wheeler, 1963; Gregg, 1963; Snelling, 1965

***Formicoxenus provancheri*  
(Emery)**

Figs. 149, 150; Map 45

**Discussion.** This species has several erect hairs on the eyes, and the clypeus of the worker is weakly depressed in the middle and is without a medial carina, although several lateral carinae are present. The scapes have numerous suberect hairs. The propodeal spines are well developed, and thickened throughout. The anterior face of the petiole meets the dorsum in a sharp angle, the posterior face is also straight. The dorsum

of the postpetiole is nearly completely free of sculpture. The mesosoma has heavy and dense sculpture, consisting of punctures interspersed among poorly defined striae.

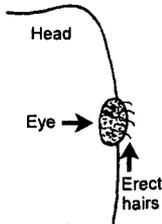


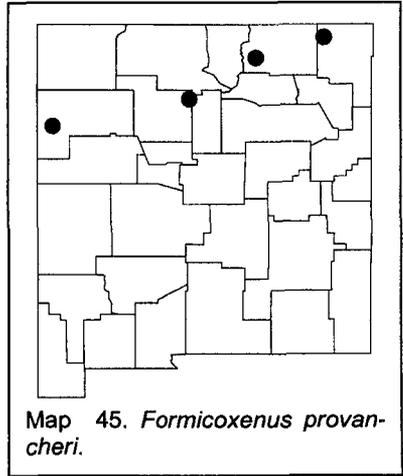
Fig. 150. Eye of a worker of *Formicoxenus provancheri*, showing the erect hairs on the surface.

The depressed clypeus could cause confusion only with *L. hirticornis* and *Leptothorax muscorum*. It can be separated from *L. hirticornis* as the dorsum of the postpetiole is nearly completely smooth, whereas the dorsum of the postpetiole of *L. hirticornis* is punctate. The hairs on the eyes separate it from *L. muscorum*, and all of the other species of *Leptothorax* which occur in New Mexico.

**Distribution.** USA: Eastern United States south and west to NM: **Colfax Co.**, 11 mi. N Eagle Nest (2,740 m on Red River Road, Cole, 1954a), **Los Alamos Co.**, Camp

May, **McKinley Co.**, 8 mi S Gallup (Fagerlund, pers. comm.), **Union Co.**, Capulín National Monument.

**Habitat.** Riparian meadows in pine forests and grasslands.



Map 45. *Formicoxenus provancheri*.

**Biology.** This species nests under stones, and is a guest in the nests of *Myrmica incompleta* and *M. fracticornis*. Apparently it cannot live without its host in the laboratory, although it can be found nesting alone in the field. Sexuials occur in the nests in July and August.

Wheeler, 1901, 1903b, 1910a; Kannoowski, 1957; Gregg, 1963 (*Leptothorax provancheri glacialis*); Wheeler and Wheeler, 1963

## Genus *Leptothorax*

(Key: Mackay, 2000)

This genus is difficult to distinguish from others due to the heterogeneity of the species. The an-

tenna consists of 11 or 12 segments with a three jointed, poorly defined

club. The propodeum is usually armed with a pair of spines.

Eliminating all other genera usually identifies these ants. They can be distinguished from *Myrmica* by the lack of pectinate tibial spurs on the mid and hind tarsi. Workers of *Tetramorium* usually have carinae that extend parallel to the scapes, and have a welt in front of the insertion of the antenna. *Stenamma* has a poorly defined 4 segmented club. The petiole of most species is not (or scarcely) pedunculate (Fig. 152). The most difficult problem with this genus is the separation of *L. pergandei* from workers of some species of *Pheidole*. Both have 12 antennal segments with a three-segmented club, the mesosoma of both is similar in structure, the petiole of both is pedunculate. It is important to collect soldiers of *Pheidole* in order to separate these two genera. *Pheidole* minors have two well developed teeth at the apex of the mandible (Fig. 47), *Leptothorax* has several teeth about equal in size. Fortunately *L. pergandei* is very rare in New Mexico.

This is a reasonably common group that occurs in nearly all New Mexican habitats, but is not often collected except by the specialist, due to their inconspicuous habits. Colonies are small and usually difficult to find. They are small ants found nesting in rotten wood or under stones, or in dead branches of trees. Many species nest within colonies of other species of ants, especially those of the genus *Formica*. Cole (1953b, 1954a, 1958) includes the species from New Mexico. Mackay (2000) describes several

new species which occur in New Mexico.

### Key to the workers of *Leptothorax*

1. Petiole with elongate peduncle (Fig. 151); dorsum of promesonotum convex in profile; metanotal suture impressed (Fig. 151); rarely collected in New Mexico ..... *pergandei* Emery

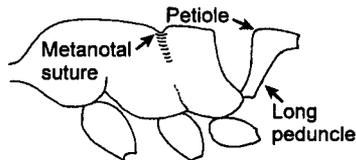


Fig. 151. Mesosoma and petiole of a worker of *L. pergandei* (From Mackay, 2000).

- Petiole without elongate peduncle (Fig. 152), or dorsum of promesonotum flat or feebly convex in profile (Fig. 152); metanotal suture at most feebly impressed (except for *L. hispidus*, see Fig. 158) ..... 2

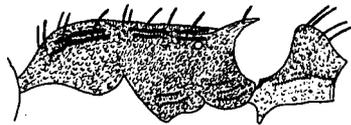


Fig. 152. Side view of a worker of *L. rugatulus*, showing a relatively short petiolar peduncle (From Mackay, 2000).

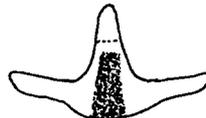


Fig. 153. Clypeus of a worker of the subgenus *Leptothorax*, with the depressed area indicated by stippling (From Mackay, 2000).

2(1). Clypeus without carinae on medial surface, but usually with carinae present anterior to frontal carinae, middle of clypeus usually concave with longitudinal depression (Fig. 153); antennal scapes often with erect or suberect hairs (**Subgenus *Leptothorax* and genus *Formicoxenus***) ..... 3

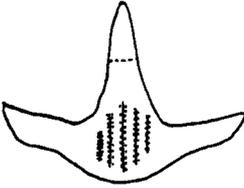


Fig. 154. Clypeus of a worker of the subgenus *Myrafant* showing the longitudinal carinae on clypeus (From Mackay, 2000).

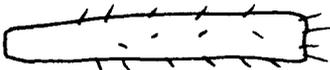


Fig. 155. Scape of a worker with erect hairs (From Mackay, 2000).

- Clypeus may be concave, but has at least a medial carina (Fig. 154), usually with 2 or more lateral carinae; scape rarely with erect or even suberect hairs (**Subgenus *Myrafant***) ..... 5

3(2). Eyes with at least a few erect hairs (Fig. 150); hairs on scapes semierect (Fig. 155) ..... **genus *Formicoxenus***

- Eyes without erect hairs; hairs on scapes decumbent or appressed ..... 4

4(3). Erect body hairs numerous, long and usually pointed; intrarugal punctures on mesosoma heavy and

dense, surface feebly shining or opaque ..... ***crassipilis* Wheeler**

- Erect body hairs sparse, short and usually clavate; intrarugal punctures on mesosoma shallow and rather sparse, the surface where they occur moderately shining .....

..... ***muscorum* (Nylander)**

5(2). Antennae with 12 segments (Fig. 156, left) (usually easier to count with funiculus held at an oblique angle) .....

6 - Antennae with 11 segments

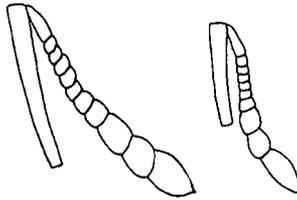


Fig. 156. Antenna with 12 segments (left) and 11 segments (right) of workers of the subgenus *Myrafant* (From Mackay, 2000).

(Fig. 156, right) ..... 25

6(5). Disc (at least basal 1/3) of first tergum of gaster predominantly reticulo - punctate (Fig. 157, left), (sculpture may be very weak and difficult to see) .....

7 - Entire disc (except possibly for region immediately posterior to connection of postpetiole) of first

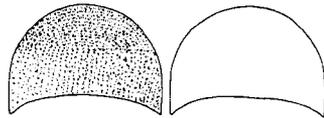


Fig. 157. Reticulopunctate sculpture on first gastral tergite (left) and smooth gastral tergite (right) (From Mackay, 2000).

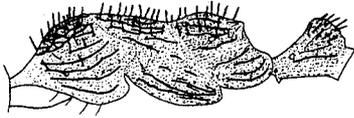


Fig. 158. Side view of a worker of *L. hispidus* (From Mackay, 2000).



Fig. 159. Propodeum and petiole of a worker of *L. silvestrii* with well developed propodeal spines (From Mackay, 2000).

tergum of gaster completely smooth, polished and shining (Fig. 157, right)

..... 9  
7(6). Propodeal angles dentiform or bump-like (Fig. 158); mesosoma impressed at metanotal suture (Fig. 158); head mostly rugose with few punctures ..... *hispidus* Cole

- Propodeal spines well formed, often half as long as, or longer than, distance between their bases (Fig. 159); mesosoma not impressed at metanotal suture (Fig. 159); sculpture of head varies ..... 8

8(7). Eye oval in shape (Fig. 160, left); dorsum of mesosoma with coarse longitudinal rugae; hind femur greatly thickened (Fig. 161); petiolar node in profile nearly as broad apically as basally (Fig. 159); propodeal spines nearly as long as

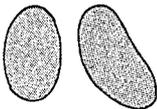


Fig. 160. Oval (left - *L. liebi*) and kidney shaped (right - *L. obliquicanthus*) eyes of workers (From Mackay, 2000).



Fig. 161. Hind femur of a worker of *L. silvestrii* (From Mackay, 2000).

distance between them; southeastern Arizona ..... *silvestrii* (Santschi)

- Eye elongate and kidney shaped (Fig. 160, right); dorsum of mesosoma finely punctate with no evidence of rugae; petiolar node in profile with a relatively sharp apex

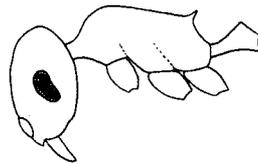


Fig. 162. Side view of a worker of *L. obliquicanthus* (From Mackay, 2000).

(Fig. 162); hind femora not greatly thickened ..... *obliquicanthus* Cole  
9(6). Dorsum of mesosoma very smooth and shiny (Fig. 163), entirely devoid of sculpture except for small, widely spaced piligerous punctures ..... *nitens* Emery

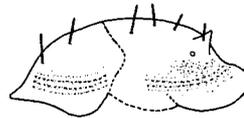


Fig. 163. Side view of the mesosoma of a worker of *L. nitens* (From Mackay, 2000).

- Dorsum of mesosoma sculptured, or at least never entirely smooth and shining, if mostly smooth and shining, at least dorsum of propodeum sculptured ..... 10  
10(9). Dorsum of head at least in part smooth and shining; if head is

partly sculptured, at least central area smooth and shining and petiolar node is angulate in profile, with relatively sharp apex (Fig. 164) ..... 11

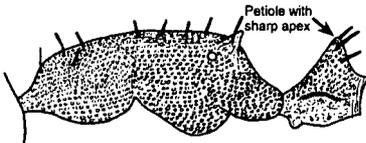


Fig. 164. Side view of a worker of *L. mariposa* (From Mackay, 2000).

- Head largely or entirely sculptured, surface feebly shining or completely opaque; if head is partially smooth and shining, then petiolar node is rounded and blunt in profile (Fig. 165), or propodeal spines are about 1/2 as long as the distance between their bases ..... 15

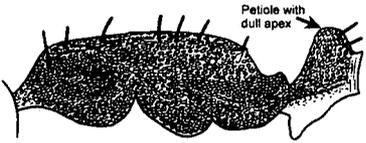


Fig. 165. Mesosoma and petiole of a worker of *L. cokendolpheri* (From Mackay, 2000).

11(10).Petiolar node blunt in profile (Fig. 165); nearly entire head smooth and shining, area adjacent to pol-

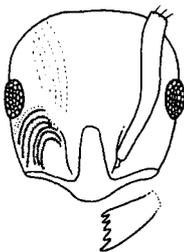


Fig. 166. Head of a worker of *L. cokendolpheri* (From Mackay, 2000).

polished central strip with very fine sculpture; central region of dorsum of head mostly free of sculpture, region adjacent to central strip with fine punctures or costulae; dorsal surface of postpetiole densely punctate; eyes small, distance from insertion of mandible to anterior border of eye about 1.2 X maximum diameter of eye (Fig. 166) .....

..... *cokendolpheri* Mackay



Fig. 167. Nodes of the postpetioles of workers of *L. melinus* (left) *L. mariposa* (right) (From Mackay, 2000).

- Petiolar node with angulate apex in profile (Fig. 164); entire dorsum of head often smooth and shining, at least posterior half of head in part smooth and shining, with broad, central strip which is free of sculpture, extending posteriorly to vertex; sculpture of postpetiole and diameter of eye varies ..... 12

12(11). Much of the dorsum of head smooth and shining; petiolar node in profile with very sharp apex (Fig. 168); posterior surface of petiolar node with punctures or fine rugulae ..... 13



Fig. 168. Propodeum and petiole of a worker of *L. melinus* (From Mackay, 2000).

- Head usually with only a central strip free of sculpture; petiolar node in profile with a relatively sharp apex (Fig. 170) ..... 14

13(12).Posterior surface of petiolar node with punctures (Fig. 167, left); New Mexico ..... *melinus* Mackay

- Posterior surface of petiolar node with fine rugulae (Fig. 167, right); SE Arizona .....

..... *mariposa* Wheeler

14(13).Dorsum of pronotum mostly glossy with a few longitudinal fine striae, but with no evidence of punctures (Fig. 169); region between propodeal spines finely punctate, nearly smooth .....

*nitens* Emery

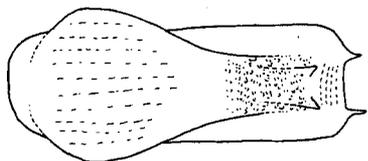


Fig. 169. Top of the mesosoma of the holotype worker of *L. nitens* (From Mackay, 2000).

- Dorsum of pronotum punctate (Fig. 170) with little evidence of striae; dark brown; region between propodeal spines with fine transverse rugae, smooth and shining lower on posterior face of propodeum; nests under bark of cottonwood trees .....

..... *adustus* Mackay

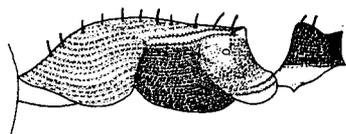


Fig. 170. Propodeum and petiole of a worker of *L. adustus* (From Mackay, 2000).

15(10).Head densely and evenly punctate, never with central strip free of sculpture, without striae or rugae, or with punctures in rows that may form weak striae; pale yellow to light brown with black eyes .....

16

- Head usually with striae or rugae as well as punctures, (if primarily punctate, central strip is smooth and shining), entire dorsal surface usually feebly shining, often central strip is without sculpture; color yellow, yellow brown to dark brown .....

18

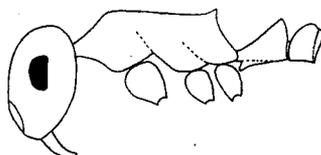


Fig. 171. Propodeum and petiole of the holotype worker of *L. colleenae* (From Mackay, 2000).

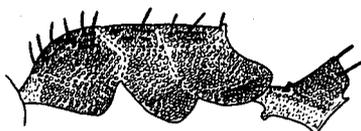


Fig. 172. Side view of a worker of *L. liebi* (From Mackay, 2000).

16(15).In profile, node of petiole blunt or rounded (Fig. 172); hairs on petiole blunt and thickened (Fig. 172); eyes relatively large (maximum diameter > 0.20 mm), maximum diameter about equal to distance from insertion of mandible; found in desert in west Texas .....

17

- In profile, node of petiole relatively sharp (Fig. 171); color pale yellow; length of propodeal spines less than 1/2 distance between bases (Fig. 171); anterior peduncle of petiole with well developed flange ending anteriorly with ventrally projecting tooth (Fig. 171); southern New Mexico .....

*colleenae* Mackay

17(16).Color nearly white; dorsum of pronotum with poorly developed

rugulae; petiolar node truncate (Fig. 172); west Texas ..... *liebi* Mackay  
 - Color pale brown; dorsum of pronotum with distinct rugae; node of petiole rounded (Fig. 173); central and southern NM .....  
 ..... *bestelmeyeri* Mackay

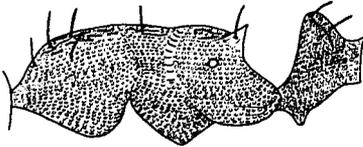


Fig. 173. Side view of a worker of *L. bestelmeyeri* (From Mackay, 2000).

18(15). Postpetiole less than 1.5 times as wide as total width of petiole, as seen from above (Fig. 174)

..... 19

- Postpetiole at least 1.5 times as wide as total width of petiole (Fig. 175), occasionally twice as wide . 22  
 19(18). Petiole and postpetiole with long, thick, hairs (Fig. 174), about 4 - 10 on petiole and 12 - 20 on postpetiole; dorsum of head with rugae, with intrarugal spaces shining; dorsum and especially sides of mesosoma with well defined rugae; node of petiole strongly truncate (Fig. 176); southeastern Arizona (Cochise Co.) ..... *stenotyle* Cole

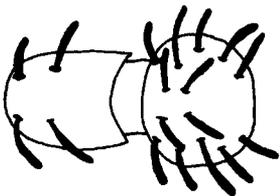


Fig. 174. Top view of the petiole and postpetiole of a worker of *L. stenotyle*, as seen from the top (From Mackay, 2000).

- Without all of above characteristics; hairs on petiole and postpetiole slightly spatulate, or only blunt tipped (Fig. 177); dorsum of head strongly striate, mixed with punctures or with fine rugulae .... 20

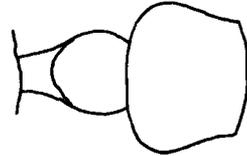


Fig. 175. Petiole and postpetiole of a worker of *Leptothorax neomexicanus* (From Mackay, 2000).

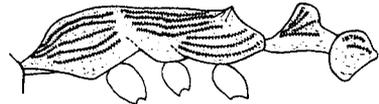


Fig. 176. Propodeum, petiole and postpetiole of a worker of *L. stenotyle*, as seen in profile (From Mackay, 2000).

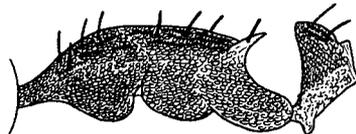


Fig. 177. Side view of a worker of *L. nevadensis* (From Mackay, 2000).

20(19). Propodeal spines about 1/2 as long as distance between bases (Fig. 177); petiolar node rounded and almost truncate in profile (Fig. 177); nests under stones and duff, and is common and widely distributed in western U.S.A., but not yet reported from NM ..... *nevadensis* Wheeler  
 - Length of propodeal spines usually less than 1/2 distance between bases, usually consisting of tiny

spines or simply angles (Fig 178) (if longer, apex of petiole sharp as seen in profile), pale yellow or light yellowish brown, head and part of gaster may be light-brown ..... 21

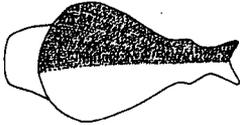


Fig. 178. Top of the mesosoma of a worker of *L. andrei* (From Mackay, 2000).

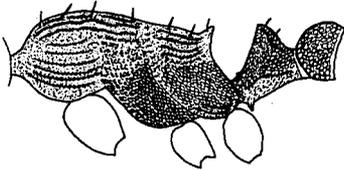


Fig. 179. Propodeum and petiole of a worker of *L. furunculus*, as seen from the side (From Mackay, 2000).

21(20).Petiole in profile with sharp apex (Fig. 179); propodeal spines nearly  $\frac{1}{2}$  length of distance between bases; mesosoma with evidence of striae, especially on sides; Colorado, Wyoming ..... *furunculus* Wheeler

- Petiole in profile with rounded or somewhat truncated apex (Fig. 180); propodeal spines short, flattened, much shorter than  $\frac{1}{2}$  distance between bases (Fig. 180);

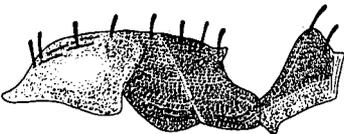


Fig. 180. Side view of a worker of *L. andrei* (From Mackay, 2000).

mesosoma completely punctate with no evidence of striae . *andrei* Emery

22(18).Dorsum of postpetiole coarsely and predominantly transversely reticulo-rugose (Fig. 181); node of postpetiole nearly twice as wide as node of petiole (dorsal view, Fig. 181); node of petiole truncate in profile (Fig. 182) ..... *texanus* Wheeler

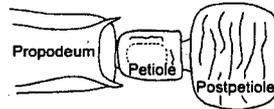


Fig. 181. Top view of the propodeum, petiole and postpetiole of a worker of *L. texanus* (From Mackay, 2000).

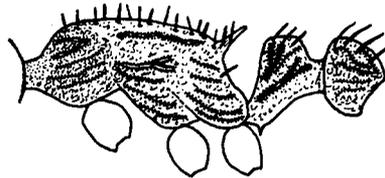


Fig. 182. Side view of the mesosoma, petiole and postpetiole of a worker of *L. texanus* (From Mackay, 2000).

- Dorsum of postpetiole punctate or granulose, rarely reticulo-rugose, rugae often present on sides of node (Fig. 183); node of postpetiole less than twice as wide as petiole, or node of petiole in profile with sharp apex ..... 23

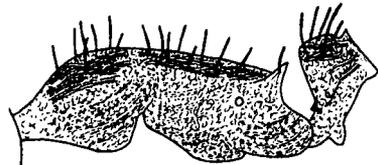


Fig. 183. Mesosoma and petiole of a worker of *L. tricarinatus*, as seen from the side (From Mackay, 2000).

**23(22).** Sculpture on dorsum of head consisting primarily of striolae or very fine rugulae (or finely punctate); side of petiole without rugae or rarely with rugulae (Fig. 184); often concolorous pale yellowish - brown (rarely dark brown), gaster often slightly darker ..... **24**

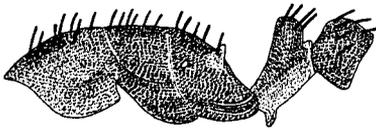


Fig. 184. Side view of a worker of *Leptothorax carinatus* (From Mackay, 2000).

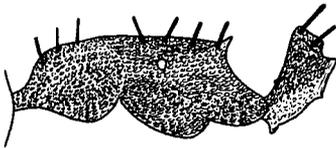


Fig. 185. Side view of the propodeum and petiole of a worker of *L. neomexicanus* (From Mackay, 2000).

- Sculpture on head consisting of fine rugae; side of petiole with rugae which are not obscured by punctures (Fig. 183); concolorous dark brown; middle and western USA ..... *tricarinatus* Emery **24(23).** Concolorous pale yellowish brown (rarely dark brown), gaster slightly darker; sculpture on dorsum of head consisting primarily of fine rugulae (or finely punctate); clypeus often somewhat depressed in form of shallow longitudinal trough, although median keel and several parallel carinae may be somewhat developed; propodeal armature consisting of simple angles (Fig. 184); sides of petiole and postpetiole punctate

without rugae or rarely with rugulae (Fig. 184); side of pronotum dull and granulate or punctate, with poorly defined parallel striae; southwestern USA and NW México ..... *carinatus* Cole - Concolorous dark brown; sculpture on head consisting of rugae; median keel on clypeus well developed; sides of petiole and postpetiole with rugae which are not obscured by punctures (Fig. 185); propodeal spines well developed (Fig. 185), length at least  $\frac{1}{3}$  distance between bases of the spines; petiole obliquely truncate (Fig. 185) ..... *neomexicanus* Wheeler

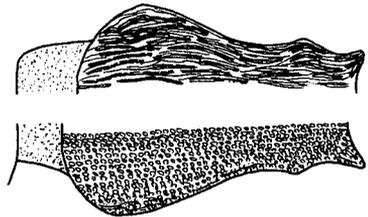


Fig. 186. Mesosomata of workers of *L. emmae* (upper) and *L. whitfordi* (lower) (From Mackay, 2000).

**25(5).** Propodeal spines short or dentiform (Fig. 186), length less than  $\frac{1}{2}$  distance between bases; often concolorous dark brown ..... **26**

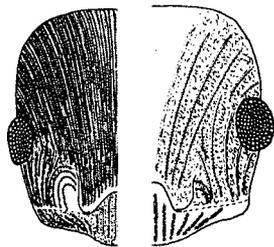


Fig. 187. The head of workers of *L. schaumii* (left) and *L. whitfordi* (right), showing the sculpture (From Mackay, 2000).

- Propodeal spines longer than  $\frac{1}{2}$  distance between bases (Fig. 188); ranging from yellowish-brown to concolorous dark-brown or bicolored ..... 28

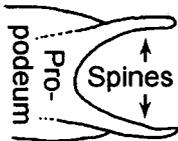


Fig. 188. Propodeal spines of a worker of *L. curvispinosus* as seen from above (From Mackay, 2000).

**26(25).**Dorsum of head densely punctate, mixed with striae (Fig. 187, left) ..... *schaumi* Roger

- Dorsum of head partially smooth and shining (Fig. 187, right) ..... 27

**27(26).**Dorsum of pronotum with rugae (Fig. 186, top); bicolored (head and gaster black, mesosoma, legs, petiole and postpetiole orange) ..... *emmae* Mackay

- Dorsum of pronotum ranging from smooth to punctate (Fig. 186, bottom); concolorous dark brown ..... *whitfordi* Mackay

**28(25).**Head with very delicate longitudinal rugae, not much coarser than intrarugal sculpture and often forming reticulations with it; propodeal spines set close together at bases, spines about twice as long as distance between bases (Fig. 188); postpetiole, from above, subquadrate, slightly broader than long; widely distributed, but not known from New Mexico ..... *curvispinosus* Mayr

- Head with coarse longitudinal rugae which are notably heavier than intrarugal sculpture and do not form reticulations with it (Fig. 189);

propodeal spines well-separated at bases ..... 29

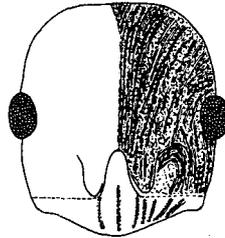


Fig. 189. Head of a worker of *L. rugatulus* (From Mackay, 2000). The sculpture is shown only on the right.

**29(28).**Relatively small, total worker length approximately 2.5 mm, yellowish-brown with dorsum of head slightly darker, rarely bicolored; nests under stones ..... *rugatulus* Emery

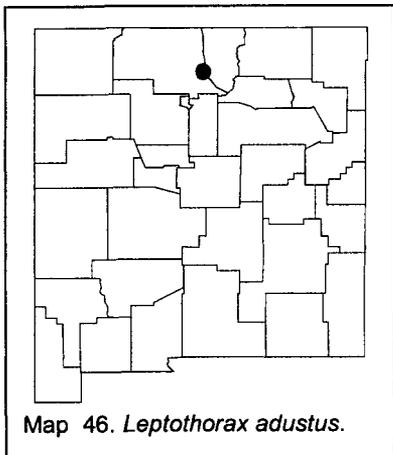
- Large ants, total worker length over 3 mm; bicolored, head and gaster black, mesosoma dark reddish brown; nests in branches of oak trees ..... *josephi* Mackay

### *Leptothorax adustus* Mackay

Fig. 170; Map 46

**Discussion.** This is a small, dark species with very tiny propodeal spines, the node of the petiole has a relatively sharp apex and the ventral surface of the peduncle has a small tooth or at least a bump. The antenna has 12 segments. The head is usually partially smooth and shining, although this lack of sculpture may be restricted to only a slender strip.

**Distribution.** USA: NM: Taos Co., Ojo Caliente.



**Habitat.** Riparian sites with cottonwood trees.

**Biology.** These ants nest under and in the bark of live cottonwood trees (*Populus fremontii*), in parts of the tree damaged by other insects.

### *Leptothorax andrei* Emery

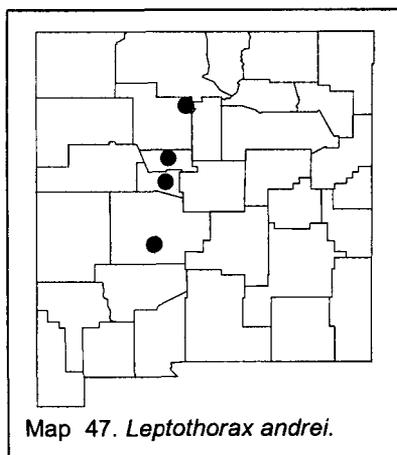
Figs. 178, 180; Map 47

**Discussion.** This is a small, light yellow or brown species with a 12-segmented antenna; striae are on the head, except for a narrow, central strip, which is smooth and shining. The entire mesosoma, petiole and postpetiole are punctate. The clypeus has a number of poorly defined carinae, the medial carina is poorly developed. The subpeduncular tooth is well developed, the petiolar node is blunt and rounded in profile, and the gaster is entirely smooth and shining. The propodeal spines consist of small angles. The postpetiole is not

broadened. The hairs on the petiole and postpetiole are somewhat clavate.

It would be easily separated from *L. bestelmeyeri* by the smaller eyes, from *L. terrigena* in that the head has striae (not punctate) and from *L. furunculus* by the very different sculpture of the clypeus (numerous, poorly developed carinae, instead of a single medial carina and 2 prominent lateral carinae).

**Distribution.** USA: CA north to NV, southeast to NM: Bernalillo Co., Albuquerque, Los Alamos Co., Rio Grande, Socorro Co., Bosque del Apache, Valencia Co., Belen; MEXICO: Baja California (Norte).



**Habitat.** This species occurs in riparian desert areas to relatively dry coniferous forests, oak woodland, laurel forest, pinyon-juniper or even cool deserts.

**Biology.** These ants nest under stones with 32 - 109 workers in the nest. Sexuials were present in nests in June and July. This species occasionally lives in nests of *Cam-*

*ponotus yogi* as well as with other *Camponotus* and *Formica* including *Formica occidua* and the thatched nests of *Formica ravidia*.

Mann, 1911; Mallis, 1941; Creighton and Snelling, 1966; Cole, 1958, 1966; Wheeler and Wheeler, 1973, 1986; Mackay and Mackay, 1984a; Mackay et al., 1988

### ***Leptothorax bestelmeyeri* Mackay**

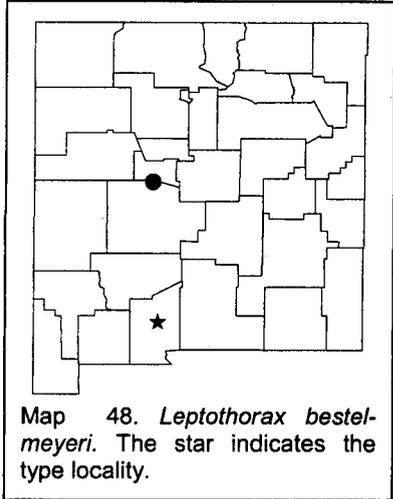
Fig. 173; Map 48

**Discussion.** This is a small, pale yellow species with large, black eyes and a 12-segmented antenna. The dorsum of the head is covered with striae formed by closely placed punctures that are in rows. The carinae on the clypeus are poorly formed, the middle carina is lacking, but the entire surface of the clypeus is convex. The top of the mesosoma is covered with fine rugae. The petiolar node is moderately sharp in profile, with the edge formed by a ruga. The subpeduncular process is well developed. The postpetiole is more than 1.5 X the width of the petiole.

This pale yellow ant with large, black eyes would be confused with few other species, except for *L. andersoni*, *L. cokendolpheri*, *L. liebi* and *L. colleenae* from the Chihuahuan Desert. See the discussion of *L. colleenae* for characteristics to separate these species. The large eyes would also separate it from *L. terrigena*, *L. furunculus*, and *L. andrei*.

**Distribution.** USA: NM: Doña Ana Co., 45 k NE Las Cruces (Long Term Ecological Research

site, type locality), Socorro Co., Sevilleta National Wildlife Refuge.



**Habitat.** Desert grassland (*Scleropogon brevifolius* and *Sporobolus cryptandrus*).

**Biology.** The single holotype worker was collected in a pitfall trap. The nest at the Sevilleta was in a silty loam soil in a Gunninson's prairie dog colony in a disturbed, patchy habitat (A. Davidson, pers. comm.). These ants apparently steal stored seeds of the mammals, and are apparently primarily nocturnal.

### ***Leptothorax carinatus* Cole**

Fig. 184

**Discussion.** This is a yellow brown species with a 12-segmented antenna. The dorsum of the head is usually finely striolate, but is still moderately shining. The top and side of the mesosoma are mostly punctate, although there may be fine rugulae along the lower border of the

pronotum. The propodeal armature consists of small angles. The petiolar node is blunt and both the petiole and postpetiole are punctate, without any sign of rugulae or costulae. The subpetiolar process is well developed. The postpetiole is at least 1.5 X as wide as the greatest width of the petiole. The gaster is completely smooth and shining.

This species superficially resembles *L. andrei*, but can be easily distinguished by a number of characters. The postpetiole is 1.5 - 1.65 X the width of the petiole, whereas in *L. andrei* it is about 1.2 times the width of the petiole. The node of the petiole in profile has anterior and posterior faces that are almost parallel, whereas the faces of the node of *L. andrei* converge towards the apex. This species could be confused with *L. tricarinatus* or *L. neomexicanus*, but differs most obviously in being lighter in color. The sides of the petiole and postpetiole are punctate (rugose or rugulose in *L. tricarinatus* and *L. neomexicanus*). It is much lighter in color than either of these 2 species and the propodeal spines are poorly developed, as compared to the latter 2 species. It can be separated from *L. rugulosus* as the hairs on the scape are nearly all closely placed on the surface, those of *L. rugulosus* are partially raised, nearly suberect. The dorsum of the mesosoma is mostly punctate, whereas the sculpture of the top of the mesosoma of *L. rugulosus* has fine rugulae. It is similar to *L. neomexicanus*, but differs in being yellow or orange (*L. neomexicanus* is dark or black), the propodeal spines are usually poorly developed, consisting of tiny angles (small, but well

developed spines in *L. neomexicanus*) and the subpeduncular process consists of an elongate lobe (tiny tooth in *L. neomexicanus*). *Leptothorax carinatus* has fine striolae on the dorsum of the head, and has a well-developed subpeduncular tooth, and seems to occur in more mesic sites. *Leptothorax neomexicanus* has at least part of the dorsum of the head finely punctate, the subpeduncular process is poorly developed, and is generally found in more arid sites.

**Distribution.** USA: WY, NV, southeastern AZ (Chiricahua Mountains); western TX (Davis Mountains, Chisos Mountains); MEXICO: Chihuahua. We have no records from New Mexico, but would expect this species to occur in the state.

**Habitat.** Nests occur in habitats ranging from desert grasslands, to juniper forests with cholla, desert riparian sites, up to pine forests.

**Biology.** This species nests beneath stones, with populations ranging between 29 - 182 workers. Nests are monogynous, with sexuals in nests from June to August.

Cole, 1958; Van Pelt, 1983; Wheeler and Wheeler, 1988; Frumhoff and Ward, 1992

### *Leptothorax* *cokendolpheri* Mackay

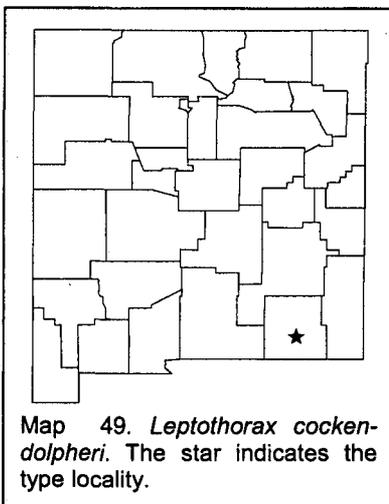
Figs. 38, 165, 166; Map 49

**Discussion.** This species has a 12-segmented antenna and is a small, light brown species in which the dorsum of the head is nearly smooth and shining. The sides of the head have fine striae, which pass to

the dorsum. The eyes are small, with about 7 ommatidia in the maximum diameter and the maximum diameter is equal to or less than the minimum distance from the anterior border of the eye to the insertion of the mandibles. The mesosoma is punctate, with the sides of the pronotum having striae. The propodeal spines are small and poorly developed. The petiole and postpetiole are punctate, and the postpetiole is usually about 1.5 X the maximum diameter of the petiole, although there is a lot of variation. The dorsum of the gaster is polished and shining.

*Leptothorax cokendolpheri* is similar to *L. punctithorax*, and differs in that the postpetiole is noticeably broadened, the propodeal spines are smaller and the eyes are smaller. It is pale yellow in color whereas *L. punctithorax* is dark brown. The propodeal armature consists of simple angles, whereas the spines of *L. punctithorax* are small, but developed and acute. It appears to be closely related to *L. carinatus*, but can be separated as the eyes are smaller (7 - 8 ommatidia in maximum diameter vs. 8 - 9 in *L. carinatus*), the distance from the anterior margin to the insertion of the mandibles is equal to or greater than the maximum diameter of the eye (equal to or less than in *L. carinatus*) and the dorsum of the head is mostly smooth and shining (mostly striate or lightly punctate in *L. carinatus*). The females of *L. cokendolpheri* and *L. carinatus* are similar, but can be easily separated as the katepisternum (lower half of mesopleuron) is completely striate (at least partially smooth in *L. carinatus*) and the pro-

podal spines are well developed (less developed in *L. carinatus*). The width of the postpetiole ranges from 1.41 to 1.67 times as wide as the petiole in the type series workers. This species could be confused with other light colored species in the Chihuahuan Desert, including *L. andersoni*, *L. bestelmeyeri*, *L. colleenae*, and *L. liebi*. See the discussion of *L. colleenae* for hints as to how these species could be separated.



Map 49. *Leptothorax cokendolpheri*. The star indicates the type locality.

**Distribution.** USA: southern New Mexico, western Texas; NM; Eddy Co., Hidden Cave (type locality).

**Habitat.** Collected in a cave, in a mesic site in the Chihuahuan Desert and in mixed hardwood forest.

**Biology.** The type series was collected in a cave, the specimen from Big Bend National Park, Brewster Co., TX, was collected mixed hardwood leaf litter.

***Leptothorax colleenae***  
**Mackay**

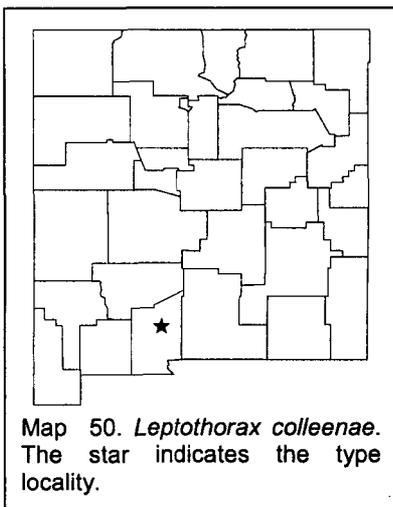
Fig. 171; Map 50

**Discussion.** This is an easily recognized, small, light yellow species with strongly contrasting black eyes and a 12-segmented antenna. Only a few species have this combination of colors and occur in the Chihuahuan Desert.

This species is clearly distinct from all other *Leptothorax* species. Although a small region posterior to the frontal area is somewhat smooth and shining, the head is almost completely punctate, which would preclude any confusion with species such as *L. carinatus*, *L. mariposa*, *L. nitens* or *L. adustus*, which usually have a large portion of the dorsum of the head smooth and shining and always have at least some striae on both sides of this shiny region. Also these 4 species are much darker than *L. colleenae*. There are no striae on the head of *L. colleenae*, except on the malar area, which would eliminate confusion with any of the species such as *L. carinatus* or *L. furunculus*. It is also much lighter in color than these species. The well-developed ventral flange on the anterior peduncle of the petiole also separates it from most of the other similar *Leptothorax*. This species can be easily distinguished from the light colored *L. bestelmeyeri* and *L. cokendolpheri*, which have heads with fine striolae, and which are partially smooth and shining. The eye of *L. bestelmeyeri* is much larger than the eye of *L. colleenae*. It could be confused with *L. liebi* and *L. andersoni*,

in which the heads are also punctate. Both of these species have blunt petiolar nodes, which would allow separation of these species from *L. colleenae*.

**Distribution.** USA: NM: Doña Ana Co., 45 k NE Las Cruces (Long Term Ecological Research site, type locality).



**Habitat.** The habitat where the holotype was collected was a creosotebush (*Larrea tridentata*) desert bajada.

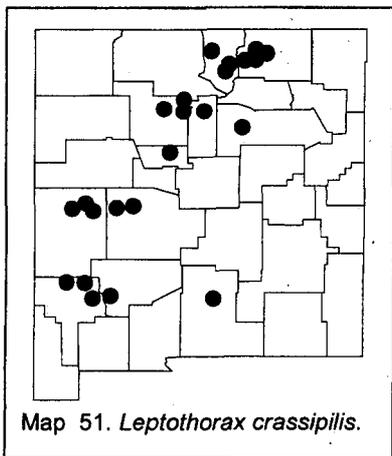
**Biology.** The holotype was collected in a pitfall trap on 6 July 1984. The specimen was collected along the Long Term Ecological Site Control Transect, a few meters west of the diagonal dirt road which crosses the transect in the creosotebush zone. Despite extensive pitfall trapping in the area and numerous collecting trips made in all seasons and during both day and night, by numerous individuals, over several years, only the single specimen was collected. This is one of the 7 species

which occur in typical Chihuahuan Desert vegetation (the others are *L. andersoni*, *L. bestelmeyeri*, *L. cokerdolphi*, *L. neomexicanus*, *L. liebi*, *L. bristoli*). It may be nocturnal as it is light colored and has large black eyes as other nocturnal desert ants.

### *Leptothorax crassipilis* Wheeler

#### Map 51

**Discussion.** The clypeus of the worker is depressed in the middle and is without a medial carina, although several lateral carinae are present. The propodeal spines are well developed, and thickened at the bases. The anterior face of the petiole meets the dorsum in an angle, the posterior face is convex and rounded. The dorsum of the postpetiole is completely covered with punctate-granulose sculpture. The mesosoma has heavy and dense sculpture. There are numerous long (most over 0.1 mm), pointed (occasionally blunt) tipped hairs.



Map 51. *Leptothorax crassipilis*.

The depressed clypeus could cause confusion only with members of *Formicoxenus* and with *L. muscorum*. It can be separated from *Formicoxenus*, as the hairs on the scapes are all appressed or decumbent, whereas the same hairs in *Formicoxenus* are suberect. There are no erect hairs on the eyes. Additionally, the dorsum of the postpetiole is completely and roughly sculptured, whereas the dorsum of the postpetiole of *Formicoxenus provancheri* is finely sculptured and predominantly smooth and shining. It can be separated from *L. muscorum* by the longer hairs on the pronotum. Additionally the dorsum of the mesosoma is more roughly sculptured, with distinct rugulae or rugae.

**Distribution.** USA: WY south to NM W to NV and AZ; NM: Bernalillo Co., **Sandia Mts.** (Cole, 1954a), **Catron Co.**, near Datil, 15.3 k NW Datil, Ox Spring Canyon, **Colfax Co.**, Cimarron Canyon (Cole, 1954a), 16 k E Eagle Nest, 4 mi. E Eagle Nest, 4 mi. W Eagle Nest, **Grant Co.**, Gila Mts., Mogollon Mts. (Trail 206), Wright's Cabin, **Los Alamos Co.**, Mortandad Canyon, 8 k NE Los Alamos (in Chupaderos Canyon), **Otero Co.**, near Timberon, **Sandoval Co.**, Bandelier National Monument (Cole, 1954a), Jémez Mts., **San Miguel Co.**, Sappello Canyon (Cole, 1954a), **Santa Fe Co.**, 12 k NE Santa Fe, **Sierra Co.**, Gila Mts. (Iron Creek), **Socorro Co.**, 43 k SE Datil, Magdalena Mts. (Water Canyon), **Taos Co.**, 6 k SW Tres Piedras, 7 mi. E Taos, 12 mi E Taos (Cole, 1954a).

**Habitat.** Oak woodland, deciduous forests, ponderosa pine-

riparian, Chihuahua pine, Douglas fir, spruce and fir forests, grasslands, subalpine fir, moist, shaded slopes as well as grassy, level, riparian areas.

**Biology.** These ants nest in the soil, under stones or rarely in logs and stumps, in sandy loam to rocky loam soils. Brood and reproductives were found in nests from June to August, flights occurred in August. Most nest females are found simply under the stone, one gyne was at a depth of about 10-cm in the soil. This species may be polygynous, as one nest contained 2 dealate females. Colonies were found together with *Myrmica hamulata*, *Camponotus vicinus*, *Formica lasioides* and *F. occulta*.

Cole, 1954a; Gregg, 1963

### ***Leptothorax curvispinosus* Mayr**

Fig. 188

**Discussion.** This is a small yellow ant with an 11-segmented antenna. The very long, inwardly curved, closely spaced propodeal spines make this species immediately recognizable. The propodeal spines are often narrow and about the same diameter throughout. The top and side of the mesosoma is covered with coarse rugae. The head is strongly punctured with delicate, longitudinal rugae.

**Distribution.** USA: Eastern United States and AZ; NM: We encountered no collections in the state.

**Habitat.** The species is widely distributed in many different habitats in forested areas.

**Biology.** Nests were found in plant cavities, including hollow stems, under bark of living trees, in reeds, twigs, logs, acorns, nut shells, insect galls, puffballs, pine cones and under stones. Nest populations are about 80 - 100 workers with several queens, up to a total of all members of 727, and nest densities of 0.6 nests per square meter. Alates are present from June to August, flights occur in early July. Larvae are found within nests throughout the year. Nests are polygynous and polydomous. The nest site may change after slight disturbances. It eats honeydew on leaves of trees and plants, but apparently does not tend aphids, and carries seeds and presumably eats at least part of them. They also feed at the axillary nectaries of bracken fern and on dead insects. Foraging involves tandem running. Seasonally, foraging rate is highest in the spring and early summer, dropping off in the fall and being absent in the winter. It is most active during the daylight hours. It is the host of *Leptothorax duloticus* Wesson, *Protomognathus americanus* (Emery), possibly *L. minutissimus* (Smith, 1942b), and *Limulodes parki* (Coleoptera - Seevers and Dybas, 1943).

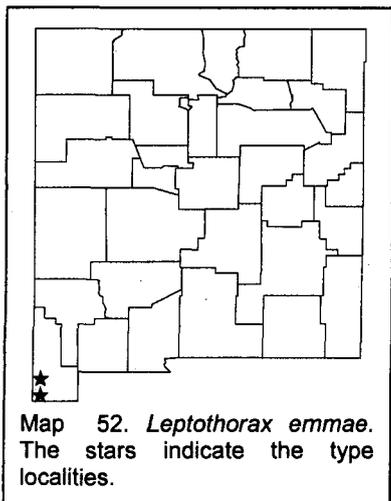
The habits of this species are well known (Emery, 1895; Wheeler, 1903b, 1905a, 1916; 1917; Smith, 1924; Talbot, 1934, 1957, 1965; Dennis, 1938; Cole, 1940; Wesson and Wesson, 1940; Headley, 1943; Buren, 1944; Gregg, 1944; Kannonowski, 1959; Van Pelt, 1963; Wilson, 1974a, 1974b; Wilson and Fagan, 1974; Möglich, 1978, 1979; Alloway and del Rio Pesado, 1979, 1983; Heithaus, 1981; Alloway et al.,

1982; Fellers and Fellers, 1982; Douglas, 1983; Herbers, 1983; DuBois, 1985; Stuart, 1985, 1987a, 1987b; Fellers, 1989; Williams, 1989; Frumhoff and Ward, 1992).

### ***Leptothorax emmae* Mackay**

Figs. 49, 186; Map 52

**Discussion.** The 11-segmented antenna, well-developed medial clypeal carina, with two prominent lateral carinae, the thick, blunt petiole and the well-developed suprapeduncular process would separate *L. emmae* from all of the other species in the subgenus, except *L. whitfordi*. It could be separated from this latter species as the mesosoma has longitudinal striae (punctate or partially smooth and shining in the latter species). Additionally, it is bicolored, whereas the other species is dark brown.



Map 52. *Leptothorax emmae*. The stars indicate the type localities.

**Distribution.** USA: AZ; NM: Hidalgo Co., Coronado Na-

tional Forest, (Peloncillo Mts., 31°30'58"N 109°00'04"W, Cloverdale Creek, 31°26'25"N 108°58'29"W, 1491 m, and Clanton Draw, 31°31'00 108°58'56").

**Habitat.** Oak forests.

**Biology.** This species nests in 3 cm diameter dead branches of Emory oak (*Quercus emoryi*). The ants attempt to escape when the nest is opened. The trees were located in the bottom of a draw, in a flat area of oak-juniper grassland. A complete nest population consisted of a single female and 116 workers.

### ***Leptothorax furunculus* Wheeler**

Fig. 179

**Discussion.** The workers of this species are yellow brown with a 12-segmented antenna. The clypeus has a single median carina, 2 prominent lateral carinae and a few others, which are poorly defined. The head has wavy rugae, forming concentric semicircles around the insertion of the antennae, the striae posterior to the eyes are directed posteriorly to the posterior lateral lobes, the central area of the head has poorly defined striae and is partially smooth and shining. The top of the mesosoma is covered with punctures and fine rugae, the sides near the top have somewhat coarse rugae. The pronotum has striae, the mesopleuron and side of the propodeum is covered with punctures. The propodeal spines are small, but well formed. The petiolar node is moderately sharp, as seen in profile. The subpeduncular process is large and well developed.

The surface of the petiole and postpetiole are covered with punctures. The dorsum of the gaster is smooth and polished.

This species could be confused with *L. nevadensis* or *L. andrei*. It differs from these species in that the petiolar node is moderately sharp at the apex (rounded in *L. nevadensis* and *L. andrei*) and the hairs on the petiole and postpetiole are only very slightly spatulate, or simply truncate. It is similar in color to *L. andrei*, but has propodeal spines which are about 1/2 the length of the distance between their bases, not simply angles as in *L. andrei*. The clypeus is completely different from that of *L. andrei* possessing a single medial carina and two prominent lateral carinae, not a series of poorly defined carinae as in *L. andrei*. It can be separated from *L. neomexicanus*, as it is lighter in color and has a much more developed subpeduncular process. Wheeler (1909) states that *L. furunculus* has a distinct metanotal impression, which is correct, although the impression is poorly developed and not much more notable than in most of the other species in the subgenus.

**Distribution.** USA: WY, CO; NM: Not known to occur in the state, but was collected in SW Colorado (Williams Canyon near Manitou, 7,500').

**Habitat.** Pinyon-cedar woodland.

**Biology.** This species nests under stones. Wheeler (1909) mentions the type series had a peculiar oily appearance not seen in any of the other species of the genus.

Wheeler, 1909; Gregg, 1963

## *Leptothorax hispidus* Cole

Fig. 158

**Discussion.** This is a large species (3 - 4 mm total length) with a 12-segmented antenna, dark brown, with the mesosoma depressed at the area of the metanotal suture, although the sculpture is not broken in the region. The top and side of the mesosoma are covered by coarse, reticulated rugae. The propodeal armature is represented by bumps. The node of the petiole is low and truncate. The petiole and postpetiole are covered with reticulated rugae. The strongly reticulo-punctate disc of the first gastral tergite, the depressed mesosoma, and the large size will separate this species from all other species in the subgenus.

Cole (1957c) stated that this species is most closely related to *L. silvestrii*, which is incorrect (Mackay, 2000). It can be easily distinguished from *L. silvestrii*, as the hind femur in *L. silvestrii* is greatly incrassate (swollen in the middle), which is not the case in *L. hispidus*. In addition, the impression at the metanotal suture is absent in *L. silvestrii*; the scapes are longer in *L. hispidus*, as compared to *L. silvestrii*. The eye is normal in shape for the genus, which easily separates this species from *L. obliquicanthus*, which has a kidney-shaped eye. In addition the propodeal spines are simple angles in *L. hispidus* and are well developed in the other two species.

**Distribution.** USA: West TX southeast into Mexico, may occur in NM.

**Habitat.** High elevation forests.

**Biology.** This ant nests under stones or in soil.

Cole 1957c; Van Pelt, 1983

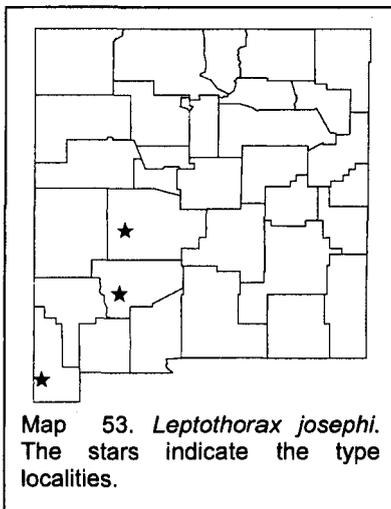
***Leptothorax josephi***  
**Mackay**

Map 53

**Discussion.** This is a large, bicolored (head and gaster black, mesosoma reddish brown) species which is easily confused with the bicolored form of *L. muscorum* in the field. The antenna is 11 segmented, the propodeal spines are large, and the mesosoma has coarse rugae. The clypeus has a well-developed medial carina, and 2 prominent lateral carinae. The dorsal surface of the gaster is strongly shining.

It is most closely related to *L. rugatulus*, but the worker is larger, the female is also larger (5 mm total length vs. 3.5 mm total length in *L. rugatulus*), and the male has numerous parallel carinae on the clypeus (*L. rugatulus* males have reticulated and partially transverse rugae on the clypeus). It differs from two other closely related species, *L. bradleyi* and *L. smithi*, in that the intrarugal spaces of the head are punctate, but shining. The long propodeal spines are much longer than those of *L. bradleyi*. *Leptothorax smithi* is never bicolored, usually being a concolorous pale brown to yellow. It can be separated from *Leptothorax* (*Leptothorax*) *muscorum* by the convex clypeus with the well-developed medial carina.

**Distribution.** USA: NM: **Hidalgo Co.**, Coronado National Forest, (Clanton Draw), **Sierra Co.**, 21 k SW Hillsboro (Road 888 off Highway 26, just inside the Gila Wilderness, 32°45'34.9" 107°40'13.7", 1720 meters), **Socorro Co.**, near Mount Withington, (33°48'32.2" 107°22'57.2", 2185 meters).



Map 53. *Leptothorax josephi*. The stars indicate the type localities.

**Habitat.** Oak forest, often near streams with pinyon pines and junipers or grassy areas with scattered oaks within a pine forest.

**Biology.** This species nests in dead branches attached to trunks of the oak *Quercus arizonicus*. The ants are timid and attempt to hide with larvae and pupae that are present in the nest. This species prefers the driest dead branches of *Q. arizonica*. The nests contain brood throughout the summer. Nest populations ranged from 41 - 76 workers, with a single dealate female in each nest.

***Leptothorax liebi* Mackay**

Figs. 160, 172

**Discussion.** This is a small, pale yellow to nearly white ant with large, dark eyes. The antenna has 12 segments, the head is heavily and densely punctate, with the punctures forming weak striae. The eyes are very large, located about one maximum diameter from the insertion of the mandibles. The propodeal spines are poorly developed, forming small angles. The petiolar node is truncate. It is soft bodied, and usually becomes distorted when dried on a point. These characters will actually separate it from all other members of the genus.

This species could be confused with *L. terrigena* or *L. punctatissimus*, but could be easily separated with the characters in the diagnosis. It somewhat resembles *L. colleenae* in terms of sculpture, but differs in having the large eyes and a blunt petiolar node. The discussion of *L. colleenae* includes suggestions as to how to distinguish the pale, desert species, including *L. andersoni*, *L. bestelmeyeri*, *L. cokendolpheri*, *L. colleenae*, and *L. liebi*. The large eye may cause it to be confused with *L. obliquicanthus*, but the eye is not kidney shaped and the first tergum of the gaster is entirely smooth and shining, not sculptured as in *L. obliquicanthus*. Therefore there is little likelihood that this species would be confused with any other. This is another species of the Chihuahuan Desert that is pale yellow in color with dark eyes. These are presumably adaptations to nocturnal

foraging, although the specimens at Van Horn were collected actively foraging at the nest entrance during the day. This coloration appears to be the result of convergent evolution, as these pale, desert species seem to have little in common morphologically other than color.

**Distribution.** USA: west Texas (Culberson Co., Hudspeth Co.), may occur in New Mexico.

**Habitat.** Desert scrub.

**Biology.** This species nests in soil in creosotebush scrub in the Chihuahuan Desert. Both specimens of the type series were collected in the same pitfall trap station, but one in August and the second in October. The site is a low flat area covered with loose, volcanic ash. They are probably active primarily at night, based on the light color and large eyes.

***Leptothorax mariposa*  
Wheeler**

Figs. 164, 167

**Discussion.** This is a small species with a 12-segmented antenna, usually light brown, the petiolar node has a sharp apex, the subpetiolar process is usually a poorly formed, angulate structure, most of dorsum of the head is smooth and polished, the side has striae or rugulae, the propodeal spines well formed, acute, but short (about 1/3 length or less of distance between bases), the mesosoma is predominantly punctate, but with fine striolae, especially obvious on the pronotum and top of the mesonotum.

This species can be separated from the others in the *nitens* group by the extremely acute petiolar node as seen in profile, and the smooth and polished dorsum of the head. The head is more quadrate than that of *L. nitens* (Cole, 1958 states the cephalic index of *L. mariposa* is 96, that of *L. nitens* is 79). The sculpture is rougher than in *L. nitens*, consisting of coarse punctures as well as prominent longitudinal rugae. It is larger than *L. nitens* (Cole, 1958 states the total thoracic length of *L. mariposa* is 0.95 mm, that of *L. nitens* is 0.71 mm). It is closely related to *L. melinus* from which it can be separated by having rugulae on the posterior face of the node (see *L. melinus* discussion).

**Distribution.** USA: OR, CA, AZ (Cochise Co., Chiricahua Mountains); NM: We have no records, but this species may be found in the southwestern part of the state.

**Habitat.** Pine-fir forests Douglas fir, *Rhododendron*, life oak and laurel (Anderson, pers. obs.). This species is also found in relatively dry sites.

**Biology.** This species nests under stones, with a nest population ranging from 37 - 97 workers.

Wheeler, 1917; Cole, 1958; Mackay, 2000

### *Leptothorax melinus* Mackay

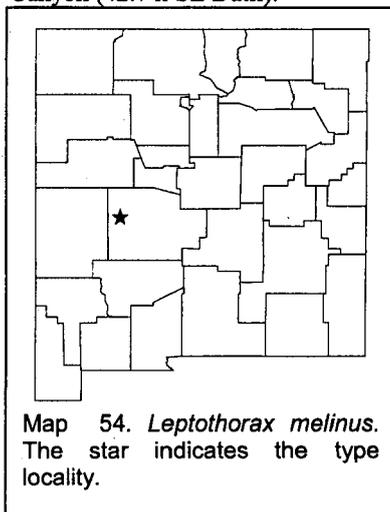
Figs. 167, 168; Map 54

**Discussion.** This is a small species of honey colored *Leptothorax* with a 12-segmented antenna, in which the head is nearly completely

smooth and shining and the mesosoma is completely and densely punctate.

This species is most similar to *L. mariposa*, and differs in that the posterior surface of the petiole is primarily punctate, whereas the posterior surface of the *L. mariposa* has fine rugulae. It may be shown to be a synonym of *L. mariposa*, when the variability is better known. It is also similar to *L. nitens*, but is easily recognized in being much lighter in color and having the mesosoma completely and densely punctate. *Leptothorax nitens* has the dorsum of the mesosoma primarily smooth and polished.

**Distribution.** USA: West central NM: Socorro Co., Beartrap Canyon (42.7 k SE Datil).



**Habitat.** Recently burned slope with ponderosa pines.

**Biology.** A nest was collected under a small, hard log in the soil on a south-facing slope. The soil was fine sand with scattered stones. Brood was found in the nest in Au-

gust. The ants are very timid and feign death. Only one nest of this species was found at the site. A *Myrmica* sp. female was under the same log. Another nest was found in the same log as a nest of *Myrmica lobifrons*.

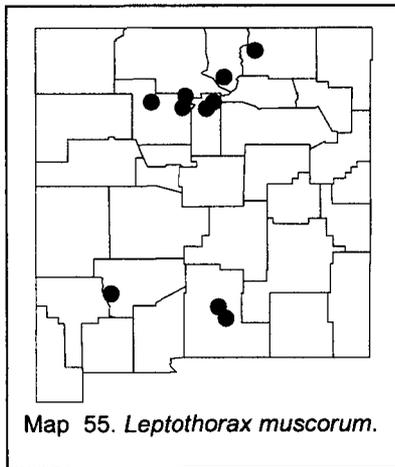
### ***Leptothorax muscorum* (Nylander)**

Map 55

**Discussion.** This is apparently a species complex and is in need of clarification. The clypeus of the worker is depressed in the middle and is without a medial carina, although several lateral carinae are present. The propodeal spines are well developed. The anterior face of the petiole is weakly concave, and meets the dorsum in an angle, the posterior face is convex and rounded. The dorsum and sides of the mesosoma, petiole and postpetiole are completely covered with punctate-granulose sculpture. There are numerous short (0.01mm), blunt-tipped hairs.

The depressed clypeus could cause confusion with members of the genus *Formicoxenus* and with *L. crassipilis*. It can be separated from *Formicoxenus* as it lacks the erect hairs on the eyes, and the hairs on the scapes are all appressed or decumbent, whereas the same hairs in *Formicoxenus* are suberect. It can be separated from *L. crassipilis* as the hairs on the dorsum of the mesosoma are shorter, and the sculpture on the dorsum of the mesosoma is finer, without distinct rugulae.

**Distribution.** USA: AK south to CA, east to CT; NM: **Grant Co.**, Gila Mts. (Wright's Cabin), **Los Alamos Co.**, Camp May, Los Alamos, Mortandad Canyon, **Colfax Co.**, north of Eagle Nest (Cole, 1954a), **Otero Co.**, 4 mi. N Cloudcroft, 14.4 k N Timberon (Spring Canyon), **Sandoval Co.**, Bandelier National Monument, 45 k SE Cuba, **Santa Fe Co.**, 12 k NE Santa Fe, Tesuque Canyon (Cole, 1954a), **Taos Co.**, 20 k S Taos.



Map 55. *Leptothorax muscorum*.

**Habitat.** Woodlands, ponderosa pine-riparian; ponderosa pine; aspen, spruce forests, mixed forest.

**Biology.** This is one of the most common *Leptothorax* spp. in northern New Mexico. It nests in rotten logs (usually ponderosa pine) throughout the area. Logs may range from 15 cm to 1 m in diameter. Nests may also be located below stones. Brood and reproductives were found in the nests in July and August and nests may contain more than one queen. It shares nests with *Myrmica fracticornis*, *M. emeryana* and *Tapinoma sessile*.

Mallis, 1941; Cole, 1942; Brown, 1955; Kanno, 1959; Gregg, 1963 (*L. canadensis*); Wheeler and Wheeler, 1963 Chapman, 1969; Möglich et al., 1974

***Leptothorax  
neomexicanus* Wheeler**

Figs. 175, 185; Map 56

**Discussion.** Workers of this species have a 12-segmented antenna, the medial clypeal carina is well developed; the lateral carinae may be somewhat weakly developed. The anterior edge of the medial clypeal lobe is usually somewhat delineated by 1 or more transverse carinae. The head is covered with fine striolae, except for a central strip, which is partially smooth and shining. The node of the petiole is rounded or weakly truncate. The postpetiole is broad as seen from above (more than 1.5 times the width of the postpetiole), but much less than  $\frac{1}{2}$  the width of the gaster. The propodeal spines are short and denticulate. The side of the mesosoma, petiole and postpetiole are more or less uniformly covered with a granulate or punctulate sculpture, which is so delicate that much of these areas, especially the mesosoma, are shiny under various lighting conditions. The top of the mesosoma is covered with fine rugulae, which nearly form foveolate punctures. The subpeduncular process is poorly developed, consisting of a tiny bump (Fig. 185).

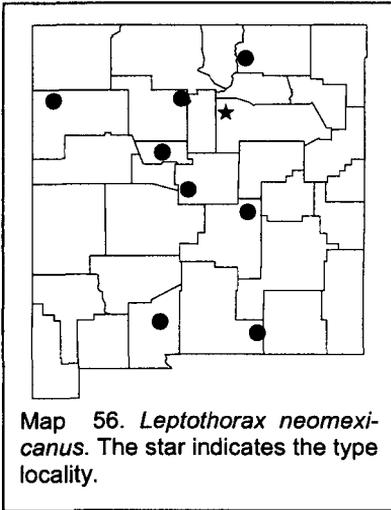
This species could be confused with *L. tricarinatus*, which has an opaque to subopaque head (owing to heavy sculpture, see Gregg, 1963),

whereas *L. neomexicanus* has a head which is largely smooth and shining, especially in the median and posterior regions (because of weak sculpture). The dorsum of the mesosoma of *L. tricarinatus* is also opaque and weakly shining, whereas in *L. neomexicanus* it is rather strongly shining. *Leptothorax neomexicanus* has longer propodeal spines, they are more stout, triangular and toothlike in *L. tricarinatus*. Although *L. neomexicanus* is similar to *L. tricarinatus*, they both appear to be valid species, as they are sympatric throughout much of their ranges, with no apparent evidence of hybridization.

The lateral carinae of the clypeus of both *L. neomexicanus* and *L. nevadensis* are very similar, in that they curve inward medially at the anterior part of the medial lobe of the clypeus, and connect. They can be easily separated as the head of *L. neomexicanus* is at least partly smooth and shining, whereas the dorsum of the head of *L. nevadensis* is nearly completely sculptured. It can be separated from *L. carinatus* in being much darker in color (*L. carinatus* is pale brown or brown-orange). The propodeal spines are well developed, but short ( $\frac{1}{3}$  to  $\frac{1}{2}$  of the length of the distance between the bases), whereas the propodeal armature of *L. carinatus* consists of poorly developed angles.

**Distribution.** USA: AZ, NV, UT, CO, NM, TX; NM: Bernalillo Co., Albuquerque, Doña Ana Co., 45 k NE Las Cruces (Long Term

Ecological Research site), **Colfax Co.**, Cimarron Canyon (Cole, 1954a), **Lincoln Co.**, 25 m SE Vaughn, **Los Alamos Co.**, Los Alamos, **McKinley Co.**, Gallup (Cole, 1954a), **Otero Co.**, Guadalupe Mts. (41 k NW Sitting Bull Falls), **San Miguel Co.**, Manzanares (type locality), **Torrance Co.**, Mountainair (Cole, 1954a); MEXICO: Chihuahua.



Map 56. *Leptothorax neomexicanus*. The star indicates the type locality.

**Habitat.** Open, dry grassy areas, riparian desert streams, to ponderosa pine forests, occasionally found in arid, desert sites.

**Biology.** This species nests in the soil, or under stones, in open areas. Nests are monogynous and are marked by a hole in the ground, occasionally with a light, asymmetrical scattering of fine soil. Colonies are small.

Wheeler, 1906b; Smith, 1952; Cole, 1953d, 1954a; Gregg, 1963; Van Pelt, 1983; Wheeler and Wheeler, 1986; Mackay et al., 1988; Frumhoff and Ward, 1992

## *Leptothorax nevadensis* Wheeler

Fig. 177

**Discussion.** This species has a completely and strongly striate head with punctures between the striae, and rarely with a slender median strip without sculpture. The sides of the pronotum are distinctly and coarsely rugose, with the background weakly punctate, but shining. The dorsum of the mesonotum is striate to finely rugose, but mixed with background punctures and not as shiny as the background of the sides of the pronotum. The petiole and postpetiole are primarily punctate, but fine rugulae can be seen on the dorsum of the petiole. There is usually a single ruga on the side of the petiole. Some larger specimens have several poorly defined rugae on the side of the petiole (making it look "wrinkled"), and occasionally on the anterior face. These larger specimens usually have longer propodeal spines, sometimes as long as the distance between the bases. Such specimens were previously referred to as *L. nevadensis* subsp. *melanderi*.

*Leptothorax nevadensis* and *L. neomexicanus* have similar lateral clypeal carinae, which usually curve and connect on the anterior part of the medial lobe of the clypeus. They are thus apparently closely related. They can be easily separated as the dorsum of the head of *L. nevadensis* is nearly completely sculptured, whereas part of the head of *L. neomexicanus* is smooth and shining.

Wheeler (1903b) stated that *L. nevadensis* was closely related to

*L. andrei*, without actually seeing specimens of *L. andrei*. This is incorrect. The three clypeal carinae of *L. nevadensis* are well developed; *L. andrei* has a number of poorly developed carinae on the clypeus. Additional, more superficial characters that would separate these 2 species would include the punctures or striae on the dorsum of the head of *L. nevadensis*, which contrast with the rugulae on the head of *L. andrei*. The propodeal spines of *L. nevadensis* are well formed and elongate; the armature of *L. andrei* consists of simple angles.

**Distribution.** USA: Eastern WA and OR east to western MT, northwestern WY south to NV, CO w to southern CA. We have no records of this species in New Mexico, but it may occur in the northwestern part of the state.

**Habitat.** Nests in soil in moist areas, usually under stones, or in rotten wood, from communities including cool desert, pinyon-juniper, coniferous forest and alpine areas. Specimens were collected in litter in a number of plant communities, including tanbark oak, oak leaf litter near a spring, maple and oak litter, Douglas fir, and laurel.

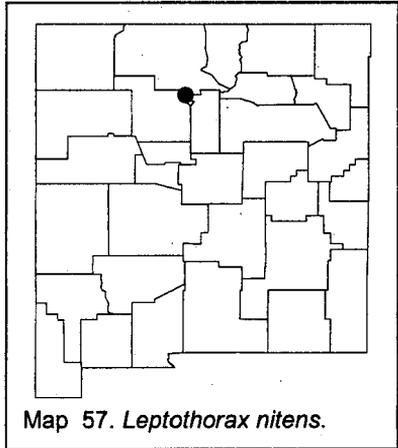
**Biology.** This species nests in soil in moist areas, usually under stones, or in rotten wood. It may be involved in plesiobiosis (association approaching symbiosis), as it nests at the entrance of *Trachymyrmex turrifex* nests and at the edge of nests of *Pheidole tepicana* (= *P. instabilis*). Insecticide treatments for the spruce budworm in eastern Oregon had little impact on this species.

Wheeler, 1903b; Cole, 1934b, 1942; Wheeler and Wheeler, 1973, 1986; Murphy and Croft, 1990

### *Leptothorax nitens* Emery

Figs. 163, 169; Map 57

**Discussion.** This species has a 12-segmented antenna. The tops of the mesosoma and head are nearly always smooth, glossy and shining, or finely punctate with fine, longitudinal costulae. The propodeal armature consists of small angles. The node of the petiole is sharp. Color ranges from concolorous yellow to medium tan.



Map 57. *Leptothorax nitens*.

This species appears to be closely related to several others, including *L. mariposa*, *L. melinus* and *L. adustus*. Based on the holotype, it can be separated from these other species by the nearly smooth and polished dorsum of the mesosoma, as all of the other species have mesosomata that are densely sculptured. It is likely that most of the records from the literature are based on misidentifications.

**Distribution.** USA: Western United States; NM: **Los Alamos Co.**, Los Alamos, Mortandad Canyon; MEXICO: Durango.

**Habitat.** Ponderosa pine-riparian; grasslands, highly disturbed areas, pinyon-cedar-oak-juniper woodland.

**Biology.** This species nests under stones, or rotten logs. One nest was found in a termite nest. Nests contain 69 - 276 workers and are monogynous. Sexu- als are found in the nest from June to August. It is one of the last ants to colonize a disturbed area.

Wheeler, 1903b, 1906b; Cole, 1942, 1958; Gregg, 1944, 1963; Wheeler and Wheeler, 1973, 1986; Moody and Francke, 1982; Wheeler and Wheeler, 1986; Mackay et al., 1988; Mackay, 1993a; Frumhoff and Ward, 1992; Rojas-Fernández and Fragoso, 1994

### ***Leptothorax obliquicanthus* Cole**

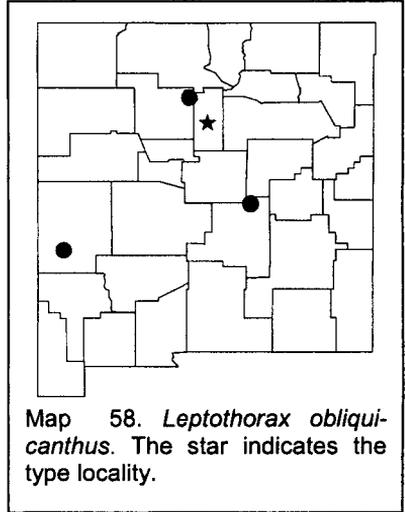
Figs. 160, 162; Map 58

**Discussion.** The worker of this species is easily recognized due to the large, kidney shaped eye. In addition, nearly all surfaces are densely and coarsely punctate. The entire first tergum is punctate, but the punctures are fine and difficult to see unless the light is placed to reflect from the surface. The antenna has 12 segments.

This species is easily recognized and separated from all other known North America *Leptothorax* by the large, oblong eyes. It could only be confused with *L. liebi*, which

is pale yellow, with black eyes and has a completely smooth first tergum of the gaster.

**Distribution.** USA: NV, CO, TX, NM: **Catron Co.**, Mogollon Mts., **Lincoln Co.**, 25 mi. SE Vaughn, **Los Alamos Co.**, Los Alamos, **Santa Fe Co.**, 10 mi. S Santa Fe (type locality).



Map 58. *Leptothorax obliquicanthus*. The star indicates the type locality.

**Habitat.** Dry, grassy areas to semi-moist meadows, highly disturbed sites, sagebrush and high, dry short-grass plains.

**Biology.** This species nests under stones. One nest was in an exposed area surmounted by a 10-cm crater, another was in the soil together with *Pheidole* sp. Nests are monogynous. The large eyes may be connected with the diurnal habitats of the ants in open areas, where the workers could scan the surrounding area before exiting the nest. Cole (1954a) was unable to locate this species at the type locality in 1952 (year after the initial collection).

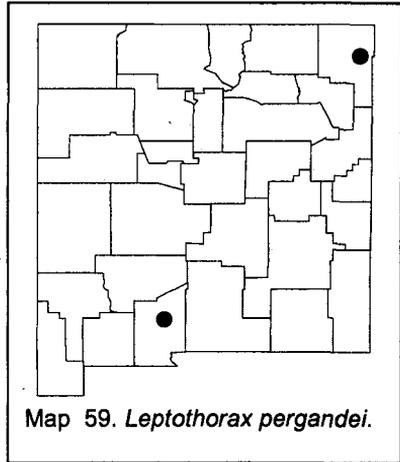
Cole, 1953d, 1954a; Gregg, 1953a, 1963; Wheeler and Wheeler, 1986; Mackay et al., 1988; Frumhoff and Ward, 1992

***Leptothorax pergandei***  
**Emery**

Figs. 52, 151; Map 59

**Discussion.** This species is very distinct from the remainder of the members of the genus *Leptothorax* (Mackay, 1993b). The clypeus has a medial carina and a few poorly defined lateral carinae, similar to members of the subgenus *Myrafant*. It differs from *Myrafant* in having the metanotal suture deeply impressed on the dorsum of the mesosoma. In addition, the peduncle of the petiole is very elongate, similar to members of the group that was previously referred to as the subgenus *Macromischa*.

These characters would easily separate it from all of the other members of *Leptothorax* which are found in the state. It can be confused with the minors of the genus *Pheidole*. Both genera have 3 segmented antennal clubs, the impressed region at the metanotal suture, and a elongate peduncle of the petiole. It differs in that the 2 apicalmost teeth are well developed as they are in *Pheidole*, the other 3 or 4 teeth are also well developed, much more so than in minor workers of *Pheidole*. *Leptothorax pergandei* could also be confused with workers of *Stenammas*, but can be separated by the well developed, 3-segmented antennal club (moderately defined 4-segmented club in *Stenammas*).



Map 59. *Leptothorax pergandei*.

**Distribution.** USA: eastern United States west to AZ; NM: **Doña Ana Co.**, 45 k NE Las Cruces (Long Term Ecological Research site), **Union Co.**, Kiowa National Grasslands.

**Habitat.** Usually mesic forests and grasslands, but in the Chihuahuan Desert it occurs in arid creosotebush scrub in southern New Mexico and southeastern Arizona (Mackay et al, 1995). It was also found in the grasslands of northern New Mexico.

**Biology.** This species nests in the soil in New Mexico, although it also nests in stumps, logs and nutshells in more mesic habitats. It is active diurnally and throughout the year, at least in Florida. Nests contain 36 or more workers and are monogynous. Sexualls were present in nests in southern United States from April to December. A flight in North Carolina occurred in June. Although it is not common in New Mexico, finding it in arid sites shows how little we know about the distri-

bution and natural history of ant species.

Mackay, 1993b

***Leptothorax rugatulus***  
**Emery**

Figs. 152, 189; Map 60

**Discussion.** Workers of this species have an 11-segmented antenna, a coarsely rugose dorsal surface of the head, the dorsum (and sides to a lesser extent) of the mesosoma and petiole are as rugose as the head, the propodeal spines are well developed, longer than the distance between their bases, the dorsum of the postpetiole has rough punctures.

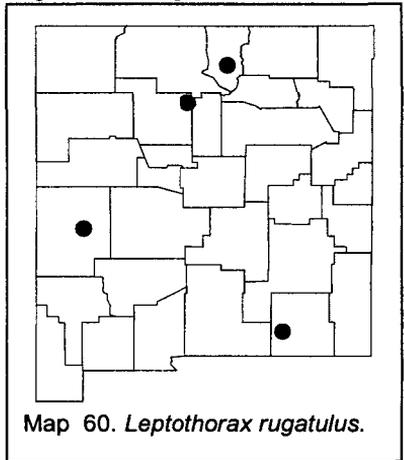
This species is smaller than *L. josephi* and is basically concolorous medium yellowish-brown, often with dark infuscation on the head and mesosoma. The subpetiolar process is often about as wide at the tip as it is at the base. The propodeal spines are well developed, which separates it from *L. schaumii*, and *L. whitfordi*.

**Distribution.** USA: western North America as far south as NM: **Catron Co.**, 35 k E Horse Springs, **Eddy Co.**, Hidden Cave, **Sandoval Co.**, Bandelier (Cole 1953d, 1954a), **Taos Co.**, 5 mi E Taos (Cole, 1954a).

**Habitat.** High elevation coniferous or deciduous forests in moist habitats, in shaded grassy slopes with pines, or grasslands. It also occurs in pinyon-juniper forests and cool desert habitats.

**Biology.** This species usually nests in the soil or under stones, in

decaying wood or even in trees. One nest had more than 100 workers and eight females, nests are monogynous (single nest queen) or polygynous (multiple females in nest). There are 2 queen morphs in this species, with mostly macrogynes (large queens) found in monogynous colonies and microgynes (small queens) in polygynous colonies. Sexuials occurred in nests in July to September. This species moves the nest if it is disturbed. It may form a plesiobiotic relationship with *Lasius umbratus*. The beetle *Amecocerus* sp. (Melyridae) occurred in a nest in Nevada. Insecticide treatments for the spruce budworm in eastern Oregon had little impact on this species.



Map 60. *Leptothorax rugatulus*.

Wheeler, 1903b, 1917; Cole, 1934b, 1942, 1953d, 1954a; Gregg, 1963; Wheeler and Wheeler, 1963, 1986; Borchert and Anderson, 1973; Möglich, 1978; Moody and Francke, 1982; Van Pelt, 1983; Mackay et al., 1988; Murphy and Croft, 1990; Frumhoff and Ward, 1992; Ruppell et al., 1998

***Leptothorax schaumii***  
**Roger**

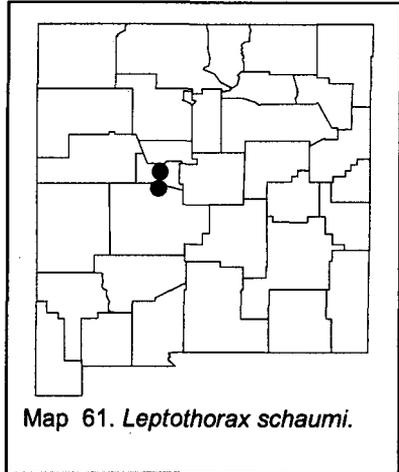
Fig. 187; Map 61

**Discussion.** These ants have an 11-segmented antennae and are usually concolorous dark brown, but are occasionally concolorous yellow. The head is nearly completely covered with fine striae, which merge with the dense punctures. Occasionally there is a central strip, which is partly free of sculpture and somewhat shining. The top of the mesosoma is mostly punctate, with a few striae, the side of the mesosoma has numerous striae with punctures between them. The propodeal spines range from tiny angles to small spines, which are dull and rounded. The petiole and postpetiole are punctate and the node of the petiole is weakly truncate, with round edges.

The 11-segmented antenna and tiny propodeal spines separate this species from all other species in the subgenus, except *L. whitfordi*. It can be easily distinguished from *L. whitfordi* as the head and pronotum of *L. schaumii* are predominantly punctate (predominantly smooth and shining in *L. whitfordi*, but the pronotum may be punctate as in *L. schaumii*). The punctures on the pronotum of *L. schaumii* are fine and completely cover the surfaces, whereas in *L. whitfordi* they are coarse and do not densely cover the surface. The small spines separate it

from the others in the *schaumii* species complex.

**Distribution.** Eastern USA, as far west as KS and TX; NM: **Bernalillo Co.**, Bosque Forest, **Socorro Co.**, Sevilleta National Wildlife Refuge.



Map 61. *Leptothorax schaumii*.

**Habitat.** This species occurs in many habitats ranging from desert canyons in trees to grasslands, and shaded deciduous forests.

**Biology.** This species nests in bark of living trees, in branches, logs and oak galls of trees. One nest contained 143 workers, 35 larvae and a single queen, although nests may have more than a single queen. The nest entrance is simply a small hole.

Wheeler, 1903b, 1905a, 1916; Cole, 1940; Gregg, 1944; Carter, 1962; Moody and Francke, 1982; Van Pelt, 1983; DuBois, 1985; Wheeler and Longino, 1988; Frumhoff and Ward, 1992

***Leptothorax silvestrii*  
(Santschi)**

Figs. 159, 161

**Discussion.** This species is yellow-brown in color with a 12-segmented antenna. The head is completely and coarsely punctate, with fine rugae interspersed among the punctures. The tops of the mesosoma and petiolar node have similar sculpture. The side of the mesosoma, side of the petiole and entire postpetiole are similarly punctate, with reduced extensive rugae when compared to the top of the mesosoma. The entire dorsum of the first tergum is evenly, but finely punctate. The petiolar spines are sharp and well developed. The peduncle of the petiole is elongate and the top of the node is truncate and square in shape. All of the femora, especially the hind femur, are incrassate (swollen in the middle). The maxillary palp has 5 segments, the labial palp 3 segments, the mandible has 5 teeth.

The reticulo - punctate disc of the first gastral tergite separates this species from all others in New Mexico, except *L. hispidus* and *L. obliquicanthus*. It differs from *L. hispidus* in that the propodeal spines are well developed and the hind femora are greatly thickened. It differs from *L. obliquicanthus* in that the eye is normal in shape and the petiolar node is very blunt in profile.

**Distribution.** USA: South-eastern AZ (Pima Co.: Tucson, Santa Catalina Mts., Baboquivari Mts.; Santa Cruz Co., Ruby), may occur in NM.

**Habitat.** Oak forests.

**Biology.** Arboreal nests are found in large branches of oaks, especially *Quercus emoryi*. Nests contain 50 - 70 workers, and a single queen.

Creighton, 1953a

***Leptothorax stenotyle*  
Cole**

Figs. 174, 176

**Discussion.** This is a roughly sculptured, relatively large, dark brown ant, with a 12 segmented antenna. The head, mesosoma, petiole and postpetiole are covered with coarse rugae, the intrarugal spaces are shining. There may be a central area at the vertex without sculpture. The propodeal spines are poorly developed and are essentially elongate angles (approximately 0.05 mm in length). The petiole is thick in profile with a blunt apex (Fig. 176).

This species can be distinguished from *L. tricarinatus*, as it has a more slender mesosoma and a narrower postpetiolar node. It differs from *L. neomexicanus* in that it is longer, more rugose and has an opaque head, which lacks distinct punctures and smaller postpetiole. It differs from *L. obliquicanthus* as the eye is of normal size and shape for the genus.

**Distribution.** USA: South-eastern AZ (Cochise Co., Chiricahua Mountains), may occur in NM.

**Habitat.** Pine and spruce forests.

**Biology.** This species nests under stones. Nest populations range

from 53 - 55 workers. Alate females were found in a nest in August.

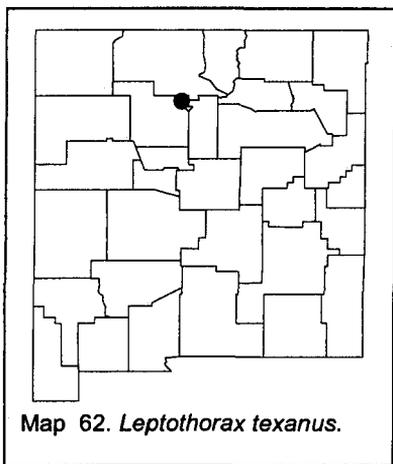
Cole, 1956a

***Leptothorax texanus***  
**Wheeler**

Figs. 181, 182; Map 62

**Discussion.** This is a small (total length 2.25 mm), dark brown species with a 12-segmented antenna, in which the postpetiole is more than 1.5 X the width of the petiole. The entire ant is roughly sculptured, with rugae on the head, top and side of the mesosoma, on the petiole and on the postpetiole. The gaster is smooth and glossy. The subpeduncular process is poorly defined and consists of a tiny tooth. The node of the petiole is truncate. The propodeum has well-developed spines.

The massive postpetiolar node, which is coarsely reticulo-rugose or punctate, separates this taxon from all others in New Mexico.



Map 62. *Leptothorax texanus*.

**Distribution.** USA: eastern United States west to TX; NM: Los Alamos Co., Mortandad Canyon.

**Habitat.** Ponderosa pine/riparian.

**Biology.** This species forms small colonies in sandy soil or even in sand dunes, or clay soils in damp spots under post-oaks, cedars and pines and even in the driest sites. They often nest at the base of a grass clump. Males have been collected from late May to late July in the nests. These ants form foraging trails, which are nearly invisible, across sand dunes and moss, and apparently use tandem running.

Wheeler, 1903b; Smith, 1932, 1952; Talbot, 1934; Wesson and Wesson, 1940; Buren 1944; Gregg, 1944; Carter, 1962; Wheeler and Wheeler, 1963; Mackay et al., 1988

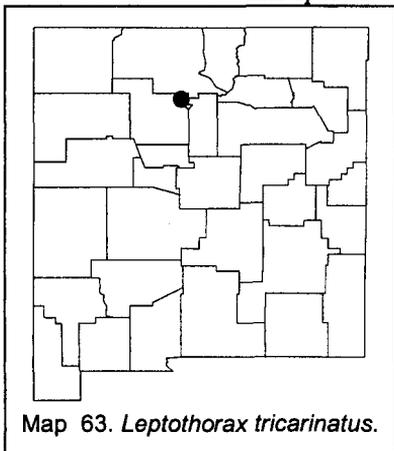
***Leptothorax tricarinatus***  
**Emery**

Figs. 183; Map 63

**Discussion.** Workers have a 12-segmented antenna, the scape nearly reaches the posterior lateral corner, the clypeus has three well-developed carinae, including a medial carina and two lateral carinae, the area between the carinae is mostly smooth and shining, the dorsum of the head is rugulose, with the intrarugal spaces shining, the area around the eye has nearly foveolate punctures. The dorsum of mesosoma is finely rugulose, with a nearly smooth background, the side of the mesosoma is rugose, and the propodeal spines are well developed, the

length about  $\frac{1}{2}$  the distance between bases of spines. The subpetiolar process is moderately well developed, the top of node is obliquely truncate, the top of the petiole and postpetiole have rugae, the background surfaces smooth, the dorsum of the gaster is shiny.

*Leptothorax tricarinatus* could be confused with other species, especially with *L. stenotyle*. It can be separated from *L. stenotyle* as the postpetiole is noticeably widened when compared with the petiole. The clypeus of *L. tricarinatus* has the medial and 2 lateral clypeal carinae well developed, more developed than in most of the other similar species.



Map 63. *Leptothorax tricarinatus*.

**Distribution.** USA: Western United States as far east as Iowa and as far south as NM: Los Alamos Co., Mortandad Canyon.

**Habitat.** Open grassy areas, including foothill meadows, canyon deciduous forests, oak woodlands, cedar forests, ponderosa pine forests, shortgrass prairie, sagebrush communities and areas with scant vegetation. It appears to do well in disturbed sites.

**Biology.** This species nests under stones and in moist soil. Nests are small and are monogynous. Males have been found in nests from July to September.

Wheeler, 1906b; Buren, 1944; Cole 1953d; Gregg, 1963; Wheeler and Wheeler, 1963; Du-Bois, 1985; Frumhoff and Ward, 1992

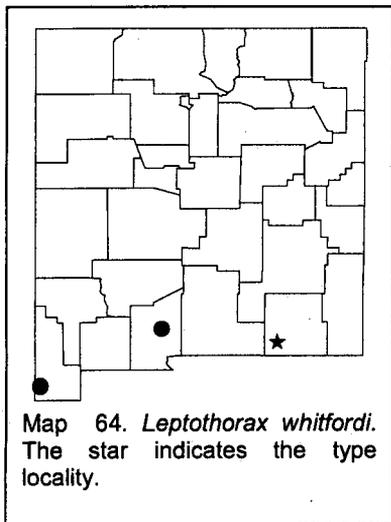
### ***Leptothorax whitfordi* Mackay**

Figs. 186, 187; Map 64

**Discussion.** The workers of this species are small, dark brown specimens with an 11-segmented antenna. The dorsum of the head is mostly smooth and shining, the pronotum is nearly completely covered with coarse punctures. The propodeal spines consist of tiny angles. The petiole is thickened with a round node.

The presence of an 11-segmented antenna easily separates *L. whitfordi* from all of the other species with similar sculpture. The smooth dorsum of the head and partially smooth pronotum would separate it from *L. schaumii*. The specimen from near Las Cruces differs from the type series in that the propodeal spines are more developed, the subpeduncular process is poorly developed (well developed in the type series), and the pronotum is covered with larger punctures that approach the form of foveolae (punctures in "normal" *L. whitfordi*, with a few wavy striae and areas that are nearly smooth and shining).

**Distribution.** USA: SE AZ, western Texas, southeastern NM: **Doña Ana Co.**, 18 k NE Las Cruces, Rancho La Cueva, **Eddy Co.**, Guadalupe Mts. (5.3 k SE Sitting Bull Falls, 32°12'15"N 104°40'23"W, 1559 meters), **Hidalgo Co.**, Peloncillo Mts.; MEXICO: eastern Mexico.



Map 64. *Leptothorax whitfordi*. The star indicates the type locality.

**Habitat.** Creosote bush scrub, desert scrub, with *Yucca* sp., *Prosopis* sp., and *Opuntia* spp., to oak forests, mixed pine-juniper-oak forests.

**Biology.** This species nests in branches of *Quercus* oaks (gray oak, Arizona oak) and other trees, including mesquite (*Prosopis glandulosa*), which was full of tunnels, at a height of 3 meters. Brood was found in nests in August. One nest contained 1 queen, 2 males and 35 workers, a second contained 1 queen and 116 workers. A single worker was collected loose in an unspecified tree, in a desert arroyo with oaks and *Celtis*.

When the nests are disturbed, they primarily attempt to rescue the brood. They are also much more aggressive than the typical *Leptothorax*, attacking and stinging. The sting is surprisingly painful, similar to that of the thief ants in the genus *Solenopsis*, or *Wasmannia*. *Liometopum apiculatum* also nests in branches of the oaks, and this *Leptothorax* may be so aggressive as it must protect nests from the former species, which were attempting to prey on the brood of *Leptothorax* during opening of nests.

## Genus *Manica*

(Key: Wheeler and Wheeler, 1986)

This is a small genus of five species, four of which are found in North America. They are rarely collected and form small colonies in the soil, usually surrounded by a small mound of soil. Principal morphological characteristics would include:

hind tibial spurs pectinate (difficult to see, refer to discussion of *Myrmica*), the top of the mesosoma is strongly depressed at the metanotal suture (Fig. 190), and there are no spines on the propodeum. The scape has suberect hairs (Fig. 191). These

characters separate this genus from all others in North America.

It would be only confused with *Myrmica*, in which the mesosoma is not strongly compressed.

### ***Manica invidia* Bolton**

Figs. 42, 190, 191; Map 65

**Discussion.** This is the most common species in the genus and the only species known to occur in New Mexico, and is very rarely collected.

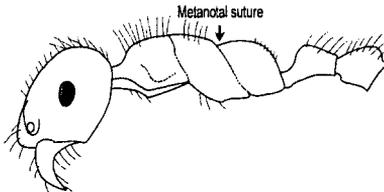


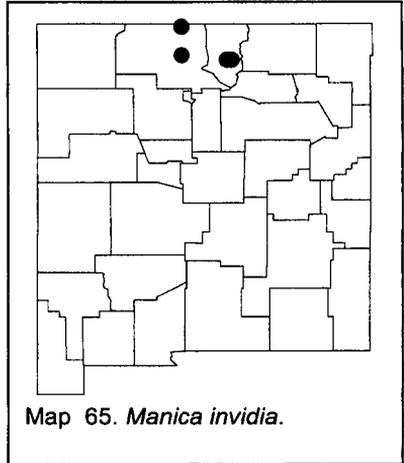
Fig. 190. Head, mesosoma, and petiole of a worker of *Manica invidia*.

The characters listed for the genus will separate it from all other species in New Mexico. In the field, it appears to be a large, golden colored *Myrmica*. This species was previously referred to as *Myrmica mutica* Emery.



Fig. 191. Scape of a worker of *Manica invidia*, as seen from the side.

**Distribution.** USA: Western United States south to NM: Rio Ar-



Map 65. *Manica invidia*.

riba Co., 7 mi. S Cebolla, 4 k N Chama, Taos Co., 12 mi E Taos (Cole 1953b), 15 mi E Taos (Cole 1953b).

**Habitat.** Occurs in a number of habitats, usually forests (aspen, pine, spruce), but may occur in areas with sagebrush or in arid grasslands.

**Biology.** This species nests under stones and logs or simply in the soil, with sand craters. Workers feed on living insects and seeds. This species is the host of *Formicoxenus* (= *Symmyrmica*) *chamberlini*. Reproductives are found in the nest from August to October, a nest founding female was captured in June. These ants are capable of stinging, although they are not very aggressive. They were very common in the site near Cebolla.

Gregg, 1963; Wheeler and Wheeler, 1963

## Genus *Monomorium*

(Key: DuBois, 1986)

This is a common group of tiny, shiny, black ants (rarely roughened yellow ants), which occur in many different plant communities. The antenna has a 3-segmented club (Fig. 192). The propodeum is rounded between the dorsal and posterior faces. The petiole and post-petiole are nearly the same size and shape.

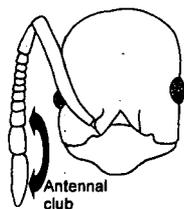


Fig. 192. Head of a worker of *M. cyaneum*.

They can be confused with the genus *Solenopsis*, but are easily separated by the black color (few *Solenopsis* are shiny black) and the antennal club is composed of three segments (two in *Solenopsis*). The antenna has 12 segments in *Monomorium*, 10 in *Solenopsis*. They could be confused with an undescribed species of *Tranopelta* (see *Tranopelta* discussion). They could be confused with minor workers of some of the smaller, shiny black species of *Pheidole*. They differ in that even the minor workers of *Pheidole* usually have at least angles on the propodeum (*Monomorium* may be angulate at the same position, but

does not have spines) and the mandibles have a large apical tooth, a smaller subapical tooth and several small teeth, whereas *Monomorium* has a mandible with 3 or 4 teeth which are almost equal in size or only the apical tooth is larger than the others. The clypeus of *Monomorium* has a pair of carinae which extend past the anterior border of the clypeus as small teeth, which are absent in *Pheidole*. *Monomorium* is monomorphic, *Pheidole* possesses soldiers.

Both of our common species nest in the soil and are usually seen under stones. Occasionally ants of this genus are house pests in New Mexico. Cole (1953e) deals with the species in New Mexico.

### Key to the workers of *Monomorium*

1. Dorsum of head and sides of mesosoma covered with dense punctures (Fig. 193); light brown in color; rare in New Mexico .....  
..... *pharaonis* (Linnaeus)



Fig. 193. Mesosoma, petiole and postpetiole of a worker of *M. pharaonis*.

- Dorsum of head and sides of mesosoma mostly or entirely smooth and shining (Fig. 194); shiny black; very common in New Mexico ..... 2

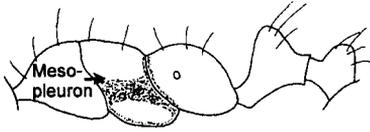


Fig. 194. Mesosoma, petiole and postpetiole of a worker of *M. cyaneum*.

**2(1).** Mesopleuron usually partially punctate (Fig. 194); usually with fewer than 12 hairs projecting above dorsum of mesosoma; unmated females without wings; usually found in arid environments .....

- ..... ***cyaneum* Wheeler**
- Mesopleuron not punctate (at least not central portion - Fig. 195); usually more than 10 hairs projecting above mesosoma (Fig. 195); unmated females with wings; usually in mesic or urban habitats .....
- ..... ***minimum* (Buckley)**

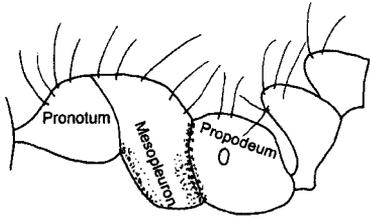


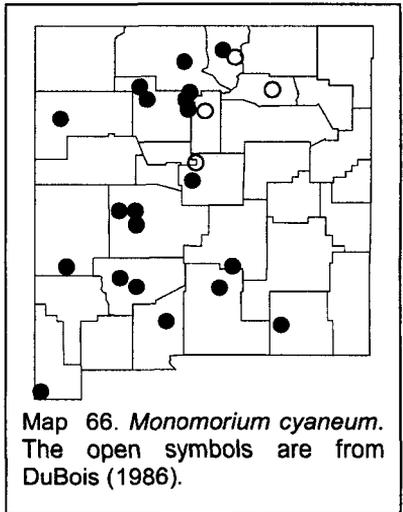
Fig. 195. Mesosoma of a worker of *M. minimum*.

### ***Monomorium cyaneum* Wheeler**

Figs. 43, 44, 192, 194; Map 66

**Discussion.** There are two small, shiny black species in New Mexico, which are very difficult to separate. If you can collect several females in the nest, and they lack wings, they are possibly this species.

You must look closely to see if they lack any vestiges of wings. If not, be sure the sclerites (pieces of body wall bounded by sutures) near the wing bases are fused. If they are, then you can be relatively certain of the correct identification. The males can be separated as those of *M. cyaneum* have 5 hairs on the cuspis (pointed process) of the volsella (median pair of genital appendages), *M. minimum* has 3 hairs on the same structure. The key (above) is somewhat useful for the identification of workers, but they are difficult to identify.



Map 66. *Monomorium cyaneum*. The open symbols are from DuBois (1986).

**Distribution.** USA: southwestern United States; NM: **Catron Co.**, Mogollon Mts., **Doña Ana Co.**, 45 k NE Las Cruces (Long Term Ecological Research site), **Eddy Co.**, Hidden Cave, **Hidalgo Co.**, Guadalupe Canyon, **Lincoln Co.**, Sacramento Mts. (Bailey Canyon), **Los Alamos Co.**, Los Alamos, Rio Grande, **McKinley Co.**, Zuni Mts. (southeast of Gallup), **Rio Arriba**

Co., 7 k S Cebolla, **Sandoval Co.**, Bandelier National Monument, 26 k S Cuba, 4 k W Cuba, **Sierra Co.**, 4 k W Hillsborough, 6 k W Kingston, **Socorro Co.**, Magdalena Mts. (Water Canyon), 25 k N Magdalena (Bear Mts.), 17 k S Magdalena, **Taos Co.**, 20 k NW Taos, **Torrance Co.**, 24 k S Mountainair.

**Habitat.** This species occurs in essentially all habitats from arid zones to grasslands, sagebrush, piñon-pine and to wet mid altitude ponderosa pine forests, to urban habitats, it is most common in semi-arid habitats.

**Biology.** This species normally nests under stones (or logs), but may have a simple nest in the soil, surrounded by a small mound. Brood was found in nests in June to August, sexuals were in nests in July. A dealate female was collected in August. One colony was collected together with *Formica fusca*, a second with *Acanthomyops coloradensis*.

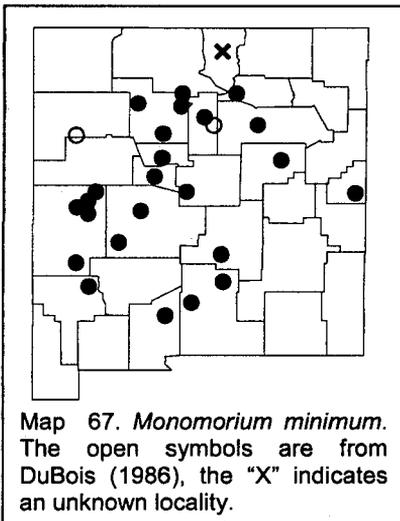
Gregg, 1963 (*M. viridum peninsulatum*).

### ***Monomorium minimum* (Buckley)**

Fig. 195; Map 67

**Discussion.** This is another common, small, shiny black ant, which is difficult to separate from *M. cyaneum*. See the discussion of the latter species for hints on how to separate them. Specimens from the Sacramento Mts. (Otero Co.) differ in being larger than the typical specimen and slightly lighter in

color, and may represent an undescribed species.



**Distribution.** USA: Most of United States; NM: **Bernalillo Co.**, NW Albuquerque, **Catron Co.**, 15 k NW Datil, 12 k E Datil, 14 k E Datil, Ox Spring Canyon, Snow Lake, **Curry Co.**, near Clovis, **Doña Ana Co.**, 45 k NE Las Cruces (Long Term Ecological Research site), **Grant Co.**, Gila Mts. (Iron Creek), **Guadalupe Co.**, Santa Rosa State Park, **Lincoln Co.**, Sacramento Mts. (Bailey Canyon), **Los Alamos Co.**, Mortandad Canyon, Rio Grande, **Mora Co.**, 10 k SE Mora, **Otero Co.**, Sacramento Mts., White Sands National Monument, **Sandoval Co.**, Bandelier National Monument, Coronado State Park, 26 k S Cuba, **San Miguel Co.**, 20 k NW Las Vegas, **Santa Fe Co.**, Santa Fe, **Socorro Co.**, Bosque del Apache, San Mateo Mts., **Taos Co.**, without locality, **Torrance Co.**, 24 k S Mountainair, **Valencia Co.**, Belén, Cole (1953e) lists a number of additional

localities; MEXICO: Chihuahua, Durango, Nuevo León, Coahuila.

**Habitat.** Essentially all habitats, ranging from arid grasslands and shrubs to pinyon-juniper forests to ponderosa pine-riparian sites. It is found most often in open areas. It is apparently more common in urban habitats than is *C. cyaneum*.

**Biology.** This species nests in soil under stones and logs. Nests have multiple queens. This species feeds on nectar, dead insects and tends aphids. This ant may be a house pest in some areas. It nests together with other species including *Camponotus vicinus*, *Acanthomyops claviger*, *A. murphyi*, *Lasius crypticus*, *L. sitiens*, *Monomorium minimum*, *Pogonomyrmex occidentalis*, *Solenopsis molesta*, and *Formica argentea* and *F. fusca*.

Gregg 1963; Rojas-Fernández and Frago 1994, 2000

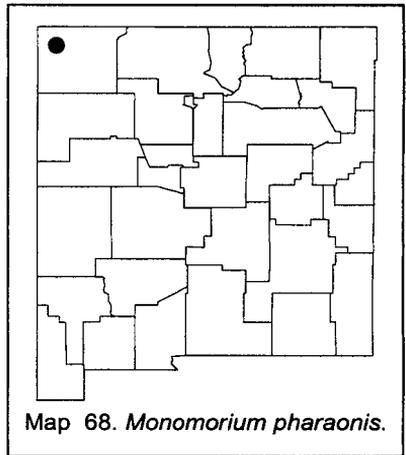
### *Monomorium pharaonis* (Linnaeus)

Fig. 193; Map 68

**Discussion.** This is a yellow-red ant with a heavily punctate head, mesosoma, petiole and postpetiole. The gaster is finely sculptured and shiny.

The rough sculpture and pale color would easily separate this species from the other two species in the genus. It could be confused with the genus *Solenopsis*, by the shape of the mesosoma, petiole and postpetiole, but the 3-segmented club of the antenna would separate it from *Solenopsis* (with a 2-segmented club). Confusion could occur between this

species and minor workers of *Pheidole*, which also have a 3-segmented club. Minors of most species of *Pheidole* have propodeal spines (lacking in *Monomorium*), and the petiole and postpetiole are very different in shape, with a long peduncle on the petiole (similar in shape in *Monomorium*). *Monomorium pharaonis* has four mandibular teeth, the outer (apical) tooth is larger than the other three, which are all about the same size. In *Pheidole*, the apical tooth is very large, the subapical (next from outer) is smaller, but well developed, and several more teeth are present which are very poorly developed.



Map 68. *Monomorium pharaonis*.

**Distribution.** This is an Old World pest that has been introduced throughout the world. In the United States it is found throughout the country, at least in major cities; it occurs away from cities apparently only in Florida; NM: San Juan Co., Farmington, numerous workers were collected in a house by Richard Fagerlund.

**Habitat.** This is a very rare species in New Mexico, although it is common in other areas. It will probably occur only within houses and urban areas in the state. It is found away from houses in more mesic areas of the United States.

**Biology.** The pharaoh ant is one of the most annoying and diffi-

cult pests to eradicate. It is found in restaurants, hotels and other similar areas. When it is found in hospitals it is a vector of infectious diseases. It nests under stones or in piles of trash in field situations.

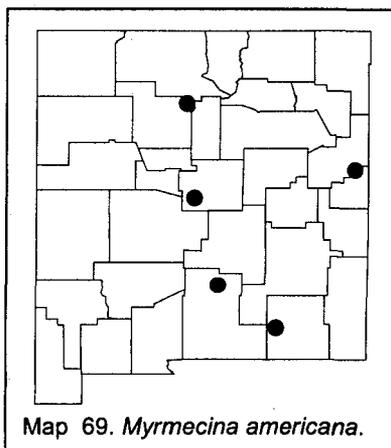
Wheeler and Wheeler, 1963;  
Fowler et al., 1993

## Genus *Myrmecina*

This genus is easily recognized as the propodeum has two sets of spines, the anterior most pair smaller than the posterior most pair (total of four spines, see Fig. 39). The antenna is composed of 12 segments with a three-segmented club. When the mandibles are closed, they leave a large space before the anterior border of the clypeus. The petiole is not pedunculate, with a poorly developed node (Fig. 39).

This genus may be confused with *Myrmica*, but the two pairs of spines on the propodeum and the lack of the pectinate posterior tibial spurs easily separate these two genera. It may also be confused with *Tetramorium*, but the antenna has 12 segments (11 in New Mexican species of *Tetramorium*) and *Tetramorium* has a single pair of propodeal spines.

This is a rarely collected genus in New Mexico. The single species in the genus in North America nests in the soil. Cole (1953e) treats the distribution of this genus in New Mexico.



Map 69. *Myrmecina americana*.

### *Myrmecina americana* Emery

Fig. 39; Map 69

**Discussion.** This is the only species of the genus in New Mexico, and it can thus be recognized by the characters of the genus (above).

**Distribution.** USA: Most of United States; NM: Curry Co., Grady, Eddy Co., Hidden Cave, Los Alamos Co., Mortandad Canyon, Otero Co., 5 mi S Mescalero (Cole,

1953e), **Torrance Co.**, 10 mi S Mountainair (Cole, 1953e).

**Habitat.** Usually found in grassy areas near forests, ponderosa pine-riparian, deciduous canyon forest.

**Biology.** This species nests under stones and in the soil. Workers are predaceous and are not known to tend Homoptera.

Wheeler, 1905a, 1906b, 1917; Talbot 1934; Dennis 1938; Cole, 1953e; Gregg 1963

## Genus *Myrmica*

(Keys: Creighton, 1950; Weber, 1950a)

These are very common ants in pine forests in New Mexico. The nests are usually located under stones or logs and are composed of only a few individuals. It can be distinguished from all other genera by the following characteristics: the middle and hind tibial spurs are pectinate (difficult to see without a high quality microscope), the head is without psammophore (long, curved hairs on the underside of the head), the mesosoma has a well defined constriction in the metanotal region, the propodeum has well developed spines, and the antenna is 12 segmented.

The pectinate mid and hind tibial spurs and the other characters will separate this genus from all others except *Pogonomyrmex*. It can be separated from most species of *Pogonomyrmex* by the lack of psammophore (long, curved hairs on the underside of the head), in addition the mesosoma of *Pogonomyrmex* is not strongly impressed in the metanotal region, as it is in *Myrmica* (Fig. 196). *Myrmica* spp. have stingers, but rarely or never use them.

Most *Pogonomyrmex* will readily sting without hesitation.

The pectinate tibial spur is difficult to see, but well worth the effort, as it will separate several genera from all the others in the Myrmicinae. Once it is seen, it can be more easily recognized with a low quality microscope and possibly even a hand lens, at least in some of the larger *Pogonomyrmex*.

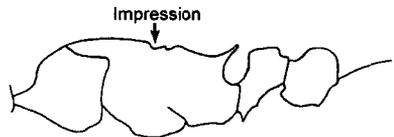


Fig. 196. Side view of the mesosoma, petiole and postpetiole of a worker of *M. lobifrons*.

Cole (1953b, 1953f, 1957a) discusses the genus in New Mexico. These ants are usually very difficult to identify to species, and it is usually necessary to have the males. Dr. André Francoeur is currently revising the group. The key we provide may be of some use in identifying the species in New Mexico.

**Key to the workers of  
*Myrmica***

1. Node of petiole high, distinctly set off from anterior and posterior peduncles and angular at apex (Fig. 197); ventral surface of petiole with distinct, obtusely angular impression formed by the junction of anterior and posterior peduncles (Fig. 197); Arizona and eastern New Mexico ..... *wheeleri* Weber

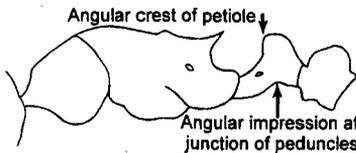


Fig. 197. Mesosoma and petiole of a worker of *M. wheeleri*, indicating the angular apex of the petiole, and the angular impression at the junction of the peduncles.

- Node of petiole not distinctly set off from anterior and posterior peduncles (Fig. 198) or, if so, it is low and much rounded above; ventral surface of petiole straight or very feebly convex (Fig. 198) ..... 2

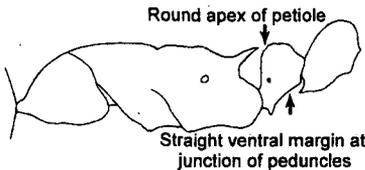


Fig. 198. Mesosoma and petiole of a worker of *M. hamulata*, indicating the rounded apex of the petiole, and the straight margin of the ventral surface of the petiole.

2(1). Antennal scape evenly bent at base (Fig. 199), upper surface never forming right angle at bend (some-

times about 80 degrees); lamina, if present, forming low, inconspicuous ridge at side of bend ..... 3

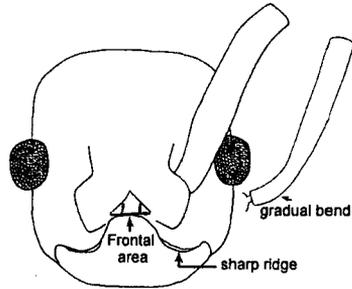


Fig. 199. Head of a worker of *M. rugiventris*. The inset shows the scape as seen from the side.

- Antennal scape abruptly bent at base, upper surface nearly forming right angle; lamina always present and of varying shapes (Fig. 200) .. 10

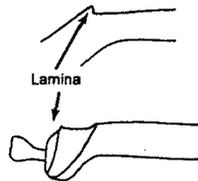


Fig. 200. Base of the antennal scape of a worker of *M. fracticornis*, as seen from the side (upper figure) and from the front (lower figure). The arrow shows the lamina as seen from the side and from the front.

3(2). Frontal area mostly smooth and glossy with 1 or 2 rugae (Fig. 199); lateral portion of clypeus raised into carina (sharp ridge) which forms abrupt, semi-circular boundary at front of antennal fossa (as in *Tetramorium*) (Fig. 199); western USA, unknown from NM .....  
..... *rugiventris* (Smith)

- Frontal area roughly sculptured, with several rugae; clypeus not as above (Fig. 201) ..... 4

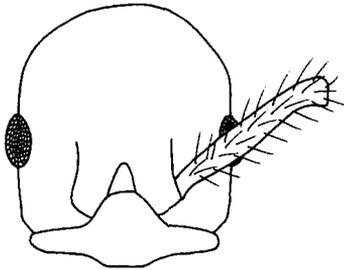


Fig. 201. Head of a worker of *M. discontinua*.

4(3). Gaster with longitudinal striae extending about 2/3 the length of first gastral tergum, sparsely, but distinctly punctate; inquiline in nest of *M. striolagaster*; Texas (Davis Mountains) ..... *colax* (Cole)

- Gaster without longitudinal striae, or striae extend less than first 1/3 of tergum (Fig. 210) ..... 5

5(4). Lateral edges of frontal lobes strongly angular, thick and slightly, but definitely bent downward (Fig. 202, upper figure); antennal scapes of male not longer than 3 following segments taken together and straight at base ..... 6

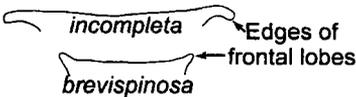


Fig. 202. Edges of the frontal lobes of a worker of *M. incompleta* and of a worker of *M. brevispinosa* as seen from the top of the head.

- Lateral margins of frontal lobes rounded, thin, moderately strongly elevated (Fig. 202, lower figure); antennal scape of male varies in length ..... 8

6(5). Antennal scape of male

slightly bent at base and as long as following 4 or 5 segments or more taken together (Fig. 203); commonly collected ..... 7

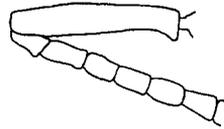


Fig. 203. Antenna of a male of *M. discontinua*.

- Antennal scape of male straight at base and shorter than following 3 segments; rarely collected ..... *wheeleri* Weber

7(6). Sculpture fine, color reddish brown over most of body and appendages ..... *incompleta* Provancher

- Sculpture of head and mesosoma coarse; color dark brownish black to black, legs, mesosoma and antennae lighter ..... *whymperi* Forel

8(5). Color often orange yellow but variable; propodeal spines slightly shorter than 1/2 as long as distance which separates their tips (Fig. 204) ..... *brevispinosa* Wheeler

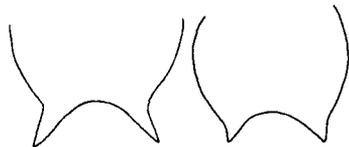


Fig. 204. Propodeal spines of 2 workers of *M. brevispinosa* as seen from above, showing the variation in the length of the propodeal spines.

- Color dark brown; propodeal spines more than 1/2 as long as distance which separates tips (Fig. 205) ..... 9

9(8). Antennal scape of male approximately as long as first 5 funicu-

lar segments (Fig. 203); area between lateral ocellus and eye of male mostly punctate .....  
 ..... *discontinua* Weber

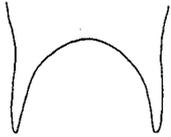


Fig. 205. Propodeal spines of a typical worker of *M. discontinua*.

- Antennal scape of male approximately as long as first 7 funicular segments (Fig. 206); area between lateral ocellus and eye mostly with reticulate rugae; reported from AZ and eastern Mexico .....  
 ..... *mexicana* Wheeler

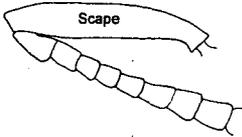


Fig. 206. Antenna of a male of *M. mexicana*

10(2). Bend of antennal scape of worker with large, thick, lobiform lamina, which extends posteriorly along the basal third of scape (Figs. 207, 208) ..... *monticola* Creighton

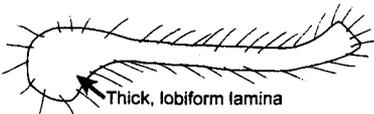


Fig. 207. Scape of a worker of *M. monticola*, as seen from the front.

- Bend of antennal scape with small, transverse lamina or with thin lamina which surrounds bend as collar (Fig. 209) and does not extend posteriorly along basal third of scape ..... 11

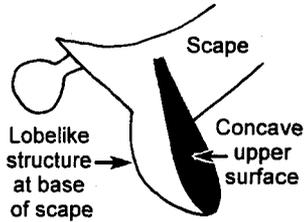


Fig. 208. Base of the scape of a worker of *M. monticola*, as seen from the side. The arrows indicate the thick, lobelike structure at the base of the scape with the concave upper surface (stippled).

11(10). Scape covered with longitudinal rugae; gaster with longitudinal striae on first tergum (Fig. 210), obvious at least near point of attachment of post petiole (gradient exists with less developed striae in western populations); gaster with coarse punctures with diameters about 5X diameter of hairs; AZ (Chiricahua

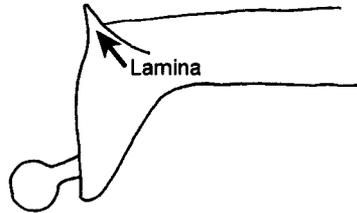


Fig. 209. Base of the antennal scape of a worker of *M. striolagaster*, as seen from below.

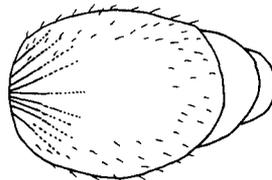


Fig. 210. Striae on the dorsum of the first gastral tergum of a worker of *M. striolagaster*.

Mts.), NM (entire state), West TX, Chihuahua (entire state), CO ..... *striolagaster* Cole  
 - Scape usually with fine sculpture, mostly punctate; gaster without striae and with punctures whose diameter is less than 3X diameter of hairs ..... 12  
**12(11).** Ventral surface of postpetiole seen in profile flat or nearly so and not forming projection in front (Fig. 211); antennal scapes of male as long or longer than following 4 segments taken together (Fig. 212, upper figure) ..... *americana* Weber

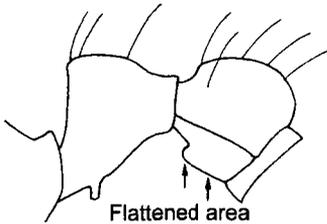


Fig. 211. Petiole and postpetiole of a worker of *M. americana*, as seen from the side. The arrows indicate the flattened base of the petiole.

- Ventral surface of postpetiole seen in profile convex or forming prominent anterior projection which thrusts forward under anterior peduncle; antennal scapes of male distinctly shorter than above (Figs. 212, lower figure, 213) ..... 13

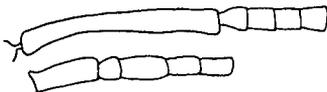


Fig. 212. Scapes and first funicular segments of males of *M. americana* (upper figure) and *M. hamulata* (lower figure), as seen from above.

**13(12).** Lamina of antennal scape forming a high, semicircular welt which surrounds scape at bend; antennal scape of male bent at base and usually shorter, never longer, than 3 following segments taken together (Fig. 213) ..... *hamulata* Weber

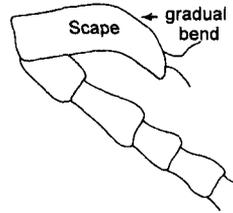


Fig. 213. Antenna of a male of *M. hamulata* as seen from the side.



Fig. 214. Base of the scape of a worker of *M. latifrons*, showing the small lamina (arrow).

- Lamina of antennal scape not forming high, semicircular welt (Fig. 214); antennal scape of male straight at base or if bent its length is equal to following 5 segments taken together (Fig. 215) ..... 14  
**14(13).** Lamina of antennal scape small and diagonally transverse on upper surface of scape (Fig. 214), but continued as prominent transparent flange along inner surface of that part of scape that lies below bend; antennal scape of male straight at base and as long as 3 following segments taken together .....  
 ..... *latifrons* Stårcke  
 - Lamina not forming

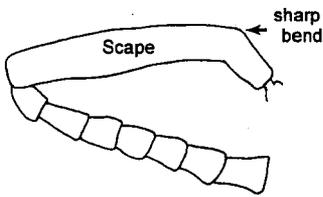


Fig. 215. Antenna of a male of *M. lobifrons*.

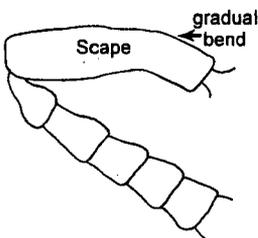


Fig. 216. Antenna of a male of *M. fracticornis*.

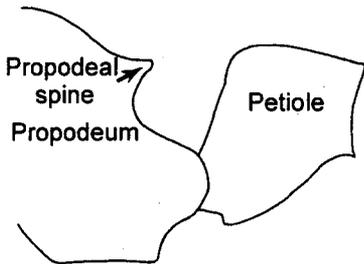


Fig. 217. Propodeum and petiole of a male of *M. lobifrons*, showing the well developed propodeal spine.

prominent median flange as above or if small median flange is present, lamina is not transverse on upper surface of scape; scape of male varies, usually longer than following 3

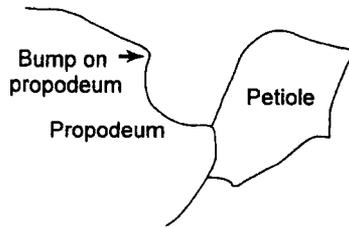


Fig. 218. Propodeum and petiole of a male of *M. fracticornis*, showing the poorly developed propodeal bump.

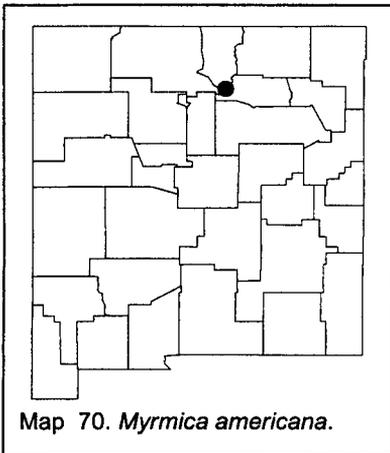
segments or bent at base (Fig. 216) ..... 15  
 15(14). Antennal scape of male straight at base and as long as the following 3 segments taken together; not recorded from NM .....  
 ..... *tahoensis* Weber  
 - Antennal scape of male bent at base and at least as long as the following 5 segments taken together (Fig. 215); common in NM ..... 16  
 16(15). Antennal lamina encircling bend of scape in form of spoon-like or saucer-like flange; antennal scape of male abruptly bent at base with upper surface distinctly angulate at bend (Fig. 215); propodeal spines of male well-developed (Fig. 217), propodeum with prominent rugae .....  
 ..... *lobifrons* Pergande  
 - Antennal lamina small, transverse, forming angular tooth-like projection on inner side of bend; antennal scape of male gradually bent at base and not forming distinct angle at bend (Fig. 216); propodeal spines of male reduced to rounded angles (Fig. 218), rugae of propodeum very feeble or lacking .....  
 ..... *fracticornis* Forel

***Myrmica americana* Weber**

Figs. 211, 212; Map 70

**Discussion.** In the field, workers of this species are medium sized, brown ants. Under the microscope the mesosoma is often lighter colored than the head and gaster. The ventral surface of the postpetiole is nearly straight, and is without an anteriorly directed projection. The scape of the male is longer than the first 4 segments of the funiculus.

It could be confused with several other species in the genus. It often occurs in dryer habitats than *M. monticola* and *M. fracticornis*. Both of these latter species also have anteriorly directed processes on the ventral surface of the postpetiole. It could be confused with *M. incompleta*. It differs in that the base of the scape is bent at almost a right angle, where a collar is present.



**Distribution.** USA: Much of United States, including AZ; NM: Mora Co., Pecos.

**Habitat.** Pine forests, oak forests, deciduous forests, grasslands, urban habitats.

**Biology.** This species nests under stones and logs, often in open habitats. Workers feed on dead insects and damaged fruits, together with juices from plants, they also tend aphids. Reproductives are found in nests from August to November; flights occur in August and September. This is one of the few species of *Myrmica* that is aggressive and can inflict a painful sting.

Kannowski and Kannowski, 1957; Gregg, 1963 (*M. sabuleti americana*); Wheeler and Wheeler, 1963; Ayre, 1968, 1969, 1971

***Myrmica brevispinosa* Wheeler**

Figs. 202, 204; Map 71

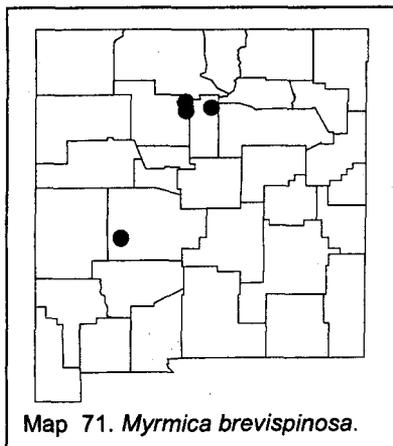
**Discussion.** Most specimens of this species have relatively small propodeal spines (Fig. 204), although there is considerable variation in the length. They are generally shorter than  $\frac{1}{2}$  the distance that separates their tips, which separates this species from all of the others of the genus that occur in New Mexico.

There are two subspecies or closely related species formally recognized: *M. brevispinosa* Wheeler and *M. discontinua* Weber, which are separated as *M. discontinua* has longer propodeal spines and is darker brown. We have found considerable variation in these characters, even from individuals from the same nest. One nest in our collection (Colorado, Conejos County, 81 k W Antonito) possesses individuals with only tiny

angles as propodeal spines and other individuals with spines as long as those found in "typical" *M. discontinua*. The two spines on an individual are often different in length. There are several differences: *M. brevispinosa* has a more rounded node of the petiole, *M. discontinua* has a pointed node in the workers; the female *M. brevispinosa* is much lighter than the mature female of *M. discontinua*; the posterior end of the node of the postpetiole of the male is somewhat less truncated in *M. brevispinosa* than in *M. discontinua*. The scape of males from western North America are similar in length to those of *M. discontinua* (see Fig. 203), those from eastern North America (Quebec) have shorter scapes (about as long as first 3 funicular segments).

**Distribution.** USA: Western United States, including AZ, CO; NM: Los Alamos Co., Camp May, Los Alamos, Santa Fe Co., Hyde State Park, Socorro Co., Mt. Withington.

**Habitat.** Riparian, pinyon-



Map 71. *Myrmica brevispinosa*.

juniper woodlands, grasslands, pine forests, aspen forests, spruce forests, deciduous forests, and urban areas.

**Biology.** This species nests under stones, or logs, brood and reproductives were found in nests in July to early August, foundress females were also collected in August and September after the nuptial flight.

Gregg, 1963; Wheeler and Wheeler, 1963

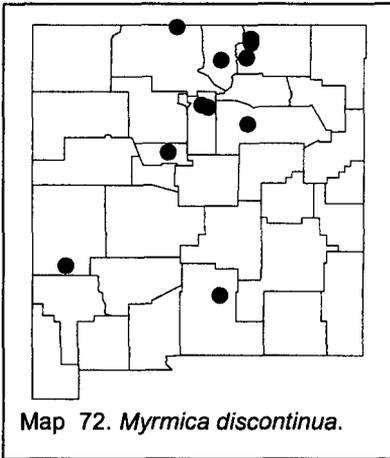
### *Myrmica discontinua* Weber

Figs. 201, 203, 205; Map 72

**Discussion.** This species is very similar to *M. brevispinosa*, but can usually be distinguished by the longer propodeal spines (compare Figs. 204 & 205). Additional characteristics can be found in the discussion of *M. brevispinosa*. This species could be confused with *M. mexicana*, but can be separated as the scape of the male is only about as long as the first 5 funicular segments (the males of *M. mexicana* have scapes about as long as the first 7 funicular segments, and probably does not occur in New Mexico). The workers of *M. discontinua* and *M. mexicana* appear to be identical.

**Distribution.** Canada: Newfoundland, Nova Scotia, Quebec; USA: most of mountains of continent, including WY; south to NM: Bernalillo Co., Sandia Mts. (Cole 1953b), Catron Co., Mogollon Mt. (Cole 1953b), Colfax Co., Cimarron Canyon (Cole 1953b), 11 mi N Eagle Nest (Cole 1953b), 15 mi N Eagle Nest (Cole 1953b), Otero Co.,

Cloudcroft (Cole 1953b), **Rio Arriba Co.**, 4 k N Chama, **San Miguel Co.**, Sapello Canyon (Cole 1953b), **Santa Fe Co.**, 12 k NE Santa Fe, Tesuque Canyon (Cole 1953b), **Taos Co.**, 12 mi E Taos (Cole 1953b).



Map 72. *Myrmica discontinua*.

**Habitat.** This species is usually found in higher elevation forests, including aspen-spruce forests and subalpine fir forests (*Abies lasiocarpa*).

**Biology.** This species makes small mounds in fine, sandy-loam soil, or nests under stones. Brood was found in the nest in July and August, sexuals in nests in August.

Cole, 1953b; Gregg, 1963

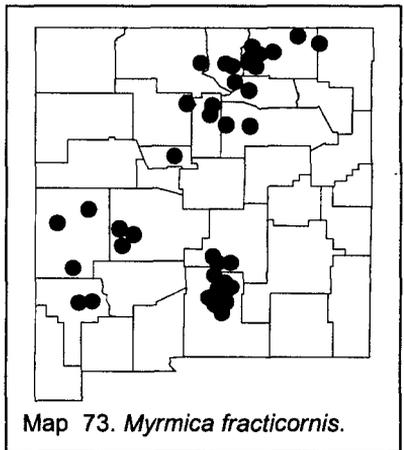
### *Myrmica fracticornis* Forel

Figs. 200, 216, 218; Map 73

**Discussion.** The flange at the base of the scape of the worker is small, and poorly developed, but the scape is definitely sharply bent at the point of the flange. The surface of the scape has fine sculpture. The

ventral surface of the postpetiole is only weakly convex, but the anterior projection is well developed. The antennal scape of the male is bent at the base, and is almost as long as the total length of the following 5 funicular segments.

**Distribution.** USA: Most of United States including AZ, CO; **NM:** **Bernalillo Co.**, Sandia Mts. (Cole 1953b), **Catron Co.**, 37 k N Apache Creek, 15.3 k NW Datil, Mogollon Mt. (Cole 1953b), **Colfax Co.**, Cimarron Canyon (Cole 1953b), 5 mi E Eagle Nest (Cole 1953b), 11 mi N Eagle Nest (Cole 1953b), 15 mi N Eagle Nest (Cole 1953b), 16 k E Eagle Nest, 4 mi. W Eagle Nest, Ratón Pass (Cole 1953b), Ute park (Cole 1953b), **Grant Co.**, 77 k E Silver City, 88 k E Silver City, **Lincoln Co.**, 2 mi. SE Alto, Sierra Blanca, **Los Alamos Co.**, Camp



Map 73. *Myrmica fracticornis*.

May, **Mora Co.**, 10 k SE Mora, **Otero Co.**, Camp Sleepy Grass, Cloudcroft (Cole 1953b), 3 mi. E Cloudcroft, 5 mi S Mescalero (Cole 1953b), 16 mi S Mescalero (Cole 1953b), Sacramento Mts. (Bailey

Canyon), Sierra Blanca, Timberon, 8.9 k N Timberon, 9 k N Timberon (Jim Lewis Spring), 12.9 k N Timberon, **Rio Arriba Co.**, 6 k SW Tres Piedras, **Sandoval Co.**, Bandelier National Monument (Cole 1953b), **San Miguel Co.**, Dailey Canyon (near Beulah) (Cole 1953b), Sapello Canyon (Cole 1953b), **Santa Fe Co.**, 12 k NE Santa Fe, Tesuque Canyon (Cole 1953b), **Socorro Co.**, Beartrap Canyon, Mount Withington Lookout, Grassy Lookout, **Taos Co.**, Taos (Cole 1953b), 20 k S Taos, 2 k W Tres Ritos, **Union Co.**, Capulín Mt. National Monument (Cole 1953b).

**Habitat.** Most nests are in wet, swampy areas, or riparian sites in longleaf cottonwood forests, poplar forests, oak forests, spruce-fir forests, pine forests (ponderosa, pinyon), fir forests, and open grassy meadows.

**Biology.** Nests are usually found under stones (occasionally very large) or branches and logs, or even "sticks" in areas with sandy soils or fine loam soils high in organic matter. Foragers feed on dead insects; workers move slowly and are not aggressive. Brood was found in nests in March, May, August and September. This species appears to be polygynous, with flights occurring in August. This species lives in the nests of *Formica fusca*, *Lasius pallitarsis*, and nests together with *Leptothorax muscorum* and *Stenamma diecki*.

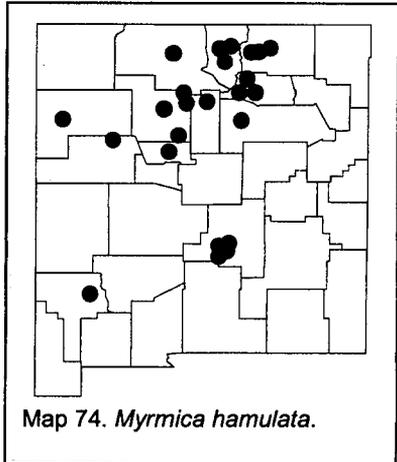
Weber, 1941, 1942; Kanno-ski, 1957, 1959; Wheeler and Wheeler, 1963; Gregg, 1963

## ***Myrmica hamulata* Weber**

Figs. 198, 212, 213; Map 74

**Discussion.** This species can be recognized by the hooked flange on the scape of the worker and female and the scape of the male, which is about equal in length to the first 2 funicular segments (Fig. 213). The ventral surface of the postpetiole has an anteriorly directed process.

**Distribution.** USA: WY, UT, CO, AZ; NM: **Bernalillo Co.**, Sandia Mts. (Cole 1953b), **Cibola Co.**, Mt. Taylor (9000'), **Colfax Co.**, 5 mi E Eagle Nest (Cole 1953b), 16 k E Eagle Nest, Ute Park (Cole 1953b), **Grant Co.**, 77 k E Silver City, **Lincoln Co.**, Sacramento Mountains, Haynes Canyon (Type locality), 2 mi. SE Alto, 4 k W Alto, Bonito Lake, Oak Grove Camp, **Los Alamos Co.**, Los Alamos, 4 k N Los



Map 74. *Myrmica hamulata*.

Alamos, Mortandad Canyon, Camp May, **McKinley Co.**, Zuni Mts. (southeast of Gallup), **Mora Co.**, Coyote Creek State Park, Mora, 10 k SE Mora, **Rio Arriba Co.**, 7 k S Ce-

bolla, **Sandoval Co.**, Bandelier National Monument, 45 k SE Cuba, Sandia Mts., **San Miguel Co.**, 20 k NW Las Vegas, **Santa Fe Co.**, 12 k NE Santa Fe, **Taos Co.**, 6 k SW Tres Piedras, 20 k NW Taos, 20 k S Taos.

**Habitat.** Ponderosa pine-riparian, aspen forests, spruce forests, meadows, oak forests, pinyon pine, subalpine fir.

**Biology.** This species usually nests in open areas in the soil, or under stones, but are occasionally found under (and in) rotten logs and stumps, or even under manure. Brood was found in nests from June to September, sexuals in July. This species nests together with *Formica neorufibarbis*, *F. hewitti*, *F. occulta*, *Acanthomyops latipes*, *Lasius sitiens*, *L. pallitarsis*, *Leptothorax crassipilis*, and *Monomorium*. One nest was a mixture of this species and *Lasius sitiens*, *Acanthomyops latipes*, and *Formica occulta*.

Gregg, 1963

### *Myrmica incompleta* Provancher

Figs. 202, 219, 220; Map 75

**Discussion.** This species can be recognized as the frontal lobes are bend downward (towards the head as seen from the top of the head, see Fig. 202). The lateral lobes extend more laterally (Fig. 219) than in most other species. The scape is straight at the base (Fig. 220).

This species looks superficially like *M. americana*, as it is a medium sized, brown ant in the field that is bicolored under the microscope (at least the gaster is darker

than the mesosoma). It is easily separated from *M. americana* as the base of the scape is not bend into a right angle, as occurs in *M. americana*. It also occurs in moist habitats, whereas *M. americana* is usually found in semiarid habitats. *Myrmica brevinodis* is a synonym of this species.

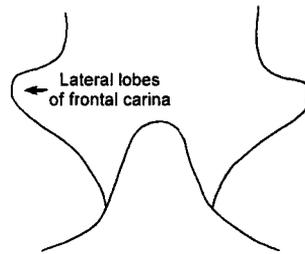


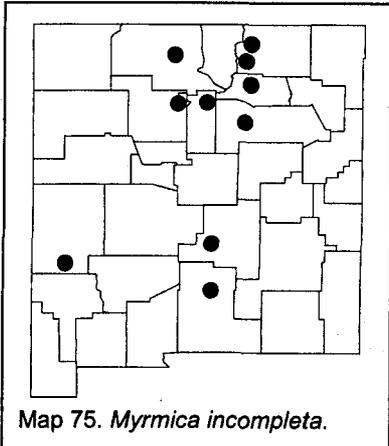
Fig. 219. Frontal carina (arrow) of a worker of *M. incompleta*, showing the strongly angular lateral lobes.



Fig. 220. Antennal scape of a worker of *M. incompleta*.

**Distribution.** USA: Most of the United States, including Alaska south down the Rocky Mountains as far south as AZ, CO; NM: **Catron Co.**, Mogollon Mts. (Cole 1953b), **Colfax Co.**, Cimarron Canyon (Cole 1953b), 11 mi N Eagle Nest (Cole 1953b), **Lincoln Co.**, Bonito Lake, **Los Alamos Co.**, Camp May, **Mora Co.**, Coyote Creek State Park, **Otero Co.**, 4 mi. N Cloudcroft, **Rio Arriba Co.**, 7 k S Cebolla, **San Miguel Co.**, Sapello Canyon (Cole 1953b), **Santa Fe Co.**, Tesuque Canyon (Cole 1953b).

**Habitat.** Ponderosa pine forests, Gambel oak forests, aspen forests, spruce forests, deciduous forest, grassy habitats, especially in boggy and swampy areas.



**Biology.** This species nests under stones or pieces of wood, or logs or in stumps. Brood was found in nests in August, sexuals in August and September. These ants are aggressive when a large nest is disturbed, but are not very effective at stinging. Workers tend Homoptera or feed on dead insects. They occasionally nest together with *Formicoxenus provancheri*.

Gregg, 1963 (listed as *M. brevinodis*)

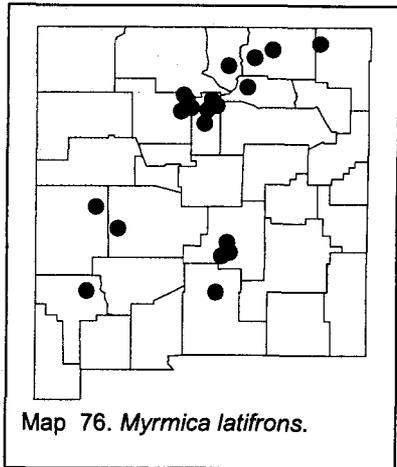
### *Myrmica latifrons* Starcke

Fig. 214; Map 76

**Discussion.** These are medium sized, dull brown (occasionally pale brown) ants with a shiny black gaster.

These ants occur in more moist sites than *M. americana*, but not as wet as those habitats of *M.*

*incompleta*. Specimens from the White Mts. (South Fork, 16-viii-1982, C. H. Townsend # 11456) are larger, more robust and the petiolar node is quadrate in shape, and are considered by Dr. Francoeur to be an undescribed species. *Myrmica emeryana* is a synonym of this species.



**Distribution.** USA: Most of United States, including AZ; NM: **Catron Co.**, Ox Spring Canyon, **Colfax Co.**, 16 k E Eagle Nest, Ute Park (Cole 1953b), **Grant Co.**, 77 k E Silver City, **Lincoln Co.**, 2 mi. SE Alto, Bailey Canyon, Bonito Lake, **Los Alamos Co.**, Los Alamos, Mortandad Canyon, Camp May, **Mora Co.**, Coyote Creek State Park, **Otero Co.**, Bailey Canyon, **Sandoval Co.**, Bandelier National Monument, **Santa Fe Co.**, Hyde Park, Santa Fe, 12 k NE Santa Fe, Tesuque Canyon (Cole 1953b), **Socorro Co.**, Grassy Lookout, **Taos Co.**, 12 mi E Taos (Cole 1953b), **Union Co.**, Capulin Mt. Natl. Monument (Cole 1953b).

**Habitat.** Mesic woodlands, ranging from pinyon-pine forests to Gambel oak forests, deciduous for-

ests, pine, spruce and aspen forests, riparian-ponderosa pine, up to subalpine fir up to 2700 meters elevation. They often nest in meadows in these forest communities.

**Biology.** This species nests under stones, logs and dung in shaded moist areas throughout much of montane New Mexico. Brood was found in nests in July and August, reproductives were in nests from July to August.

Talbot, 1945 (as *M. schencki emeryana*); Kanno, 1959; Gregg, 1963; Wheeler and Wheeler, 1963

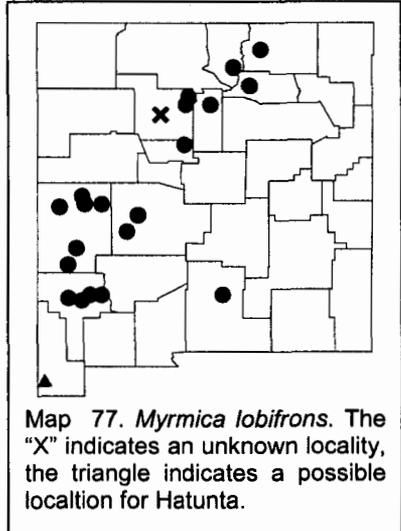
### *Myrmica lobifrons* Pergande

Figs. 42, 196, 215, 217; Map 77

**Discussion.** The base of the scape of the worker and female bends at about a 90° angle before attaching to the head. The flange at the bend is well developed, but does not form a high, semicircular welt, and is somewhat spoon shaped as seen from the top. The surface of the scape has fine sculpture. The propodeal spines of the worker are well developed, longer than the distance between their bases. The scape of the male is bent at the base, and about as long as the following 5 funicular segments taken together.

**Distribution.** USA: Much of western United States, including AZ, CO; NM: **Bernalillo Co.**, Sandia Mts., **Catron Co.**, 37 k NE Apache Creek, 15 k NW Datil, Mogollon Mts. (Trail 206), Ox Spring Canyon, Sawtooth Mt., Snow Lake, **Colfax Co.**, 16 k E Eagle Nest, **Grant Co.**,

Gila Mts. (Iron Creek), 16 k E Silver City, 77 k E Silver City, 88k E Silver City, **Hidalgo Co.**, Hatunta?, **Los Alamos Co.**, Camp May, Los Alamos, **Mora Co.**, 10 k SE Mora, **Otero Co.**, Cloudcroft, **Sandoval Co.**, Bandelier National Monument, without locality, **Santa Fe Co.**, Santa Fe, **Socorro Co.**, Beartrap Canyon, Water Canyon, **Taos Co.**, Tres Ritos.



**Habitat.** High altitude forests of all types (pinyon-juniper, Chihuahua pine, Gamble's oak, ponderosa pine, fir, spruce) mostly above 2450 meters elevation.

**Biology.** This ant nests under stones and logs in fine sandy soils to rocky loam. Brood was found in nests in July and August, reproductives were in nests from June to September, flights occur in August. One colony was nesting together with *Camponotus* another with *Formica neogagates*, a third nest was in the same log as *Leptothorax melinus*.

Gregg, 1963; Wheeler and Wheeler, 1963 (as *M. brevinodis*)

### ***Myrmica mexicana* Wheeler**

Fig. 206

**Discussion.** This species has the frontal lobes thin and elevated, and the scape the male is relatively long, approximately as long as the first seven funicular segments (Fig. 206). The propodeal spines of the worker are nearly as long as the distance between their tips. The scape of the worker is gradually bent at the base at about a 120° angle, the outer edge of the scape has a poorly defined carina.

It would probably only be confused with *M. discontinua*, but could be separated by the latter species, in which the scape of the male is only about as long as the first 5 funicular segments. The workers of the 2 species appear to be identical. It is doubtful that this species occurs in western United States, although many other species occur in the Rocky Mountains and the mountains of eastern Mexico (for example, several species in the genus *Leptothorax*). We suspect that its report in Arizona is based on the misidentification of *M. discontinua*.

**Distribution.** USA: AZ, This species could be found in NM; MEXICO: Nuevo León, Veracruz.

**Habitat.** Pinyon-pine, Pine and fir forest, mixed hardwoods, often in meadows.

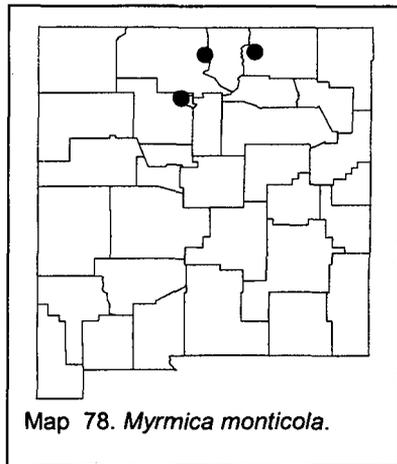
**Biology.** This species nests under stones in areas of rocky loam. Brood and sexuals were found in nests (in northeastern México) in September. Two dealate females

were found in a nest, suggesting that this species may be polygynous.

### ***Myrmica monticola* Creighton**

Figs. 207, 208; Map 78

**Discussion.** The workers and females of this species are easily recognized by the large, lobiform flange at the base of the antennal scape (Fig. 208). This is a timid, slow moving, dark colored, small species, which has been referred to as *Myrmica scabrinodis schencki* var. *monticola* Wheeler, and *M. sabuleti nearctica* Weber.



Map 78. *Myrmica monticola*.

**Distribution.** USA: Much of western United States, including CO; NM: Colfax Co., 16 k E Eagle Nest, Los Alamos Co., Los Alamos, Rio Arriba Co., 6 k SW Tres Piedras.

**Habitat.** Woodlands of all types, at moderate elevations (1800 - 2600 meters), grasslands.

**Biology.** These ants nests under stones or logs; reproductives

were found in nests in July, when flights occurred.

Gregg, 1963; Wheeler and Wheeler, 1963

### *Myrmica rugiventris* (M. Smith)

Figs. 199, 221

**Discussion.** This is an easily recognized species, as the part of clypeus anterior to the insertions of the antennae is raised up into a carina or boundary (Fig. 199). The medial part of the clypeus is depressed, compared to the surrounding lateral edges and as seen from top of the head. The middle and posterior tibial spurs are pectinate, but not with a row of fine hairs as in *Myrmica*, but as branched structures. The node of the petiole is low and slopes posteriorly to the point of attachment of the postpetiole (Fig. 221). It was previously known as *Tetramorium rugiventris* Smith and *Paramyrmica rugiventris* (Smith).

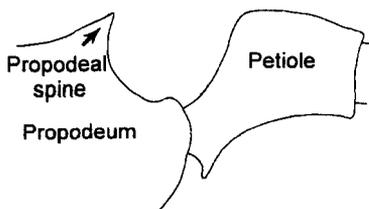


Fig. 221. Propodeum and petiole of a worker of *M. rugiventris*.

The relationships between this genus and *Tetramorium* are in a state of confusion. Some of the species of *Tetramorium*, specifically *T. bicarinatum* and *T. caespitum*, appear to have finely pectinate middle

and posterior tibial spurs, similar to *Myrmica*. It is possible that *Tetramorium* will be shown to be a synonym of *Myrmica*.

**Distribution.** USA: CA, CO, AZ (Chiricahua Mts.); this species hasn't been collected in NM, but may occur in the mountains in the southwestern corner, as it occurs in the adjacent Chiricahua Mts.

**Habitat.** Transition of deciduous forests to low elevation pines (1700m in SE Arizona, in oak-juniper-pine forests).

**Biology.** This species nests under stones in shady regions, and may be a parasite of other species of *Myrmica*.

Smith, 1943c, Gregg, 1961

### *Myrmica striolagaster* Cole

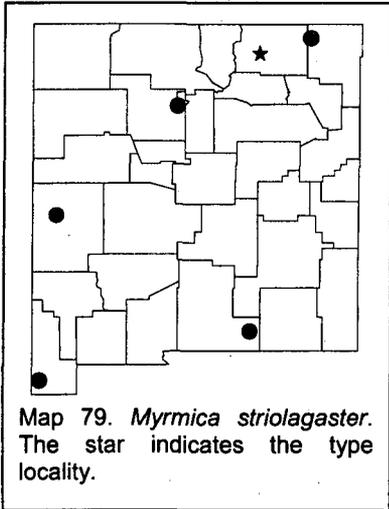
Figs. 209, 210; Map 79

**Discussion.** The workers of this species are easily recognized by the longitudinal striations at the base of the gaster and by longitudinally striate antennal scapes. The striations on the gaster are occasionally fine, and difficult to see, in which case the large punctures are generally obvious.

**Distribution.** USA: AZ, CO, TX; NM: **Catron Co.**, 13.4 k N Apache Creek, **Colfax Co.**, Cimarron Canyon (type locality, 5 ½ mi W Cimarron), **Eddy Co.**, Hidden Cave, **Hidalgo Co.**, Clanton Draw, **Sandoval Co.**, Bandelier National Monument, **Union Co.**, Capulin Mountain National Monument (Cole, 1955c); MEXICO: Chihuahua.

**Habitat.** Pinyon pine, ponderosa pine, cedar and oak wood-

lands (silver leaf, white oak), sycamore canyons, grasslands in forests; this is one of the few *Myrmica* species which nests in dry habitats.



Map 79. *Myrmica striolagaster*. The star indicates the type locality.

**Biology.** This species nests under stones. Brood was present in nests in June. One nest was under a stone together with *Camponotus vicinus*.

Cole, 1953b, 1953f; Gregg, 1963

***Myrmica tahoensis* Weber**

**Discussion.** The workers of this species are nearly impossible to separate from those of *M. lobifrons* and *M. fracticornis*. Often the mesosoma is reddish yellow and the head and gaster black, a combination rarely seen in the other two species. The propodeal spines are sometimes slightly bent downwards, but the two spines on a single specimen may be different, whereas they are rarely bend down in the other two species. The shorter antennal scape of the

male (about as long as first three funicular segments) easily separate it from the other two species (scape of these two species about as long as the first five funicular segments).

**Distribution.** USA: Most of western United States, including AZ; NM: We have no records of this species in the state.

**Habitat.** Shady forests.

**Biology.** This species nests under stones. Colonies are small.

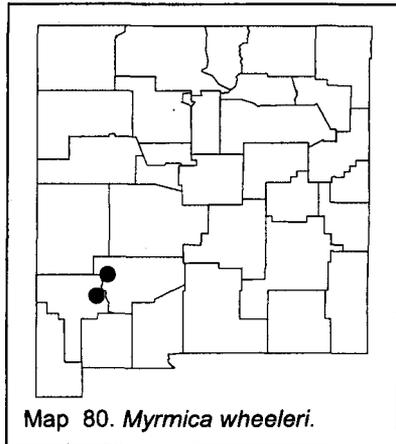
Weber, 1948

***Myrmica wheeleri* Weber**

Fig. 197; Map 80

**Discussion.** This species is easily recognized by the shape of petiole. The node of the petiole is well separated from both the anterior and posterior peduncles (Fig. 197). The ventral surface of the petiole is strongly bent where the anterior and posterior peduncles meet (Fig. 197). (Similar in worker, female and male). The scapes are not modified at the base.

**Distribution.** USA: SE AZ



Map 80. *Myrmica wheeleri*.

(Chiricahua Mts.); NM: **Grant Co.**, Gila Mts. (Wright's Cabin), **Sierra Co.**, Black Range.

**Habitat.** Ponderosa pine, Douglas fir forests.

**Biology.** This species nests under stones in rocky loam soils. Sexuials were found in nests in mid August.

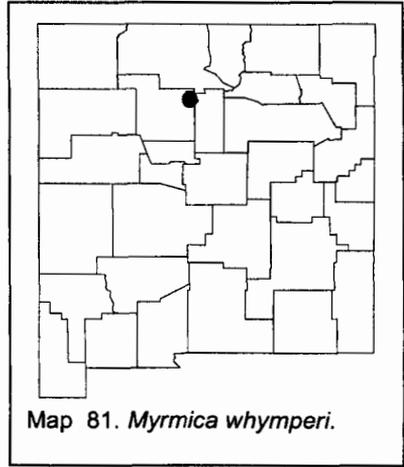
### ***Myrmica whymperi* Forel**

Map 81

**Discussion.** This species is larger than most species in the genus (4.5 - 5.3 mm total length), is very dark and has coarse sculpture. The edges of the frontal lobes are deflected towards the head, similar to that of *M. incompleta* (see Fig 202). *Myrmica sulcinodoides* is a synonym of this species.

**Distribution.** USA: Alaska south California, east to SD, south to NM: **Los Alamos Co.**, Camp May.

**Habitat.** Variable in choice of habitat, including grasslands and



meadows, cottonwood-willow forests, deciduous forests, aspen-spruce-fir forest.

**Biology.** This species nests under stones and logs. Reproductives were found in nests from July to September; nuptial flights probably occur in late summer.

Wheeler, 1915; Cole, 1934b; Gregg, 1963

## **Genus *Pheidole***

(Key: Gregg, 1958)

This is a common genus of easily recognized ants. There are two (or rarely more) separate worker castes, with soldiers having large heads (Fig. 46), which are often larger than the mesosoma. The mandibles of the soldiers (and most workers) have two large, well developed, acute teeth (Fig. 47). The propodeum usually has two well-developed

spines; the postpetiole often has lateral connules (Fig. 251).

It could be confused with *Aphaenogaster*, but can usually be distinguished as most *Pheidole* have a 3-segmented antennal club (4 segments in *Aphaenogaster*). It is also easy to confuse this genus with *Leptothorax*. *Pheidole* has an antennal club, which is usually made up of 3 well-defined antennal segments,

which are noticeably larger than the other segments, whereas the antennal club of *Leptothorax* is usually poorly defined. Additionally, the mesosoma of *Pheidole* is not continuous across the dorsum, it usually constricted at least at the metanotal suture, the mesosoma of most *Leptothorax* is nearly straight across the dorsum. The mandibles of *Pheidole* workers always have 2 prominent apical teeth, whereas the workers of *Leptothorax* have 4 - 6 teeth, which are about equal in size. The species of *Leptothorax* which causes the most confusion, is *L. pergandei*, in which the outline of the dorsum of the mesosoma is similar to that in many species of *Pheidole* (see Fig. 151). It can be separated from species of *Pheidole* by the form of the antennal club, as well as the teeth on the mandibles. *Pheidole* is superficially similar to the dimorphic or polymorphic species of *Solenopsis*, but is easily distinguished by the 12 segment antenna (10 segmented with two segmented antennal club in *Solenopsis*). Small *Pheidole* workers could possibly be confused with workers of *Monomorium*, but ants of the latter genus are usually shiny black and lack propodeal spines. *Monomorium* also has a 12-segmented antenna with a 3-segmented club. It is very important to collect a complete nest series, including the soldiers, for species identifications. Workers can only be identified by slow, tedious comparisons with other species, and the workers of some species cannot be distinguished.

This is a difficult group replete with taxonomic problems, but a revision by Dr. E. O. Wilson will be

published in late 2002. It is important to refer to his revision for nomenclatural changes and the descriptions of several new species from Arizona that may occur in New Mexico. Cole (1952a, 1953g, 1955a, 1956b) includes the New Mexican species. Most species nest in the soil with the entrance surrounded by a small mound. These ants also nest under stones and logs. Most species are seed harvesters; the soldiers rarely defend the nest and are usually the first to hide when a nest is disturbed. They apparently break larger seeds with their mandibles. Workers of some species also harvest the corpses of dead insects.

### Key to the workers of *Pheidole*

(See Gregg, 1963)

1. Antennal club composed of 4 segments (Fig. 222); rarely collected ..... *clydei* Gregg

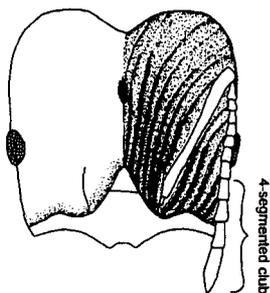


Fig. 222. Head of a major of *Ph. clydei*.

- Antennal club composed of 3 segments; very common ..... 2
- 2(1). Gaster truncate or subtruncate at base; species small to moderately large in size usually dimorphic;

very common ..... 3  
 - Gaster not truncate at base (rounded where postpetiole attaches to gaster - Fig. 223); giant species, polymorphic; propodeal spine unusually long and sharp (Fig. 223); rarely collected in SW New Mexico ..... **rhea** Wheeler

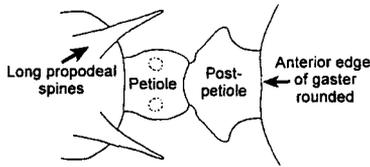


Fig. 223. Dorsal view of a major of *Ph. rhea*, showing the long propodeal spines and the rounded anterior margin of the gaster.

3(2). Antennal scape of major surpassing posterior lateral borders of the head (Fig. 224) ..... **desertorum** Wheeler

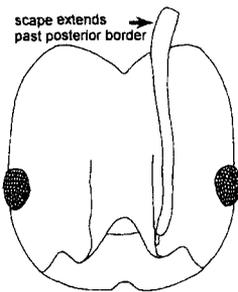


Fig. 224. Head of a major of *Ph. desertorum*. The arrow indicates the scape, which extends past the posterior margin of the head.

- Antennal scape of major not reaching posterior lateral border (Fig. 225) ..... 4

4(3). Scape of major abruptly bent at base so it turns toward midline of head in passing to antennal insertion (Fig. 225), basal part of scape flat-

tened and often as broad or broader than distal portion (Fig. 225) ..... 5

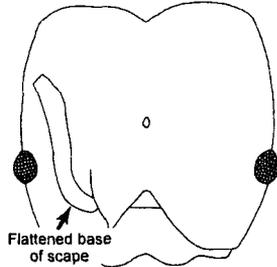


Fig. 225. Head of a major worker of *Ph. tetra*, indicating the flattened, bent base of the antennal scape.

- Scape of major not abruptly bent towards midline of head (Fig. 224), if basal section is flattened it is not as broad as distal portion .. 12  
 5(4). Antennal scape of major reaching  $\frac{3}{4}$  or more of distance between insertion and posterior lateral angle (Fig. 226) ..... 6

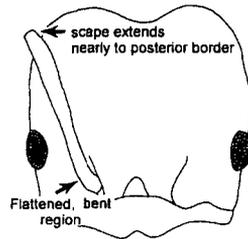


Fig. 226. Head of a major of *Ph. hyatti*. The arrows indicate the length of the scape and the flattened bend near the base of the scape.

- Antennal scape of major reaching  $\frac{2}{3}$  or less of distance between insertion and posterior lateral angle (Fig. 227) ..... 9

6(5). Entire dorsal surface of head of major covered with reticulo-rugose sculpture, intrarugal spaces granulose ..... 7

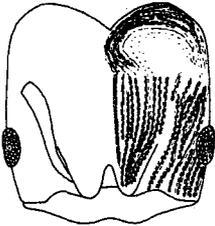


Fig. 227. Head of a major of *Ph. rugulosa*.

- Reticulo-rugose sculpture of head of major largely confined to anterior half, posterior lateral lobes punctate or feebly granulose, surface moderately to strongly shining, at least on posterior part of head ..... 8

7(6). Pronotal rugae of major coarse, transverse, and with intrarugal spaces notably shining; petiolar notch broad and shallow; gastral hairs long, nearly of equal length, coarse, blunt at tips, and widely spaced ..... *sciara* Cole

- Pronotal rugae of major weak and somewhat reticulated, with intrarugal spaces granular, subopaque; petiolar notch feeble; gastral hairs short, uneven in length, fine, pointed at tips, and more numerous .....

8(6). Head of minor densely punctate, opaque; erect hairs on gaster of major sparse and widely spaced ..... *vallicola* Wheeler

- Head of minor smooth and shining; erect hairs on gaster of major numerous, long, and closely spaced ..... *hyatti* Emery

9(5). Posterior lateral lobes of head of major striato-granulose, scarcely

shining (Fig. 228) ..... *obtusospinosa* Pergande

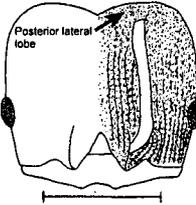


Fig. 228. Head of an intermediate sized major of *Ph. obtusospinosa*. The scale = 1 mm and is drawn to the same scale as Fig. 245 & 246.

- Posterior lateral lobes of major strongly shining, with piligerous punctures only ..... 10

10(9). Flattened basal portion of scape of major notably broader than distal portion (Fig. 229) .....

..... *porcula* Wheeler

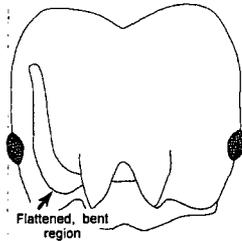


Fig. 229. Head of a major of *Ph. porcula*, the arrow indicates the flattened portion of the antennal scape.

- Flattened basal portion of scape of major no wider than distal portion (Fig. 230) ..... 11

11(10). Erect hairs on dorsum of gaster short, shorter than maximum diameter of eye, mostly of same length (Fig. 231) .....

..... *diversipilosa* Wheeler

- Erect hairs on dorsum of gaster of various lengths, some longer than maximum diameter of eye ..... *tetra* Creighton

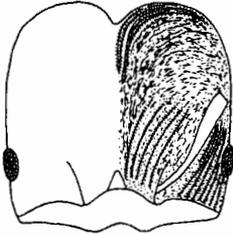
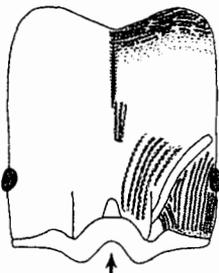


Fig. 230. Head of a major of *Ph. rufescens*.



Fig. 231. Mesosoma pedicle and first gastral tergite of a major of *Ph. diversipilosa*.

12(4). Tops of posterior lateral lobes of major, and usually front faces as well, covered with sculpture, surface opaque or feebly shining (Fig. 232) ..... 13



Emargination along anterior margin of clypeus

Fig. 232. Head of a major of *Ph. tepicana*.

- Tops of posterior lateral lobes of major, and usually front faces as well, free from sculpture (Fig. 229),

except for piligerous punctures, surface in most cases strongly shining ..... 18  
 13(12). Anterior border of clypeus of major with deep, semicircular emargination, which extends almost to level of frontal lobes (Fig. 232) ...  
 ..... *tepicana* Pergande

- Anterior border of clypeus of major entire, or if impressed, emargination is shallow (Fig. 234) and not semicircular ..... 14  
 14(13). Humeral angles of pronotum of major weakly developed and not forming lateral bosses ..... 15

- Humeral angles of pronotum of major strongly developed, forming distinct, epaulet-like bosses .. 16  
 15(14). Head and mesosoma punctate, opaque; hairs on promesonotum of major and especially minor strongly clavate (Fig. 233) .....  
 ..... *rufescens* Wheeler

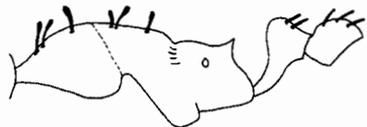


Fig. 233. Mesosoma of a minor of *Ph. rufescens*.

- Head and mesosoma of minor, at least in part, strongly shining; hairs not clavate ..... *soritis* Wheeler  
 16(14). Postpetiole of major lenticular (lens shaped) in form, lateral connules well-developed ..... 17

- Postpetiole of major trapezoidal, lateral connules absent or poorly developed ... *rugulosa* Gregg  
 17(16). Transverse rugae on head of major pronounced and usually extending onto front faces of lobes ...  
 ..... *senex* Gregg

- Transverse posterior lateral rugae on head of major much finer, resembling striations, and largely confined to top of head (Fig. 234) ...  
 ..... *coloradensis* Emery

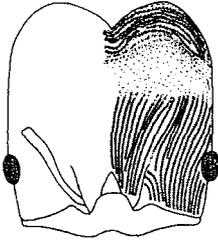


Fig. 234. Head of a major of *Ph. coloradensis*.

**18(12).**Head, mesosoma, and gaster of minor, and often major, with distinct violaceous or bluish reflections; not recorded from New Mexico (occurs in Texas) .....

..... *metallescens* Emery

- Head, mesosoma, and gaster of minor (and major) without violaceous reflections ..... **19**

**19(18).**Entire mesosoma of minor densely covered with granulate sculpture and completely opaque ...

..... *sciophila* Wheeler

- At least part of promesonotum of minor shining, or if entire mesosoma is opaque, promesonotum is longitudinally striate and not densely granulate ..... **20**

**20(19).**Large species, head of major (excluding mandibles) at least two mm in length and usually more ... **21**

- Small species, head of major not exceeding 1.5 mm in length .. **24**

**21(20).**Pronotum of major with transverse striae; unknown from NM ..... **22**

- Pronotum of major without

transverse striae. *militicida* Wheeler **22(21).**Head of major with longitudinal rugae confined to anterior half, posterior half without sculpture, except for piligerous punctures ..... **23**

- Head of major with longitudinal rugae extending onto anterior portion of posterior lateral lobes; not recorded from New Mexico (occurs in southern Arizona and western Texas) .....

*titanis* Wheeler **23(22).**Head of major with flattened, rugose area interposed between frontal lobe and eye, furnished with large, intrarugal foveolae; petiole with prominent lateral spiracles; not recorded from New Mexico (occurs in Arizona and southern Texas) .....

..... *macclendoni* Wheeler

- Head of major without flattened, rugose area between frontal lobe and eye; petiole unarmed; not recorded from NM (AZ, TX) .....

..... *virago* Wheeler

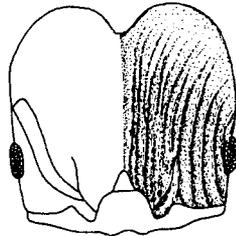


Fig. 235. The head of a major worker of *Ph. ceres*.

**24(20).**Sculpture on head of major extending to vertex, only posterior border smooth and shining (Fig. 235) .....

..... *ceres* Wheeler

- Sculpture on head of major largely confined to anterior half of head, posterior half smooth and shining ..... **25**

**25(24).**Eyes of major with 60 facets or more ..... **26**

- Eyes of major with 40 facets or fewer ..... 27
- 26(25). Major with dorsum of pronotum covered with numerous, course, reticulated rugae in addition to more nearly parallel transverse rugae on anterior face and neck; intrarugal surfaces heavily coriaceous, opaque or nearly so ..... *tucsonica* Wheeler
- Major with dorsum of pronotum bearing few or no rugae, rugae mainly restricted to anterior face and neck of pronotum, and not noticeably reticulate; intrarugal surfaces smooth to slightly coriaceous, moderately to strongly shining *xerophila* Wheeler 27(25). Vertex and posterior border of minor with small, close set punctures (Fig. 236), which give surface a noticeably duller appearance on both parts than elsewhere on head .....
- ..... *cerebrosior* Wheeler

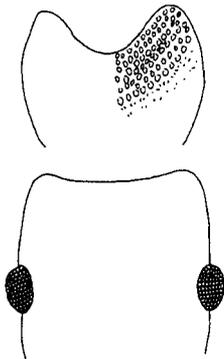


Fig. 236. Outline of the head of a minor worker of *Ph. cerebrosior*. The upper inset shows the punctures on the vertex.

- Vertex and posterior border of minor strongly shining, or only slightly less shining than remainder of head, punctures widely scattered

- over entire head ..... 28
- 28(27). Erect hairs on mesosoma of minor short, sparse and strongly clavate (Fig. 237) .....
- ..... *marcidula* Wheeler

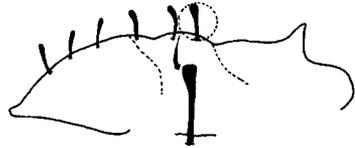


Fig. 237. Mesosoma of a minor of *Ph. marcidula*. The inset shows the details of the shape of a hair.

- Erect hairs on mesosoma of minor long, abundant, and although often blunt tipped, not clavate .....
- ..... *bicarinata* Mayr

***Pheidole bicarinata* Mayr**

Figs. 238, 239; Map 82

**Discussion.** The majors can be recognized as being small (slightly more than 2 mm total length), most of the dorsum of the head of the major is smooth and

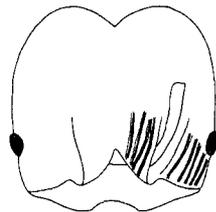


Fig. 238. Head of a major worker of *Ph. bicarinata*.

glossy (Fig. 238), the area between the frontal carinae has coarse, parallel striae, the scapes extend about 1/2 of the length of the head. The dorsum of the pronotum is covered with

fine punctures, and is partially smooth and shining, the lateral bosses are well developed, the dorsal face of the propodeum is covered with punctures; and transverse striae. The propodeal spines are well developed and slightly bent downwards

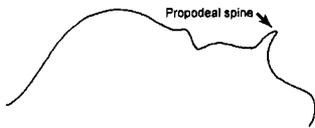


Fig. 239. Outline of the mesosoma of a major of *Ph. bicarinata*.

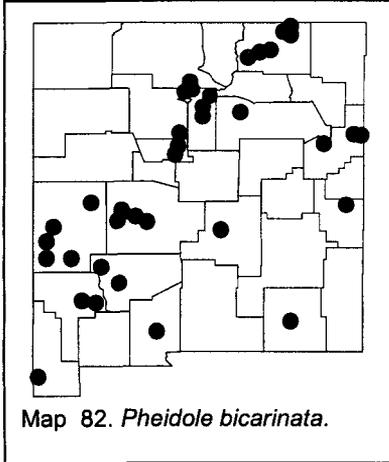
(Fig. 239). They are often short (about 0.05 mm in length) and angulate in shape. The mesopleuron and the side of the propodeum are punctate. The lateral connules are present, but are blunt and poorly developed. The head of the minor worker is mostly smooth and polished, as is the dorsum of the pronotum and most of the mesosoma.

This species is difficult to separate from *Ph. cerebrostor*. It differs in that the vertex of the head of the minor worker is smooth and polished, or finely, transversely striolate, whereas the vertex of *Ph. cerebrostor* is densely punctate. There is a considerable amount of variation in the sculpturing of the vertex of the minor worker, and it is often difficult to identify a series, as different workers may have characteristics of both species. *Pheidole bicarinata* could be confused with *Ph. marcidula*, but can be separated as the minor lacks the clavate hairs on the dorsum of the mesosoma. See the discussion of *Ph. marcidula* for

more details. *Pheidole longula* is included here.

**Distribution.** USA: Most of the country, from the East Coast as far west as WY, UT, CO, AZ, west TX; **NM:** **Bernalillo Co.**, Embudo (Cole, 1956b), 3 mi S Embudo (Cole 1953g), **Catron Co.**, 4k NW Datil (2421 m), 2 mi. N Frisco Springs, Glenwood, Mogollon Mts., 8 k NNE Reserve, **Colfax Co.**, Cimarron (Cole 1953g), Cimarron Canyon (Cole, 1956b), 20 mi W Ratón (Cole, 1956b), 5 mi S Ratón Pass (Cole 1953g), 20 mi W Ratón (Cole 1953g), Ute Park (Cole, 1956b), **Doña Ana Co.**, 4 mi N Las Cruces (Cole 1953g), **Eddy Co.**, Carlsbad, **Grant Co.**, 18 mi SE Bayard (Cole 1953g), 2 mi S San Juan (Cole 1953g), **Hidalgo Co.**, Coronado National Forest (Clanton Draw), **Lincoln Co.**, 33°42'05.52"N 105°49'41.59"W, **McKinley Co.**, near Gallup (*Ph. longula*, ) **Quay Co.**, Glenrio (Cole 1953g), 9 mi W Glenrio (Cole, 1956b), Tucumcari (Cole 1953g, 1956b), **Rio Arriba Co.**, Española (Cole, 1956b), 2 mi SW Española (Cole 1953g), San Juan Pueblo (Cole, 1956b), **Roosevelt Co.**, 1 k E Oasis State Park, **Santa Fe Co.**, 12 mi S Santa Fe (Cole 1953g), Tesuque Canyon (Cole 1953g), **Sandoval Co.**, Placitas (Fagerlund, pers. comm.), **San Miguel Co.**, 22 mi N Las Vegas (Cole 1953g, 1956b), **Santa Fe Co.**, 12 mi S Santa Fe (Cole, 1956b), **Sierra Co.**, Black Canyon, (Black Mts.) (Cole 1953g, 1956b), 21 k SSW Hillsborough, **Socorro Co.**, Magdalena (Cole 1953g), Magdalena Mts. (Rd. 235), 9 mi W Magdalena (Cole, 1956b), 16 mi W Socorro

(Cole 1953g, 1956b), Water Canyon (Cole 1953g), **Union Co.**, Capulin Mt. National Monument.



**Habitat.** Grasslands (including arid sites with yuccas), scrub oak, pine and cedar, pinyon-juniper forests, oak forests, ponderosa pine forests.

**Biology.** This species nests in rotten logs, as well as in the soil and under objects (especially stones) in grassy areas with fine sand. Brood was found in nests in March and August. They are attracted to baits on the soil surface (Vienna sausage). This species is the host of *Solenopsis molesta*.

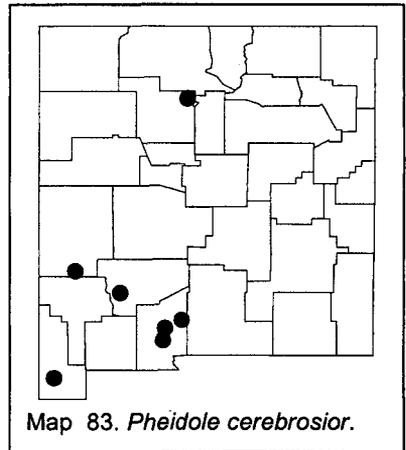
### ***Pheidole cerebrosior* Wheeler**

Fig. 236; Map 83

**Discussion.** The major of this species is nearly identical to *Ph. bicarinata*. It differs in that the vertex of the minor is punctate (Fig. 236); it is smooth and shining to very finely striolate in *PH. bicarinata*.

There is a considerable amount of variation in the sculpture of the vertex of the minor worker and is often very difficult to separate this species from *Ph. bicarinata*.

**Distribution.** USA: CA, AZ; NM: **Catrón Co.**, Mogollón Mts., **Doña Ana Co.**, Aguirre Springs, 4 mi N Las Cruces (Cole, 1956b), 45 k NE Las Cruces (Long Term Ecological Research site), **Hidalgo Co.**, Animas Mts. (San Luis Pass) (Creighton and Gregg, 1955), **Los Alamos Co.**, Rio Grande, **Sierra Co.**, 4 k W Hillsborough.



**Habitat.** Sagebrush, riparian, evergreen-oak associations. This species usually nests in mountain canyons (including riparian sites), between 550 and 1800 meters elevation, and is rarely found in the open deserts.

**Biology.** This species nests under stones or logs. There are seldom more than 12 majors present in a nest.

Creighton and Gregg, 1955

***Pheidole ceres* Wheeler**

Fig. 235; Map 84

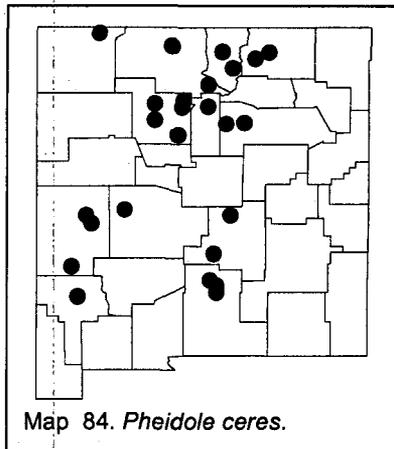
**Discussion.** This is a small species (majors < 2.5 mm total length). Most of the head is striate, only the posterior part of the head and the tops of the posterior lateral lobes are shining. The mesosoma is predominantly punctate, the side and top of the pronotum are smooth and shining. The lateral connules of the postpetiole are weakly formed, but present. The dorsal surface of the gaster is smooth and glossy. The scapes extend about half of the length of the head. The scapes of the minor worker extend about one funicular segment past the posterior lateral corners, the dorsum of the head is nearly completely glossy, the side as well as the top of the pronotum are smooth and glossy, much of the remainder of the mesosoma is densely, and coarsely punctate. The major and minor are generally dark brown.

The sculpture of the dorsum of the head of the major worker generally separates it from all other species. It could be confused with *Ph. marcidula*, but can be separated, as the minors do not have clavate hairs on the dorsum of the mesosoma. See the discussion of *Ph. marcidula* for more details.

**Distribution.** USA: AZ, CO, TX; NM: **Catron Co.**, 12 k SW Datil, 14 k SW Datil, Mogollon Mts. (Cole 1953g), **Colfax Co.** Cimarron Canyon (Cole 1953g), Ute Park (Cole 1953g), **Grant Co.**, 14 mi N Silver City, **Lincoln Co.**, Bonito Lake, Cibola National Forest, Mes-

calero (Cole 1953g), 13 mi S Mesca- lero (Cole 1953g), **Los Alamos Co.**, Los Alamos, 4 k N Los Alamos, **Otero Co.**, Bailey Canyon, **Rio Arriba Co.**, 7 k S Cebolla, Truchas, **Sandoval Co.**, Bandelier National Monument, 11 k E Cuba, 26 k S Cuba, Placitas (Fagerlund, pers. comm.), **San Juan Co.**, Colorado New Mexico border on Highway 550 (Cole 1953g), **San Miguel Co.**, Beulah (Cole 1953g), Sapello Canyon (Cole 1953g), **Santa Fe Co.**, Santa Fe, **Socorro Co.**, Magdalena Mts. (Water Canyon), **Taos Co.**, 20 k NW Taos, 12 mi E Taos (Cole 1953g).

**Habitat.** Ponderosa pine,

Map 84. *Pheidole ceres*.

ponderosa pine-riparian, Gambel oak, highly disturbed areas, including burned areas, between 1500 - 2,800 meters. It is also found in pin-juniper and sagebrush communities in northern New Mexico, often on south-facing slopes.

**Biology.** This species normally nests under stones in open, sunny locations, in fine, sandy or

loam soils. Brood and reproductives were collected from June to August. It is apparently able to adapt well to large-scale disturbance such as forest fires and waste site construction. It is a seed harvester and stores the seeds in the nests. It nests together with *Monomorium*. It is parasitized by the chalcid wasp *Orasema wheeleri*.

Wheeler, 1908

### *Pheidole clydei* Gregg

Figs. 222, 240

**Discussion.** The four segmented antennal club (Fig. 222) in the major and minor separates this species from all other species of *Pheidole* found in New Mexico. The scape reaches about  $\frac{2}{3}$  of the distance to the tops of the posterior lateral lobes, the eyes are large, containing about 80 ommatidia. Nearly the entire head is coarsely sculp-

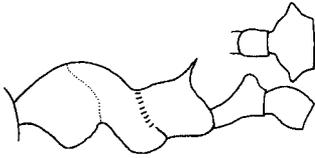


Fig. 240. Mesosoma of a major of *Ph. clydei*. The inset shows the petiole and postpetiole as seen from above.

tured, becoming glossy and shining at the tops of the posterior lateral lobes. The dorsal surface of the promesonotum is rounded, in a single unit, with the promesonotal suture poorly marked. The propodeal

spines are slender and elongate (Fig. 240). The lateral connules on the postpetiole are very well developed (Fig. 240). The dorsum of the gaster is finely punctate, but appearing smooth and glossy.

The antennal club of the minor is similar to that of the major, consisting of 4-segments. The scape is long, extending about  $\frac{1}{3}$  length past the posterior lateral corner. The propodeal spines are long and slender, being about the same diameter along the entire length.

**Distribution.** USA: southern CA, NV, AZ; NM: Smith (1979) lists NM, although we are not aware of any specific localities. It would be expected to occur along the western side of the state adjacent to Arizona.

**Habitat.** Desert canyons, especially in riparian areas, to the typical cholla - palo verde and agave - ocotillo communities, from 150 meters to 2200 meters in elevation.

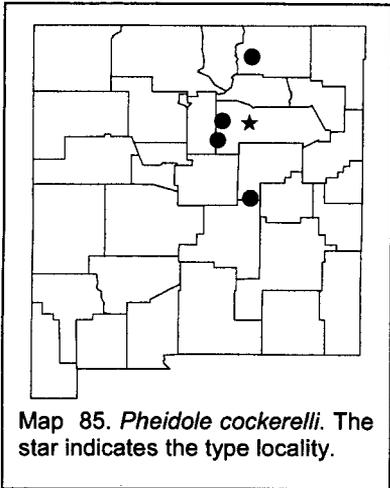
**Biology.** This is a fascinating species of *Pheidole*, which nests in cracks and crevices in rock walls. They collect pieces of arthropods and do not appear to be seed harvesters. Only the minors forage, the majors remain in the nest and only help move larger pieces of food into the nest. The majors do protect the nest entrance. This species does not appear to be common, and workers are usually collected loose on the soil surface.

Gregg, 1953b; Wheeler and Wheeler, 1973

***Pheidole cockerelli***  
**Wheeler**

Map 85

**Discussion.** The majors of this species could be confused with the intermediate sized workers of *Ph. obtusospinosa*. They differ in that the front faces of the posterior lateral lobes are covered with reticulo-rugose sculpture, with the intrarugal spaces granulate, whereas the lobes of *Ph. obtusospinosa* are predominantly granulate only.



Map 85. *Pheidole cockerelli*. The star indicates the type locality.

**Distribution.** USA: AZ, CO, OK, TX; NM: Colfax Co., Cimarron Canyon (Cole 1953g, 1956b), Guadalupe Co., 25 mi. SE Vaughn, San Miguel Co., Arroyo Pecos, Las Vegas (type locality), San José (Cole, 1956b); MEXICO: Durango.

**Habitat.** Pines, junipers, oaks, desert scrub and arid grasslands.

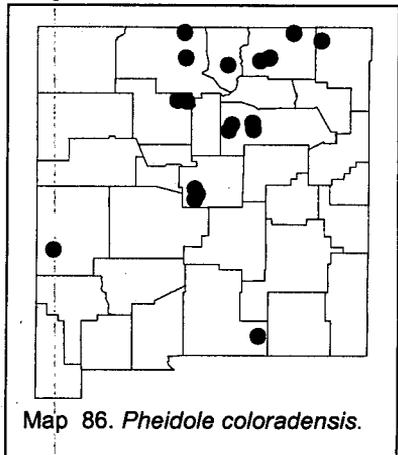
**Biology.** This species nests under stones. Brood was found in a nest in July.

Rojas-Fernández and Frago, 1994, 2000

***Pheidole coloradensis***  
**Emery**

Fig. 234; Map 86

**Discussion.** The majors of this species are small (about 2.6 mm total length, head length about 1.4 mm). The anterior half of the head is longitudinally striate the posterior half is finely, but transversely striate, the tops of the lobes are transversely striate. The scapes are short, reaching about  $\frac{1}{3}$  of the distance to the posterior lateral lobes. The humeral angles (in vicinity of "shoulder" of pronotum) are well developed, and the lateral connules are well developed. The minor worker is a small, pale brown specimen, with a shiny head, shiny pronotum, with the remainder of the mesosoma finely sculptured.



Map 86. *Pheidole coloradensis*.

**Distribution.** USA: ND east to NV, south to NM: Catron Co., 16 mi E Mogollon (Cole 1953g), Colfax Co., Cimarron, (Cole 1953g), 2 mi S

Ratón Pass (Cole 1953g), Ute Park (Cole 1953g), **Los Alamos Co.**, Chupaderos Canyon, Los Alamos, 4 k N Los Alamos, **Otero Co.**, Guadalupe Mts. (41 k NW Sitting Bull Falls), **Rio Arriba Co.**, 7 k S Cebolla, 4 k N Chama, **San Miguel Co.**, Beulah (Cole 1953g), Pecos, Old Pecos Pueblo, Sapello Canyon (Cole 1953g), Las Vegas, **Santa Fe Co.**, Santa Fe, **Taos Co.**, Taos (Cole 1953g), **Torrance Co.**, 13 k NW Mountainair, 24 k S Mountainair, 13 k S Mountainair, **Union Co.**, Capulín Mt. National Monument (Cole 1953g).

**Habitat.** Grassy areas in pinon-juniper forests, ponderosa pine-riparian forests, disturbed urban areas.

**Biology.** Nests are usually found under stones, or simply in the soil, with the entrance surrounded by a small mound. Brood was present in nests in June and August. This species harvests grass seeds, as well as other seeds, which are stored in the nest.

Wheeler, 1908; Cole, 1952a

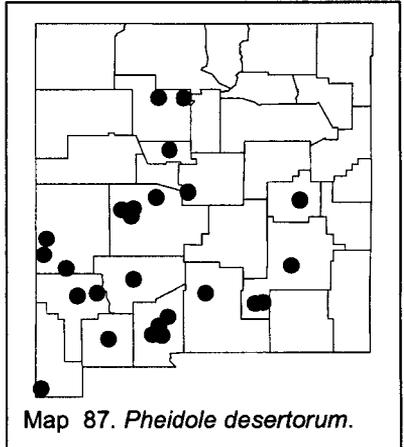
***Pheidole desertorum***  
**Wheeler**

Fig. 224; Map 87

**Discussion.** The majors of this species are easily recognized by the long scapes, which extend nearly to the posterior lateral corners, or even past the corners. The dorsum of the head is rugose, the regions between the rugae are mostly shining, although they may be somewhat granulose.

The elongate scapes will separate it from all other species, except *Ph. vistana* (= *Ph. grallipes*), from which it can be separated as the upper surface of the head of the major of this latter species is densely sculptured and dull, and *Ph. vistana* has not been reported from New Mexico. It may be confused with the intermediate sized majors of *Ph. obtusospinosa*, but can be separated as the scapes usually extend past the posterior lateral corners (fail to reach the posterior lateral corners in majors of *Ph. obtusospinosa*), the fronts of the posterior lateral lobes are at least partially shiny (completely granulose in *Ph. obtusospinosa*), and the scapes of the major are not flattened near the bases (always at least weakly flattened in *Ph. obtusospinosa*).

**Distribution.** USA: NV, UT, AZ, west OK, west TX; NM: **Berna-**



**lillo Co.**, NW Albuquerque, **Catron Co.**, Glenwood, 20 k N Glenwood, Mogollon Mts., **Chaves Co.**, Bottomless Lakes, 12 mi W Hope (Cole

1953g), 20 mi W Hope (Cole 1953g), **De Baca Co.**, Lake Sumner, **Doña Ana Co.**, Dripping Springs, Las Cruces, 4 mi N Las Cruces (Cole 1953g), 45 k NE Las Cruces (Long Term Ecological Research site), **Grant Co.**, Leopold Vista, 60 k E Silver City, San Lanuto [Jacinto?], **Hidalgo Co.**, Clanton Draw, **Los Alamos Co.**, Los Alamos, **Luna Co.**, 18 k NW Deming (1380m), **Otero Co.**, 8 mi. NE Tularosa, **Sandoval Co.**, 1 mi. S Jémez Springs, **Sierra Co.**, Caballo, **Socorro Co.**, Bernardo (Cole 1953g), Magdalena Mts. (23 k S Magdalena), 33°48'32.2"N 107°22'57.2", Water Canyon, **Torrance Co.**, 15 mi W Mountainair (Cole 1953g); MEXICO: Durango.

**Habitat.** Sagebrush, desert scrub, arid grasslands, black grama grassland, fluff grass habitat, to oaks, pinyon-juniper, and ponderosa pine forests, up to 1600 meters in elevation.

**Biology.** Nests are found under stones in areas of rocky loam and coarse sand, as well as gravel. These ants are very alert, fast and aggressive when the a large nest is disturbed. Brood was found in nests in March, April, August, and September, reproductives in August. This species may be polygynous, as multiple, dealate females are found in nests. This is a very common species in New Mexico, especially in arid ecosystems.

Rojas and Fragoso, 2000

### *Pheidole diversipilosa* Wheeler

Figs. 231, 241

**Discussion.** The majors of this species are easily recognized by the short (less than 0.05 mm), erect hairs on the dorsum of the gaster (Fig. 231). The scape of the major is flattened near the base, but the width is less than the width of the scape near the apex. The scape extends slightly more than ½ the distance to the posterior lateral corner. The anterior half of the head has coarse, reticulated rugae, the posterior half of the head, and the tops of the posterior lateral lobes, are smooth and glossy. The posterior half of the mesonotum is enlarged and swollen, the propodeal spines are well developed, but thick. The lateral connules on the postpetiole are absent.

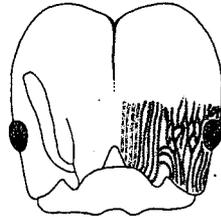


Fig. 241. Head of a major of *Ph. diversipilosa*.

The minor worker has most surfaces punctate, with shining areas in the middle of the head, dorsum and side of the pronotum, and the gaster.

The major worker can be separated from that of *Ph. tetra* in being smaller (about 2.6 mm total length, compared with nearly 4 mm in *Ph. tetra*), having shorter scapes,

and having less well-developed propodeal spines. The erect hairs on the dorsum of the gaster of *Ph. tetra* are at least 0.2 mm in length, much longer than the hairs in *Ph. diversipilosa*. The minor workers of the 2 species are nearly identical, except those of *Ph. diversipilosa* are about 2 mm in total length, whereas those of *Ph. tetra* are greater than 2 mm in total length.

**Distribution.** USA: AZ. We have not collected this species in NM, but it occurs in Arizona (SE corner, Cochise Co.) and Chihuahua, and would be expected to occur in the southern part of the state.

**Habitat.** Oak forests, alligator juniper, Chihuahua pine forests.

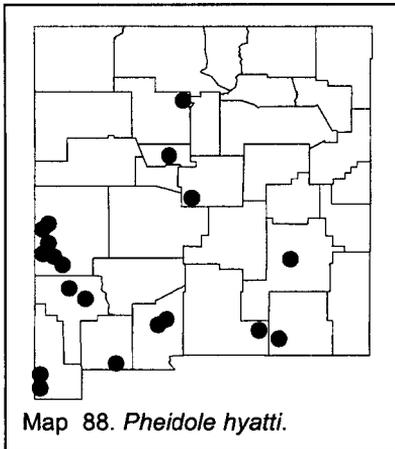
**Biology.** These ants form populous nests under large stones. Brood is found in nests in April, sexuals in June. Nests appear to be monogynous, even though the nests are very large. Foragers are attracted to tuna baits.

### *Pheidole hyatti* Emery

Fig. 226; Map 88

**Discussion.** The major of this species can be recognized by the relatively long scapes, which are flattened near the base. The posterior lateral lobes are finely granulose, and at least moderately shining.

Majors could be confused with intermediate sized majors of *Ph. obtusospinosa*. They can be separated as the fronts of the posterior lateral lobes are at least partially smooth and shiny, whereas they are completely granulose and dull in *Ph. obtusospinosa*.



Map 88. *Pheidole hyatti*.

**Distribution.** USA: southwestern states; NM: **Bernalillo Co.**, NE Albuquerque, **Catron Co.**, Frisco Hot Springs, 2 mi. N Frisco Hot Springs, 20 k N Glenwood, 35 k N Glenwood, Mogollon, 8 k N Reserve, **Chaves Co.**, Bottomless Lakes State Park, **Doña Ana Co.**, 18 k E Las Cruces, 45 k NE Las Cruces (Long Term Ecological Research site), **Eddy Co.**, 5 k SE Sitting Bull Falls, **Grant Co.**, 80 mi N Silver City (Cole 1953g), 60 k E Silver City, **Hidalgo Co.**, Clanton Draw, Guadalupe Canyon, **Los Alamos Co.**, Rio Grande, **Luna Co.**, Columbus, **Otero Co.**, Guadalupe Mts. (41k NW Sitting Bull Falls), **Torrance Co.**, 10 mi S Mountainair (Cole 1953g); MEXICO: northwestern states.

**Habitat.** Creosotebush scrub, grasslands, riparian vegetation in arid ecosystems, with oaks and hackberry, pinyon-juniper woodlands and ponderosa pine forests, up to 1920 meters in elevation, common in urban habitats.

**Biology.** *Pheidole hyatti* nests under stones, or simply in the

soil, in areas with rocky loam, gravely soils, or sandy areas with abundant rocks. Brood is found in nests in March. They are usually not aggressive, and simply escape with the brood when the nest is disturbed. Workers are omnivorous or predaceous, and are attracted to subterranean Vienna sausage baits. Nests are raided by the army ant *Neivamyrmex nigrescens*.

Rojas-Fernández and Frago, 1994, 2000; Ward, 2000

### *Pheidole macclendoni* Wheeler

**Discussion.** The majors of this species can be recognized by having a flattened, rugose area located between the frontal lobe and the eye, with large, intrarugal foveolae, and the petiole has a large, prominent lateral spiracle. The head of the major is large, at least 2 millimeters in total length, excluding the mandibles. The pronotum of the major has transverse striae. This species is weakly polymorphic.

**Distribution.** USA: AZ east to southern TX. This species may occur in NM, but we are not aware of any records.

**Habitat.** Sandy-gravely desert (Cole, 1957b).

**Biology.** This species nests in the soil, with the nest marked by a small entrance.

Cole, 1957b; Gregg, 1958

### *Pheidole marcidula* Wheeler

Figs. 237, 242; Map 89

**Discussion.** The minor worker of this species is easily recognized by the clavate or spatulate hairs on the dorsum of the mesosoma (Fig. 237). The scapes of the minor extend about 1 funicular segment past the posterior lateral corner, the dorsum of the head is nearly completely smooth and glossy, the dorsum and sides of the pronotum are smooth and glossy, the remainder of the mesosoma is punctate, the propodeal spines are well-developed and somewhat curved upwards.

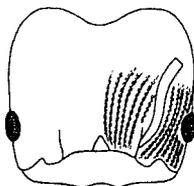
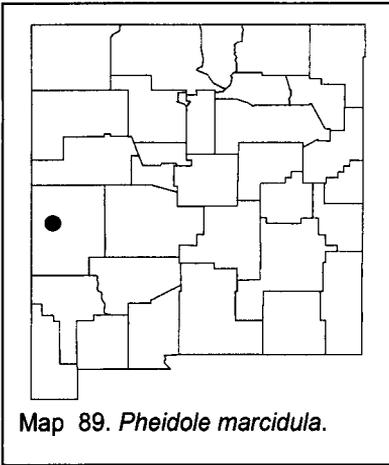


Fig. 242. Head of a major of *Ph. marcidula*.

The major is small, about 2.5-mm total length. The anterior  $\frac{1}{2}$  -  $\frac{2}{3}$  of the head is striate, the posterior part is smooth and glossy (Fig. 242). The dorsum of the pronotum is smooth and glossy, the side of the pronotum is punctate and weakly shining, and the remainder of the mesosoma is punctate, except for parts of the mesopleuron, which are smooth and shiny. The propodeal spines are well developed, but thickened. The lateral connules on the postpetiole are not developed. Most hairs on the mesosoma are blunt-tipped, with a few weakly spatulate, but not noticeably so.

This species could be confused with *Pheidole ceres*, but a greater proportion of the posterior part of the head is smooth and

glossy, and posterior part the mesonotum is not as strongly raised. The minor workers are very similar, but those of *Ph. marcidula* can usually be separated by the clavate hairs, which are only blunt-tipped or only slightly enlarged at the tips in *Pheidole ceres*. The majors of this species could be confused with those of *Ph. bicarinata*. They are usually darker and brown in color (*Ph. bicarinata* is often pale brown in color), and greater proportion of the head is striate (usually less than  $\frac{1}{2}$  in *Ph. bicarinata*). The propodeal spines are more developed, and directed upwards.



Map 89. *Pheidole marcidula*.

**Distribution.** USA: TX (eastern); NM: Catron Co., 37.1 k N Apache Creek (straight-line distance). This is the first record from New Mexico.

**Habitat.** Ponderosa pine forests.

**Biology.** Two nests were found under stones in rocky loam. Brood and females were present in the nests in March.

Wheeler, 1908

## *Pheidole metallescens* Emery

**Discussion.** The minors of this species can be easily recognized, as they have abundant bluish or purple reflections, which are especially obvious on the head. The majors rarely have bluish reflections, and are relatively small (about 2 mm total length), with short scapes (extend about  $\frac{1}{2}$  the length of the head), and the entire dorsum of the head is covered with rugae, and is granulose between the rugae. Only the tops of the posterior lateral lobes are smooth and shining. The lateral connules on the postpetiole are well developed, but blunt and rounded.

**Distribution.** USA: FL west to TX; NM: This species may occur in southern New Mexico.

**Habitat.** Oak forests.

**Biology.** This species makes small crater nests in the soil. Nest populations are small.

Wheeler, 1908

## *Pheidole militica* Wheeler

Figs. 243, 244; Map 90

**Discussion.** The majors of this species are large (head length, excluding mandibles, > 2 mm, total length of ant more than 5 mm). The anterior  $\frac{1}{3}$  of the head is sculptured with rugae, the intrarugal spaces are mostly shining, and the posterior  $\frac{2}{3}$  of the length of the head is smooth and glossy (Fig. 243). The dorsum of the pronotum is smooth and glossy, the promesonotum forms a single,

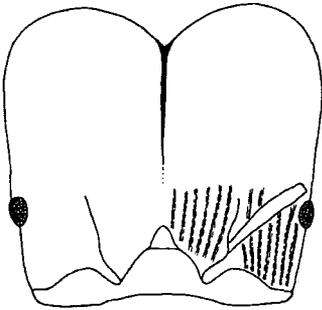


Fig. 243. Head of a major worker of *Ph. militicida*.

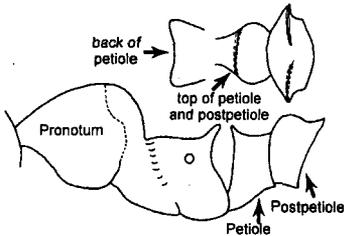


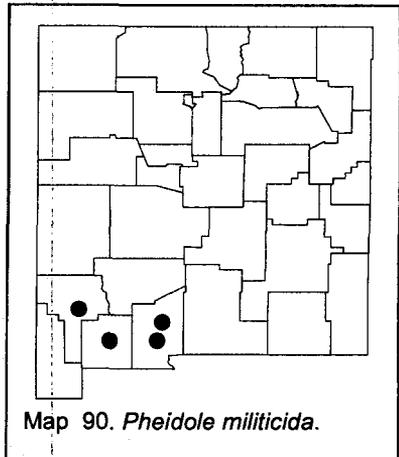
Fig. 244. Mesosoma of a major of *Ph. militicida*. the insets show the apex of the petiole from the back, and the petiole and postpetiole as seen from the top.

convex unit, and the dorsum of the propodeum is nearly flat. The propodeal spines are well developed, but are thick and blunt. The apex of the petiole is sharp in profile, concave as seen from behind; the postpetiole is wide with well-developed connules, as seen from above. The structure of the mesosoma of the major makes this species easily recognized and easy to separate from all others in the genus.

The structure of the promesonotum is similar to that of *Pheidole clydei*, but the 3-segmented club and the predominantly glossy

and shiny head easily separates this species from the latter mentioned species.

The minor workers are remarkably small, most slightly longer than 2 mm, the head is smooth and glossy, the pronotum is smooth and glossy (Fig. 244), and the remainder of the mesosoma is sculptured but at least moderately smooth and glossy. The smooth and glossy pronotum, as well as the moderately glossy remainder of the mesosoma, separates the minor workers of this species from many of the others, but it may be difficult to recognize his species on the basis of the minor workers only.



Map 90. *Pheidole militicida*.

**Distribution.** USA: AZ, NM: Doña Ana Co., Las Cruces (Cole, 1955c), 45 k NE Las Cruces (Long Term Ecological Research site), Grant Co., Bayard, Luna Co., Deming.

**Habitat.** Creosotebush scrub, areas of open annuals.

**Biology.** This species nests in the soil, with the entrance (7 - 13 cms diameter) surrounded by a low

mound and chaff of seed hulls. They also feed on dead insects. Majors are difficult to find and rarely collected.

It is interesting to note the derivation of the name of this species ("soldier killer"). Wheeler (1915) noted that there were majors in the nests in August, but were absent in November, when their remains were found in the chaff pile surrounding the nest. He hypothesized that the majors were killed on the approach of the winter, after they had broken all of the seeds in the nest and were no longer needed. Creighton and Gregg (1955) doubt that this occurs, but it needs to be carefully checked.

Cole, 1953g; Creighton and Gregg, 1955

***Pheidole obtusospinosa*  
Pergande**

Figs. 47, 228, 245, 246; Map 91

**Discussion.** This is a polymorphic species, which has the usual minors, intermediate sized workers (which look like major workers of other species) and very large major workers. The scape is flattened at the base, but the flattened area is not as wide as the width of the scape near the apex (Fig. 245). It extends about  $\frac{2}{3}$  the length of the head in the largest workers (Fig. 245), but may extend nearly to the posterior lateral lobes in the smallest majors (Fig. 228). The entire dorsal surface of the head is sculptured (Fig. 228), with granulose sculpture on the front faces of the posterior lateral lobes. The entire dorsum of the head is dull. The mesonotum projects above the

level of the pronotum and propodeum (Fig. 246). The dorsal surface of the gaster is finely punctate. This species was previously referred to as *Pheidole subdentata* Pergande.

The intermediate sized

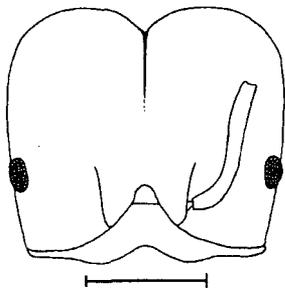


Fig. 245. Head of a large major of *Ph. obtusospinosa*. The sculpturing is not shown. The scale = 1 mm and is drawn to the same scale as Figs. 228 & 246.

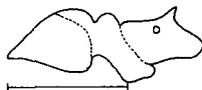
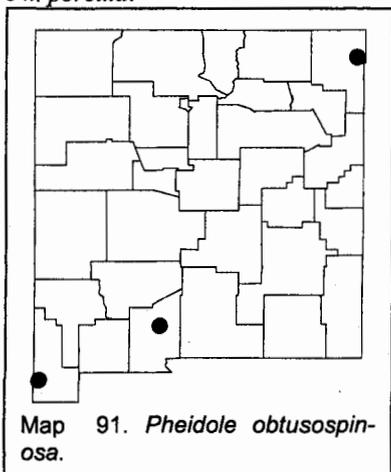


Fig. 246. Mesosoma of an intermediate major worker of *Ph. obtusospinosa*. The scale = 1 mm and is drawn to the same scale as Figs. 228 & 245.

workers of this species could be confused with the majors of *Ph. desertorum*. They differ in having the entire dorsal face of the head sculptured and dull (at least parts of the posterior lateral lobes are shiny in *Ph. desertorum*), the scapes do not extend past the posterior lateral lobes (they usually extend well past the lobes in *Ph. desertorum*) and the scapes are definitely flattened at the base (never flattened at the base in *Ph. desertorum*). This species could also be con-

fused with *Ph. cockerelli*. It can be separated as the faces of the posterior lateral lobes are covered with granulose sculpture, those of *Ph. cockerelli* are covered with granulose sculpture, as well as reticulo-rugose sculpture.

This species is similar to *Ph. porcula*, but can be separated if a complete series is available, as the workers are trimorphic or polymorphic. The intermediate size worker of *Ph. obtusospinosa* is very easily confused with the largest major of *Ph. porcula*. The scape of *Ph. obtusospinosa* is widened at the base, and flattened, but the flattened portion is narrower than the width of the scape near the apex (Fig. 228). The scape of *Ph. porcula* is wider at the base as it is near the apex of the scape (Fig. 229). The propodeal processes are basically angles, not spine-like as in *Ph. porcula*.



**Map 91.** *Pheidole obtusospinosa*.  
**Distribution.** USA: AZ; NM: Doña Ana Co., 45 k NE Las Cruces (Long Term Ecological Research site), Hidalgo Co., Coronado National Forest (Clanton Draw), Un-

ion Co., Kiowa National Grasslands; MEXICO: Chihuahua, Nayarit, Sinaloa, Jalisco, Sonora, Durango. These are the first records from New Mexico.

**Habitat.** Creosotebush scrub, grasslands, oak-pinyon-pine forests, pinyon-juniper communities, Chihuahua pine, up to 2100 m elevation. This species is very common in Clanton Draw in the Coronado National Forest of Hidalgo Co.

**Biology.** This species nests under stones, often the largest stones in an area, or nests in the soil with several separate entrances. It is common in sandy soils, including dunes, but also occurs in areas of rocky loam. Brood is found in nests in March. They are preyed on by *Neivamyrmex leonardi*, and make no attempt to defend the nest and only escape and rescue brood. Foragers are both diurnal and nocturnal, and visit extrafloral nectaries.

Rojas-Fernández and Fragoso, 1994, 2000; Ward, 2000

### *Pheidole porcula* Wheeler

Fig. 229

**Discussion.** The form of the scape easily separates this species from most of the others. It is wide near the base, and flattened or even concave on the upper surface. The scape progressively narrows towards the apex (Fig. 229). The scapes of the major extend about two-thirds the length of the head. The posterior lateral lobes are usually moderately smooth and shining, but they are occasionally punctate. The propodeal spines are small, but well formed.

This species could be easily confused with the intermediate sized workers of *Ph. obtusospinosa*. It can be distinguished, as the background sculpture of the head of *Ph. obtusospinosa* is obviously punctate and only weakly shining. The propodeal processes of *Ph. obtusospinosa* are in the form of an angle, and not a spine as in *Ph. porcula*. The scape of the intermediate sized worker of *Ph. obtusospinosa* is strongly angulate, and flattened near the base, where it is narrower than it is near the apex (Fig. 228).

**Distribution.** USA: west Texas (Jeff Davis Co., Real Co.), possibly CO. We have no records from NM, but this species may be found in the southeastern part of the state.

**Habitat.** Cypress and oak forests, grasslands, up to 1450 meters in elevation. They are apparently most common in semi-arid habitats.

**Biology.** These ants nest under stones, in very rocky loam. They can be aggressive when the nest is disturbed, and the minors, and especially the majors, can bite.

### *Pheidole rhea* Wheeler

Figs. 223, 247, 248; Map 92

**Discussion.** This is a large, polymorphic species, in which the propodeal spines of both the major and minor are unusually long and sharp (Fig. 247). The gaster is rounded anteriorly, where it connects to the postpetiole (Fig. 248). The entire dorsum of the head is covered with striae, which diverge towards the posterior lateral lobes. These

striae may form concentric whorls on the posterior lateral lobes of the largest workers. The apex of the petiole is relatively sharp, and may be bidentate in the largest workers (Fig. 248). The lateral connules are well developed.

The minor worker is similar, and could be mistaken for a member of the genus *Aphaenogaster*, based



Fig. 247. Mesosoma, petiole and postpetiole of a minor worker of *Ph. rhea*.

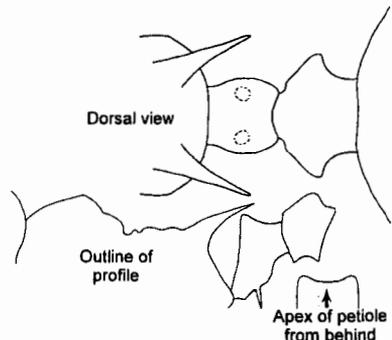
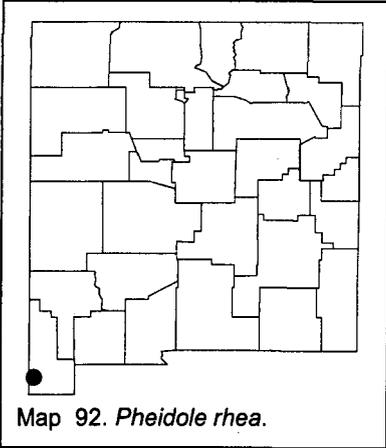


Fig. 248. Mesosoma, petiole and postpetiole of a major worker of *Ph. rhea*. The upper inset shows the propodeum, petiole, postpetiole and anterior edge of the gaster as seen from above, the lower inset shows the apex of the petiole as seen from behind.

on its relatively large size and well developed propodeal spines (Fig. 247). The three-segmented club easily separates it from *Aphaenogaster*. The dorsum of the head is predominantly smooth and shining, the scapes extend about  $\frac{1}{3}$  of their length

past the posterior lateral corners, the propodeal spines are very long, and curved slightly downward, the node of the petiole is rounded, the lateral connules are not developed and the gaster is rounded anteriorly (as in the major).



**Distribution.** USA: AZ; NM: Hidalgo Co., Peloncillo Mts.; MEXICO Sonora south to Nayarit. This is the first record from New Mexico.

**Habitat.** Upland open and grassy slopes in mountain foothills. Nests are found on plateaus or in foothills at the bases of mountains, from 1100 - 2200 meters.

**Biology.** This species nests in the soil, and nests can be very large. They are not commonly collected in the United States, and are much more common in México. The majors have such heavy heads, that they become "stuck" in a position with the heads down and the remainder of the body and legs kicking in the air!

Smith, 1943b

## *Pheidole rufescens* Wheeler

Figs. 230, 233

**Discussion.** The majors of this species are small (total length about 2.5 mm), the anterior half of the head is longitudinally striate, the posterior half is coarsely sculptured, with a combination of punctures and striae, the tops of the posterior lateral lobes are transversely striate, with the striae extending onto the dorsal surface of the head and posteriorly and longitudinally on the sides of the posterior lateral lobes. The humeral angles of the pronotum are weakly developed. The head of the minor is predominantly punctate, except for a central region, which is partially shining. The mesosoma is mostly punctate, although the top and side of the pronotum is partially smooth in shining. The erect hairs of the mesosoma (of the minor and to a lesser extent the major) are clavate or spatulate (Fig. 233).

The sculpture on the tops of the posterior lateral lobes would separate this taxon from most of the others in the genus *Pheidole*. The poorly developed humeral angles and clavate hairs on the dorsum of the mesosoma of the minor (and to a lesser extent the major) would separate it from many of the similar species. *Pheidole sitarches campestris* Creighton is considered a synonym.

**Distribution.** USA: MO south to MI, west to CO, south to central TX; NM: we know of no records from the state, but it undoubtedly will be found within the borders.

**Habitat.** This species occurs in a variety of habitats.

**Biology.** Nests are found in the soil.

### ***Pheidole rugulosa* Gregg**

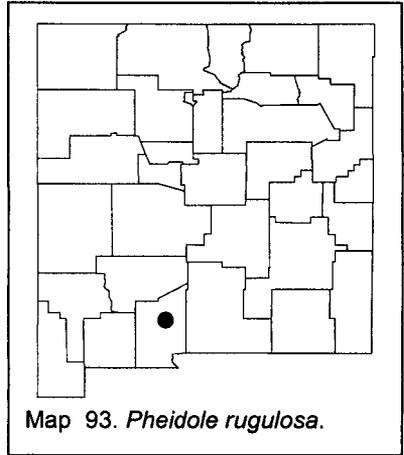
Fig. 227; Map 93

**Discussion.** The majors of this species are small (total length about 2.5 mm, head length 1.2 mm). The anterior  $\frac{1}{2}$  of the head is longitudinally striate, the posterior half of the head is predominantly smooth and shining, the tops of the lobes have transverse striae, which extend onto the fronts of the lobes, as well as extend longitudinally on the posterior surfaces of lobes. The humeral angles are present, but are not notably developed; the connules are poorly developed. The minors are small, dark brown specimens, with a shiny head, shiny pronotum, the remainder of the mesosoma is punctate.

**Distribution.** USA: AZ, TX; NM: **Doña Ana Co.**, 45 k NE Las Cruces (Long Term Ecological Research site).

**Habitat.** Creosotebush scrub, weedy bajada, fluff grass habitat, black grama grass, mesquite zone at edge of playa,

**Biology.** These ants make small nests in the soil, with the nest entrance usually surrounded by a small mound. This species is very common near Las Cruces, but was not found in other sites in New Mexico. The nests and the specimens are small, making them easily overlooked.



Map 93. *Pheidole rugulosa*.

### ***Pheidole sciara* Cole**

Map 94

**Discussion.** The major of this species can be recognized by the flattened area at the base of the scape, the long scape, the rough sculpture over the entire dorsal surface of the head, and the coarse, transverse pronotal rugae, with the intrarugal spaces shining. The petiolar notch is shallow, but broad, the hairs on the gaster are long, nearly of equal length, blunt, and widely spaced. The head of the minor is smooth and shining, the postpetiole is globular and less than twice the width of the node of the petiole.

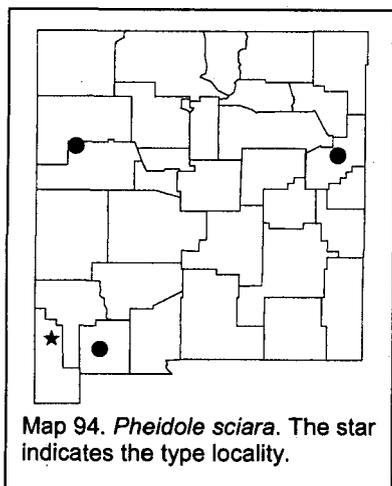
**Distribution.** USA: TX, NM: **Cibola Co.**, Zuni Mts. (south-east of Gallup, 35°10.3'N 108°19.5'W), **Hidalgo Co.**, Lordsburg (type locality, see Cole, 1955a), **Luna Co.**, 6 mi. NW Deming (Cole

1955a), **Quay Co., Glenrio** (Cole, 1956b).

**Habitat.** Open, sandy, semi-desert areas.

**Biology.** This species nests in the soil, with the entrance surrounded by a small mound.

Cole, 1955a



***Pheidole sciophila***  
**Wheeler**

Figs. 249, 250; Map 95

**Discussion.** The major of this species is tiny (total length slightly more than 2 mm, head length 1.2 mm), with the anterior half of the head longitudinally striate, the posterior half of the head and the tops of the posterior lateral lobes smooth and shining, much of the dorsum of the pronotum is smooth and glossy, the sides of the mesosoma are finely punctate, the humeral angles are poorly developed, the lateral conules are not developed. The scapes

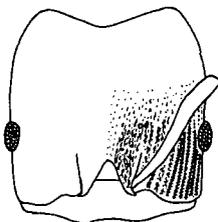


Fig. 249. Head of a major of *Ph. sciophila*.

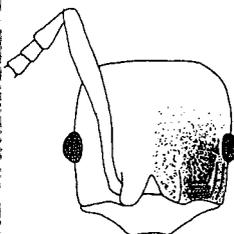
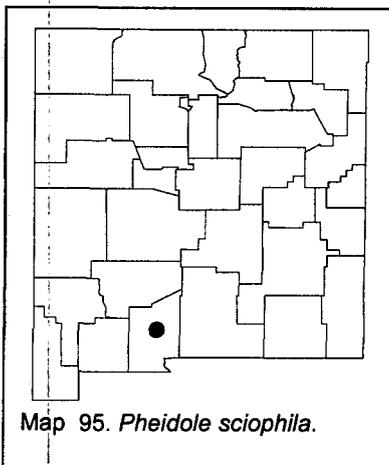


Fig. 250. Head of a minor of *Ph. sciophila*.



of the minor workers extend more than one funicular segment past the posterior lateral corners (Fig. 250), the head is glossy and shining, the mesosoma is completely and densely punctate, the dorsum of the prono-

tum may shine in the central region, but is still punctate.

**Distribution.** USA: AZ, TX; NM: Doña Ana Co., 45 k NE Las Cruces (Long Term Ecological Research site); MEXICO: Chihuahua, Sonora, Durango.

**Habitat.** Weedy zone of annuals, black grama grasslands, creosotebush scrub, mesquite communities, Chihuahua pine forests.

**Biology.** Small colonies of this species nest under stones. Foragers were attracted to peanut butter baits. Wheeler (1908) suggested that this species was entomophagous (eats insects).

***Pheidole senex* Gregg**

Figs. 251, 252; Map 96

**Discussion.** The major of this species can be recognized by the very elongate, sharp lateral connules on the sides of the postpetiole (Fig. 251). The anterior half of the head is covered with parallel rugae, the tops

of the posterior lateral lobes are covered with fine rugae, the region between the sculptured areas is predominantly smooth and shining (Fig.

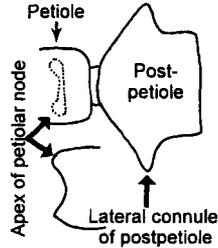


Fig. 251. Petiole and postpetiole of a major of *Ph. senex*, as seen from above, showing the lateral connules on the postpetiole, and the petiole as seen from behind.

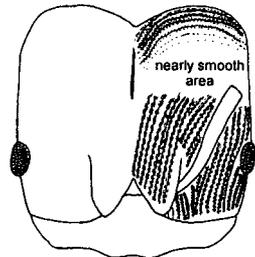
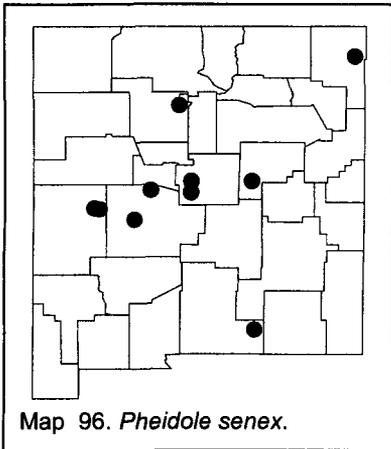


Fig. 252. Head of a major of *Ph. senex*.

252). Most surfaces of the minor worker are sculptured: the head has a mixture of parallel striae and punctures, and the entire mesosoma is punctate (usually part of the dorsum of the pronotum, and side of the pronotum are partially smooth and glossy). *Pheidole pilifera anfracta* (Cole 1952a) is a synonym.

**Distribution.** USA: CO, TX; NM: Catron Co., near Datil (Cole 1953g), Sawtooth Mts., Guadalupe Co., 25 mi. SE Vaughn, Otero Co., 41 k NW Sitting Bull Falls, Sandoval Co., Bandelier National



Map 96. *Pheidole senex*.

Monument, **Socorro Co.**, 7 mi W Magdalena (types of *Ph. pilifera anfracta*) (Cole 1952a), Sevilleta National Wildlife Refuge (Fagerlund, pers. comm.), **Torrance Co.**, 13 k NW Mountainair, 10 mi S Mountainair (Cole 1953g), **Union Co.**, Kiowa National Grasslands; MEXICO: Chihuahua.

**Habitat.** Grasslands, pinyon-juniper, pine forests.

**Biology.** This species nests under stones or cow manure. Brood was found in nests in April.

Wheeler, 1908

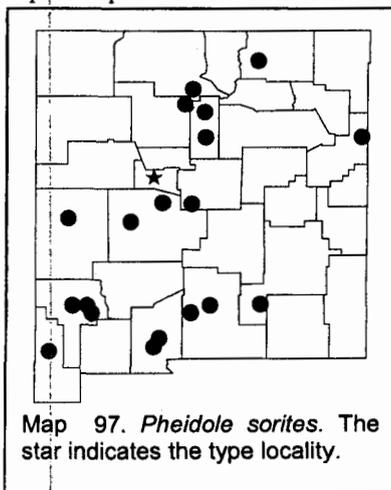
### *Pheidole soritis* Wheeler

Map 97

**Discussion.** The major of this species is small (total length about 2½ mm), the scapes expand about ½ way to the posterior lateral corners, the anterior ½ of the head is covered with fine, longitudinal rugae, the posterior half is roughly sculptured with longitudinal and transverse striae, the tops of the posterior lateral lobes have transverse striae. The humeral angles and lateral connules are poorly developed. The anterior part of pronotum is predominantly glossy, the posterior part is covered with transverse, but fine striae. The minor worker is a small black ant, in which most of the dorsum of the head is smooth and glossy, the side and top of the pronotum are smooth and glossy, the remainder of the mesosoma punctate. The hairs on the dorsum of the mesosoma are blunt tipped, but not clavate.

Cole (1953g) proposed that *Ph. sitarches rufescens* (as *campes-*

*tris* Wheeler) be synonymized with *Ph. sitarches soritis* Wheeler, but later (Cole, 1956b) reversed his position. *Pheidole sitarches* Wheeler and *Ph. rufescens* also hybridize at the area of overlap of their distributions near Austin, TX (Creighton, 1950). The minors in our samples show considerable variation in the sculpturing of the head, and in the pronotal rugae, and some of them would key to *Ph. sitarches*. It is possible that at least *Ph. sitarches* (from Brownsville, Texas area) and *Ph. soritis* are conspecific. A revision of the species complex would probably reveal two species: *Ph. sitarches* Wheeler and *Ph. littoralis* Cole. We consider that Naves (1985) was justified in treating *Ph. littoralis* as a separate species.



Map 97. *Pheidole sorites*. The star indicates the type locality.

**Distribution.** USA: UT, AZ, western TX; NM: **Bernalillo Co.**, NW Albuquerque (type locality), **Catron Co.**, 35 k E Old Horse Springs, **Chavez Co.**, 12 mi W Hope (Cole 1953g, 1956b, as *Ph. sitarches*), **Colfax Co.**, Cimarron

Canyon (Cole, 1956b, as *Ph. sitarches*), **Doña Ana Co.**, Organ Mts. (Cole, 1955c), Las Cruces (Cole, 1955c), **Grant Co.**, 18 mi S Bayard (Cole 1953g, 1956b, as *Ph. sitarches*), 2 mi N San Juan (Cole 1953g), 15 mi E Silver City (Cole 1953g, 1956b, as *Ph. sitarches*), **Hidalgo Co.**, Lordsburg (Cole, 1955c, 1956b, as *Ph. sitarches*), **Los Alamos Co.**, Los Alamos, **Otero Co.**, 8 mi W Almodordo (Cole, 1956b, as *Ph. sitarches*), White Sands National Monument (Cole 1953g, 1956b, as *Ph. sitarches*), **Quay Co.**, Glenrio (Cole 1953g), **Rio Arriba Co.**, San Juan Pueblo (Cole, 1956b, as *Ph. sitarches*), **Santa Fe Co.**, Galesteo (Cole 1953g, 1956b, as *Ph. sitarches*), 10 mi S Santa Fe (Cole 1953g, 1956b, as *Ph. sitarches*), **Socorro Co.**, 23 mi[?] E jct. US 60 and 85 (on US 60) E of Bernardo (Cole, 1956b, as *Ph. sitarches*), 7 mi W Magdalena (Cole 1953g, 1956b, as *Ph. sitarches*), **Torrance Co.**, 10 mi S Mountainair (Cole 1953g, 1956b, as *Ph. sitarches*).

**Habitat.** Sagebrush communities and disturbed areas.

**Biology.** Nests are usually located beneath stones.

Wheeler, 1908

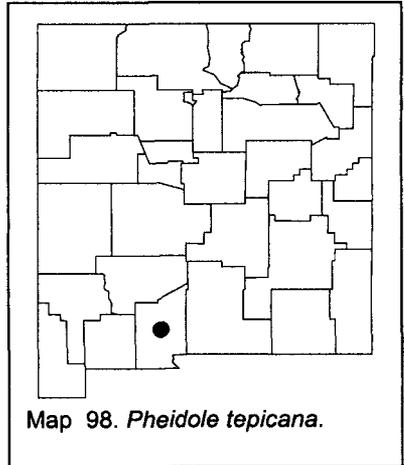
### ***Pheidole tepicana* Pergande**

Fig. 232; Map 98

**Discussion.** The deep, semi-circular emargination (cut out margin) along the anterior border of the clypeus of the major (Fig. 232), separates this species from all the others in NM. The anterior  $\frac{1}{3}$  of the

head is finely rugose, the posterior lateral lobes have fine, transverse striae, and the remainder of the head is smooth and glossy. The humeral angles are poorly developed, as are the lateral connules. The dorsum of the pronotum is smooth and glossy, much of the side of the mesosoma is glossy, and the propodeal spines are small and somewhat upturned. The minor worker is a small, brown specimen, with pale brown legs. The dorsum of the head is smooth and glossy, as is much of the mesosoma, especially the pronotum. The propodeal spines are small, consisting of tiny angles.

This is a polymorphic species, which may also help in separating it from other species of *Pheidole*.



Map 98. *Pheidole tepicana*.

**Distribution.** USA: AZ, TX; NM: **Doña Ana Co.**, 45 k NE Las Cruces (Long Term Ecological Research site); MEXICO: throughout northern Mexico.

**Habitat.** Fluff grass habitat, weedy desert bajada, black grama grassland.

**Biology.** This species nests in the soil.

### *Pheidole tetra* Creighton

Fig. 225; Map 99

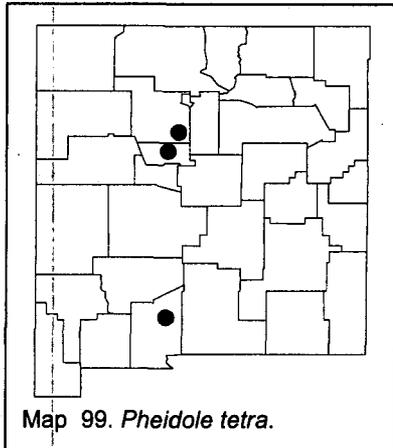
**Discussion.** This species can be recognized as the base of the scape is flattened, with the dorsal surface slightly concave; and the scapes extend about  $\frac{2}{3}$  of the distance to the posterior lateral corners. The flattened area of the scape is about equal in width to the diameter near the apex of the scape. The anterior  $\frac{2}{3}$  of the head is roughly sculptured, with coarse, reticulated rugae, with the intrarugal spaces punctate. The posterior  $\frac{1}{3}$  of the head is finely sculptured and moderately to strongly shining; the tops of the posterior lateral lobes have only piligerous punctures and are glossy and shiny. The dorsum of the pronotum is finely sculptured, and mostly smooth and glossy. The posterior  $\frac{1}{2}$  of the mesonotum is swollen into a protuberance; the propodeal spines are moderately slender, and well developed. The lateral connules on the postpetiole are poorly developed.

Most surfaces of the minor worker are densely and evenly punctate, only the central portion of the head and the side and dorsum of the pronotum are smooth and glossy. The gaster is smooth and glossy.

This species could be confused with *Pheidole porcula*, but differs in that the flattened area of the scape is about the same width as the scape near the apex (Fig. 225). It commonly occurs in the same habitat

as *Pheidole hyatti*, but the majors can be easily separated by the shorter scapes, and the minor workers can be separated as most surfaces are densely punctate, not primarily smooth and shining as are the minor workers of *Ph. hyatti*. If you collect smaller majors, which appear to be this taxon (less than 3 mm total length), in which the hairs on the dorsum of the gaster are all short (less than 0.02 mm), they are probably *Ph. diversipilosa*. See the discussion of *Ph. diversipilosa* for more details.

*Pheidole crassicornis* occurs in eastern United States, as far west as Texas. It differs in that erect hairs on the gaster are sparse, longer, and the pubescence is mostly oppressed. The erect hairs on the gaster of *Ph. tetra* are more numerous, shorter and finer, and merge with the pubescence, most of which is semierect. These differences appear to be variable, and of little importance.



Map 99. *Pheidole tetra*.

**Distribution.** USA: AZ, TX; NM: Bernalillo Co., NW Albuquerque, Doña Ana Co., 45 k NE Las Cruces (Long Term Ecological Re-

search site), **Sandoval Co.**, Placitas (Fagerlund, pers. comm.); MEXICO: Durango.

**Habitat.** Creosotebush scrub, weedy bajada, black grama grassland, and urban areas.

**Biology.** This ant nests in soil, with entrance surrounded by a small mound. Workers are group foragers.

Rojas-Fernández and Frago, 1994

### *Pheidole titanis* Wheeler

**Discussion.** As the name suggests, the majors of this species are very large, with the head length of the major exceeding 2 mm. The longitudinal rugae on the dorsum of the head extend onto the anterior portions of the posterior lateral lobes, the tops of the posterior lateral lobes of the major are shiny. The pronotum of the major has several transverse striae.

**Distribution.** USA: southern AZ, western TX; NM: We have not collected this species in New Mexico, but expect it to occur in the southwestern corner of the state, as it is found in southeastern Arizona.

**Habitat.** Riparian areas in desert canyons, creosotebush scrub.

**Biology.** This species nests under large stones in rocky soils. It is a carnivore, and feeds on termites.

Creighton and Gregg, 1955

### *Pheidole tucsonica* Wheeler

Figs. 46, 253, 254; Map 100

**Discussion.** The major of this species can be recognized by view-

ing the head in profile. The head is obviously narrowed towards the apex (Fig. 254), and the eyes relatively

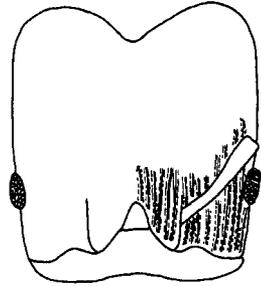


Fig. 253. Head of a major of *Ph. tucsonica*.

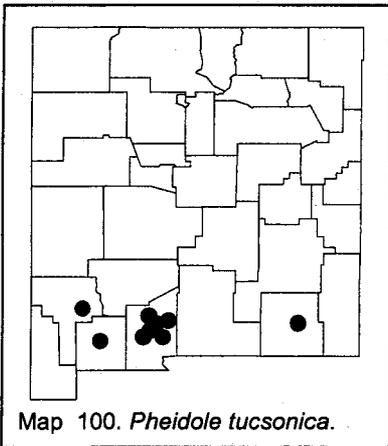


Fig. 254. Side view of the head of a major worker of *Ph. tucsonica*.

large, with more than 70 ommatidia. The anterior  $\frac{1}{3}$  of the head is covered with rugae, with the intrarugal spaces smooth and shiny, the posterior  $\frac{2}{3}$  of the head and the tops of the posterior lateral lobes are smooth and glossy. The scape is gradually bent at the base and extends about  $\frac{1}{3}$  the length of the head. The dorsum of the pronotum is coarsely sculptured, with transverse rugae or coarse striae, with the intrarugal spaces punctate. The humeral angles are developed as swellings, the lateral conules are developed, but blunt. The minor worker has a glossy dorsal

surface of the head, the sides of the pronotum are smooth and glossy, the top is finely sculptured and at least the center of the dorsal surface is smooth and glossy.

The shape of the head of the major, and the coarse sculpture of the pronotum would separate this species from most of the others. It could be confused with *Pheidole xerophila*, but can be separated because *Pheidole xerophila* has few or no rugae on the dorsum of the pronotum and the intrarugal surfaces are smooth to slightly coriaceous, moderately to strongly shining. This species can be separated from *Pheidole yaqui* by the shape of the head, the head of *Pheidole yaqui* is not narrowed towards the posterior lateral lobes when seen in profile.



**Distribution.** USA: CA, AZ, N TX; NM: Doña Ana Co., Aguirre Springs, Las Cruces, 11 mi N Las Cruces (Cole 1953g), 23 mi N Las Cruces (Cole 1953g), 40 k NNE Las Cruces, 45 k NE Las Cruces (Long Term Ecological Research site), Eddy Co., 30 mi E Carlsbad (Cole

1953g), Grant Co., 18 mi SE Bayard (Cole 1953g), Luna Co., 7 mi W Deming (Cole 1953g); MEXICO: Sonora.

**Habitat.** Creosotebush scrub, grasslands, mixed basin bajada.

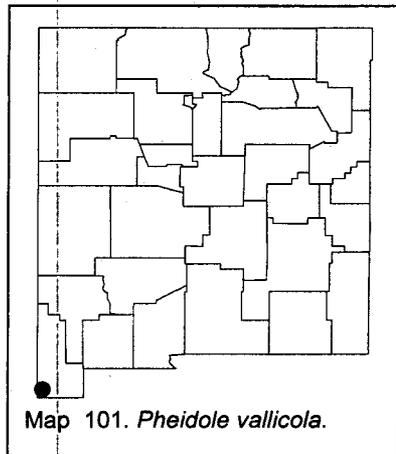
**Biology.** This species nest in the soil, where mounds may be small or crater-like, it is occasionally found nesting under stones. Brood is found in nests in April and September, sexuals in September. Foragers work in columns. This species is very common in southern New Mexico, but was not collected anywhere else in New Mexico.

Creighton and Gregg, 1955

### *Pheidole vallicola* Wheeler

Map 101

**Discussion.** The major of this species can be recognized by the flattened region at the base of the scape, as well as by the elongate scape, which reaches at least  $\frac{3}{4}$  of the distance between its insertion and the posterior margin of the posterior lat-



eral lobe. The posterior half of the posterior lateral lobe is moderately to strongly shining. The dorsum of the head of the minor worker is densely punctate and opaque, erect hairs on the gaster of the major are sparse and widely spaced.

This species would most likely be confused with *Pheidole hyatti*. It can easily be separated by the opaque dorsum of the head of the minor worker, which is smooth and shining in *Pheidole hyatti*.

**Distribution.** USA: AZ; NM: Hidalgo Co., Guadalupe Canyon. This is the first record from New Mexico.

**Habitat.** Riparian habitats in bottoms of desert canyons with sycamore, cottonwood trees and meadows.

**Biology.** This species nests under stones in rocky loam soils. Brood was found in nests in July. Seeds are stored in nests.

### *Pheidole virago* Wheeler

**Discussion.** The majors of this species are large, with a head length (excluding mandibles) at least 2 mm in length, usually more. The pronotum of the major is covered with transverse striae, the posterior half of the head is without sculpture.

This species would be most likely confused with *Pheidole macclendoni*, but can be separated as the head of the major is without a flattened, rugose area between the frontal lobe and the eye, and petiole is

without the prominent lateral spiracle.

**Distribution.** USA: AZ, TX. We have no records of this species from the state, but it would be expected to occur within the border.

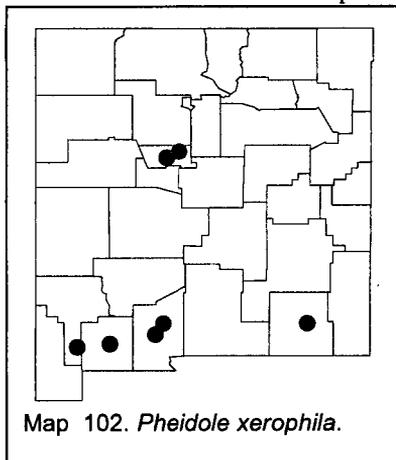
**Habitat.** Riparian areas in the Sonoran Desert.

**Biology.** The nests of this species are in the soil, with a small mound (7 - 13 cms diameter). The nest entrance is large (1.2 cms), suggesting they are preyed upon by army ants (*Neivamyrmex*). Colonies are small and contain only a few workers.

### *Pheidole xerophila* Wheeler

Map 102

**Discussion.** The major of this species is similar to that of *Pheidole tucsonica*, which is obviously narrowed toward the apex, when seen in profile. The eyes are relatively large, with about 70 ommatidia. The poste-



Map 102. *Pheidole xerophila*.

rior part of the head, and top of the posterior lateral lobe, are smooth and glossy.

This species could be confused with *Pheidole tucsonica*, but can be separated as the dorsum of the pronotum of the major has few or no rugae, which are mostly restricted to the anterior face and neck of the pronotum, and not noticeably reticulate, and the intrarugal spaces are smooth to slightly coriaceous or even moderately to strongly shining.

**Distribution.** USA: TX; NM: Bernalillo Co., Albuquerque, Sandia Mts., Doña Ana Co., 11 mi.

N Las Cruces, 45 k NE Las Cruces (Long Term Ecological Research site), Eddy Co., Carlsbad, Grant Co., 7 [?] mi. W Deming, Luna Co., west of Deming.

**Habitat.** Black grama grassland, weedy bajada.

**Biology.** This species nests in the soil with the hole surrounded by a mound or crater. Nests are attacked by the army ant *Neivamyrmex harisii*.

Wheeler, 1908; Creighton and Gregg, 1955

## Genus *Pogonomyrmex*

(Keys: Cole, 1968; Mackay et al., 1985)

This is a common and obvious group of seed harvesting ants, found throughout the state. Most species are seed harvesters, others feed on a variety of items, especially dead or dying insects. Large quantities of seeds are stored in nests (Mackay and Mackay, 1984b).

Most species in the genus have a large psammophore or beard of coarse hairs on the ventral surface of the head, which are used to carry fine sand during the excavation of the nest. Large mating flights occur in late summer, usually after a rain on the previous day (Mackay, 1981). Some species, especially *Po. occidentalis*, build large, conspicuous mounds. These ants clear the vegetation from around the nest. The function may be to reduce the impact of prairie fires, increase the amount of

solar insolation, or may reduce web sites of spiders, which are found around the nest entrance (Mackay, 1982). Some species construct enormous nests, with diameters over 5 meters and heights up to a meter. Most species in this genus can deliver very painful stings.

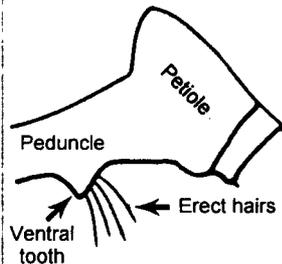


Fig. 255. Petiole of a worker of *P. apache*.

Important characteristics of this genus include the pectinate mid

and hind tibial spurs, the sutures and constrictions on the dorsum of mesosoma are rudimentary or absent, the propodeum usually has a pair of spines; the psammophore is usually present, if it is absent, the propodeal spines are connected by a carina, and the petiolar node is well developed (Fig. 255). The pectinate tibial spurs and the form of the dorsum of the mesosoma separate this genus from all others in the state. Latke (1990) has shown that the subgenus *Ephobomyrmex* is a synonym of *Pogonomyrmex*.

Cole (1934b, 1954b) discussed the genus in New Mexico. See also Spangler and Rettenmeyer (1966), and Wheeler and Wheeler (1963, 1973).

**Key to the workers of *Pogonomyrmex*<sup>3</sup>**  
(See Mackay et al., 1985)

1. Propodeal spines connected by ridge or carina (Fig. 256); psammophore (long, curved hairs on ventral surface of head) poorly devel-

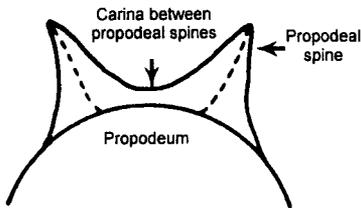


Fig. 256. Propodeum of a worker of *P. imberbiculus* as seen from the front (From Mackay et al., 1985).

<sup>3</sup> Note *P. anergismus* Cole (and *P. colei* Snelling, from Nevada and Gila Co. AZ), known only from sexuals, are not included in the key.

oped (Fig. 257); clypeus (seen from above) forms projections anterior to the antennal fossae (Fig. 258) .....  
..... *imberbiculus* Wheeler

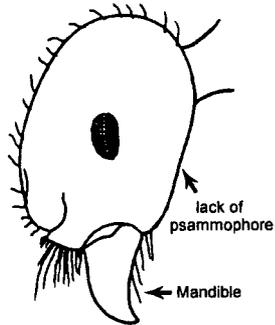


Fig. 257. Side of the head of a worker of *P. huachucanus* (From Mackay et al., 1985).

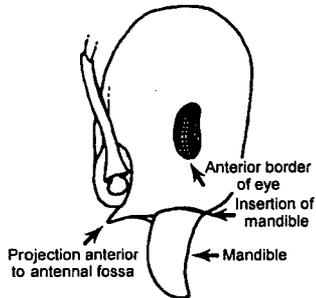


Fig. 258. Side of the head of a worker of *P. imberbiculus* (From Mackay et al., 1985).

- Propodeal spines (not always present) not connected by ridge (may be connected by a raised area); psammophore absent (rare) to well developed (Fig. 259); clypeus without projections anterior to antennal fossae ..... 2  
2(1). Propodeal spines absent, or if present in some workers in a nest, they are bumps or tiny spines irregu-

lar in size (Fig. 263) ..... 3  
 - Propodeal spines well developed (Fig. 260) ..... 7

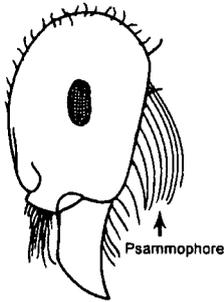


Fig. 259. Side view of a head of a worker of *P. rugosus* (From Mackay et al., 1985).

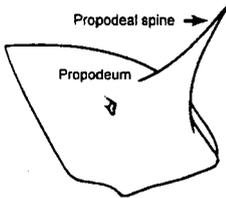


Fig. 260. Propodeum of a worker of *P. rugosus* (From Mackay et al., 1985).

3(2). Longitudinal rugae of head widely diverging towards the posterior lobes of the head, usually forming concentric curves above eyes (Fig 261) ..... 4

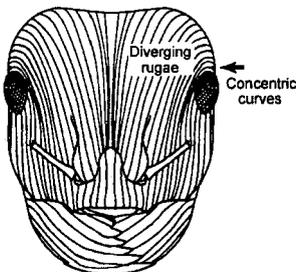


Fig. 261. Head of a worker of *P. californicus* (From Mackay et al., 1985).

- Longitudinal rugae (ridges) of head almost parallel, rarely forming concentric curves posterior to eyes (Fig. 265); rarely collected ... 5

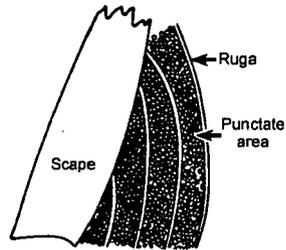


Fig. 262. Side view of a portion of the head of a worker of *P. maricopa* (From Mackay et al., 1985).

4(3). Regions between the rugae on the head, side of the pronotum and mesopleuron punctate, dull (Fig. 262); usually some of the workers have tiny spines on their propodia (Fig. 263) ..... *maricopa* Wheeler

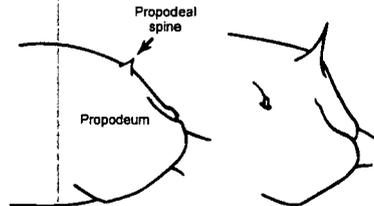


Fig. 263. Propodia of workers of *P. maricopa*, showing 2 extremes of the propodeal spines (From Mackay, 1985).

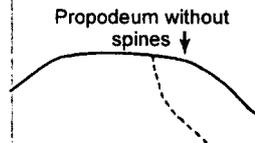


Fig. 264. Mesosoma of a worker of *P. californica* (From Mackay, 1985).

- Region between the rugae on these surfaces mostly smooth and

shining; propodeum never has spines or teeth (Fig. 264) .....  
 ..... **californicus** (Buckley)  
**5(3)**. Anterior margin of clypeus with wide, deep impression that often extends to frontal lobes (Fig. 265); rugae on head very coarse .....  
 ..... **apache** Wheeler

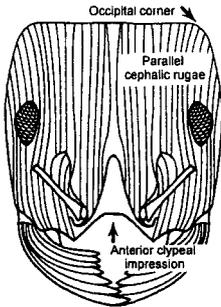


Fig. 265. Head of a worker of *P. apache*, showing the parallel rugae and the impression along the anterior border of the clypeus (From Mackay, 1985).

- Anterior margin of clypeus weakly concave (nearly straight) .. **6 6(5)**. Mandible with 5 or 6 teeth; rugae on dorsum of head very fine, parts of surface smooth and glossy; not recorded from New Mexico (collected in western Texas and northern Chihuahua) .....

**bigbendensis** Francke & Merickel

- Mandible with 7 teeth (Fig. 266); head with well developed ru-

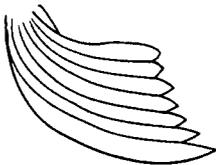


Fig. 266. Mandible of a worker of *P. bigbendensis* (From Mackay, 1985).

gae . **texanus** Francke & Merickel **7(2)**. Basal tooth (closest to head) abruptly bent upward and backward (Fig. 267); common ant at higher elevations, which builds large mounds ..... **occidentalis** (Cresson)

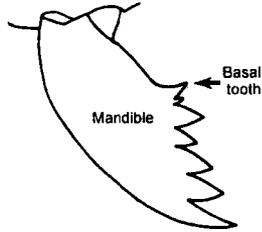


Fig. 267. Mandible of *Pogonomyrmex occidentalis*, showing the offset basal tooth (From Mackay, 1985).

- Basal tooth similar to other teeth of mandible (Fig. 266); ants do not build large gravel mounds, although they often surround nest entrance with gravel ..... **8 8(7)**. Rugae on dorsum of head diverging posteriorly; sculpture on mesopleuron very rough, with poorly defined rugae, and size relatively small (total length up to 6 mm); mesic habitats .....

..... **huachucanus** Wheeler

- Rugae on dorsum of head nearly straight (may be less than 6 mm total length), or slightly diverging posteriorly and relatively large (over 8 mm total length); primarily desert habitats ..... **9 9(8)**. Posterior lateral corners of head smooth and glossy; striae on dorsum of head fine and silky; usually less than 6 mm total length .....

..... **desertorum** Wheeler

- Posterior lateral corners of head with sculpture; striae or rugae on head coarser, not silky; usually

greater than 8 mm in total length ..... 10  
 10(9). Color deep red or reddish orange, gaster same color as mesosoma ..... *barbatus* (Smith)  
 - Color dark or black, gaster usually lighter in color than mesosoma, may be strongly contrasting orange with remainder of ant black ..... *rugosus* Emery

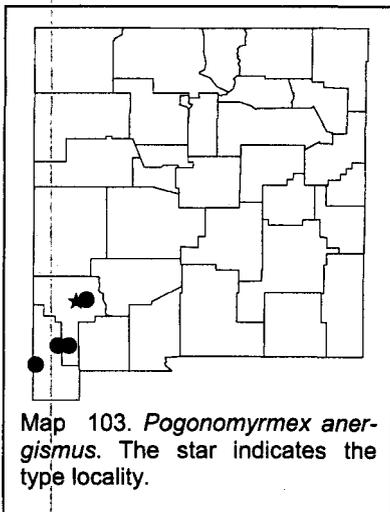
### ***Pogonomyrmex anergismus* Cole**

Map 103

**Discussion.** Only the females and males are known, presumably there is no worker caste. These ants can be found in nests of either *Po. barbatus* or *Po. rugosus*. They can be recognized as they are smaller than the sexuals of the hosts (females about 8 mm, males about 7 mm total length, compared to the hosts in which the females are about 12 - 15 mm and the males about 12 mm total length). The males and females are very similar in color, both being pale brown to ferruginous brown.

The hosts are dark brown (*Po. rugosus*) or dark ferruginous brown to dark brown (*Po. barbatus*).

**Distribution.** USA: AZ, TX; NM: Grant Co., 25 mi. E Lordsburg, 6.1 and 7.6 k E Separ (300 to 1000 m south of Interstate 10, 32°10'30"N, 108°21'30"W), 15 mi. E Silver City (type locality), 24 k E Silver City, Hidalgo Co., 0.5 k W junction of Highways 9 and 80 (31°55'30"N, 109°2'30"W).



**Habitat.** Chihuahuan Desert grasslands.

**Biology.** These ants are social parasite in nests of *Po. barbatus* and *Po. rugosus*. This species occurs at very low densities, infecting only a few nests out of a population of several hundred. This species can be collected most efficiently by digging into nests of the host (to a depth of a few cms) in late summer or fall, and rapidly spreading the soil on the surface. After a quick examination, you should move on the next nest (you should notice them immediately if they are present, and to avoid stings by the host species). They are easily distinguished from the darker *Po. rugosus* by their light yellowish red color. They are essentially the same color as the alates of *Po. barbatus*, making them difficult to distinguish, but can be separated on the basis of their smaller size.

Flights occur during the afternoon after late summer and fall rains. Pouring about 8 liters of water on a parasitized colony can some-

times stimulate flights. Workers of the host are highly aggressive during the flights, as would happen during flights of their own species.

Females mate with colony mates, usually within the nest. The females fly from the nests, males remain in the nest. The spermathecae contain about 8000 sperm, about 1/20 that of other species of *Pogonomyrmex* (i. e. the other social parasite *Po. colei*). Apparently females must replenish the sperm in the spermatheca during later mating flights.

Apparently the females encounter aggression when they enter a nest of the host. When the female makes contact with the host queen or brood of the host, hostile behavior is replaced by intensive grooming by the host workers. Thereafter she is completely accepted by the nest and does not kill the host queen. Nests may contain more than one parasitic queen.

Cole, 1954b; Mackay and Van Vactor, 1985; Johnson, 1994

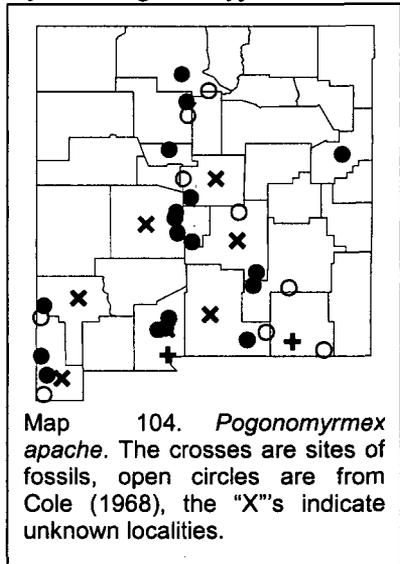
### *Pogonomyrmex apache* Wheeler

Figs. 255, 265; Map 104

**Discussion.** This species is easily recognized due to the deeply emarginate (notched) clypeal border.

It could be confused with *Po. texanus*, but the latter species does not have the excised clypeal border (at least not nearly to the extent of *Po. apache*). The lack of spines on the propodeum would separate this species from most of the others in the genus. The lack of propodeal spines could result in this species

being confused with *Pogonomyrmex californicus*, or *Po. maricopa*. It can be separated from both of the species by the emarginate clypeal border.



**Distribution.** USA: South-west USA; NM: **Bernalillo Co.**, Sandia Mountains near Albuquerque, **Doña Ana Co.**, Bishops Cap (fossils), 11 mi. N Las Cruces, 45 k NE Las Cruces (Long Term Ecological Research site), Organ Mts. (Cole 1955c), **Eddy Co.**, Rocky Arroyo (fossils), **Grant Co.**, without locality, **Hidalgo Co.**, Rodeo, Granite Pass, **Lincoln Co.**, without locality, **Los Alamos Co.**, Los Alamos, **Otero Co.**, without locality, **Rio Arriba Co.**, Abiquiu Dam, **Quay Co.**, 7 mi. S Quay, **Socorro Co.**, without locality, **Torrance Co.**, without locality; MEXICO: Sonora, Chihuahua, and Durango.

**Habitat.** Creosotebush scrub, desert grasslands, sagebrush.

**Biology.** Nests are small and difficult to locate. They occur in the

soil, sometimes evident simply by a hole, or otherwise by a small hole with a small (10 cm diameter) mound of soil. Nests are small, with perhaps 80 - few hundred workers. A founding female was collected in July. Although they are large individuals, they are not as aggressive as others in the genus.

Cole, 1954b, 1954f, 1968; Gregg, 1963; Rojas-Fernández and Frago, 1994, 2000

### *Pogonomyrmex barbatus* (Smith)

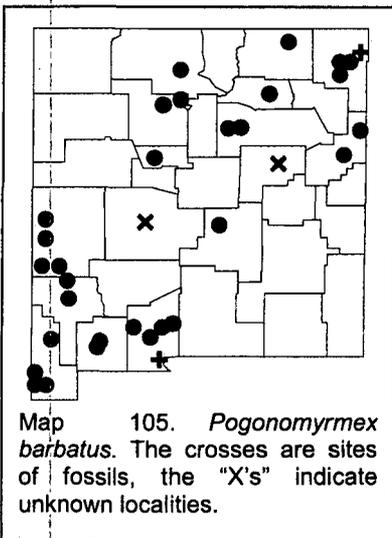
#### Map 105

**Discussion.** This is usually an easily recognized species as it is large, red and aggressive.

Occasionally it is difficult to distinguish specimens from those of *Po. rugosus*. The color usually works to distinguish this species (*Po. rugosus* is dark with a contrasting lighter gaster), but it may be necessary to examine the cephalic rugae to determine if they are fine or coarse as in *Po. rugosus*. It can be separated from the other species, as it is much larger (total length over 8 mm, usually about 10 mm in total length). Workers from newly founded nests are small, and could be confused with *Po. desertorum*. The cephalic rugae are fine, but are not as fine as those of *P. desertorum*, which also has a shiny area at the posterior lateral corner, an area which is covered with rugae in *Po. barbatus*.

**Distribution.** USA: Southwestern United States; NM: **Bernillo Co.**, Albuquerque, **Catron Co.**, Frisco Hot Springs, 2 mi. N Frisco

Hot Springs, Glenwood, Mogollon Mts., **Colfax Co.**, 10 mi. S Raton, **Doña Ana Co.**, Aguirre Springs, Bishop's Cap (fossil), Las Cruces, 45 k NE Las Cruces (Long Term Ecological Research site), **Grant Co.**, 14 mi. N Silver City, 100k N Silver City, **Guadalupe Co.**, without locality, **Hidalgo Co.**, Guadalupe Canyon, Lordsburg, Peloncillo Mts., 3



Map 105. *Pogonomyrmex barbatus*. The crosses are sites of fossils, the "X's" indicate unknown localities.

mi. N Rodeo, **Lincoln Co.**, 33°57'08.45N 105°42'44.95"W, **Los Alamos Co.**, Rio Grande, **Luna Co.**, Deming, 16 mi. WSW Deming, **Mora Co.**, 2 k E Wagon Mound, **Otero Co.**, White Sands National Monument, **Quay Co.**, 6 m SW Nara Visa, 7 mi. S Quay, **Rio Arriba Co.**, Abiquiu Dam, **Sandoval Co.**, 1 mi. S Jémez Springs, **San Miguel Co.**, Infield, Villanueva State Park, **Socorro Co.**, without locality, **Union Co.**, Clayton, 6 mi. NW Clayton, 10 mi. SE Clayton; MEXICO: Widely distributed and common in the northern half of the country.

**Habitat.** Found in a variety of habitats in the state, ranging from the edges of the desert and grasslands up to lower elevation pine forests (up to 1850 meters), pinyon-juniper and oak forests, sagebrush, riparian habitats. It occurs in more mesic sites than *Po. rugosus* and they are sympatric in only a few areas (i.e. Aguirre Springs in Doña Ana Co.)

**Biology.** This species has large crater-like mounds with a diameter of about 1-meter. They are cleared of vegetation and covered with gravel, if it is available. Brood and reproductives were found in the nests in July. They are extremely pugnacious and their sting is very painful. It is not as common in the state as *Po. rugosus*.

Gregg, 1963

***Pogonomyrmex  
bigbendensis*  
Francke and Merickel**

**Discussion.** This is a very rare species that shows some similarities to *Po. desertorum*. It can be distinguished as the cephalic sculpture is almost absent and the head is mostly smooth and shining.

There is no other North American *Pogonomyrmex* with a smooth and shiny head.

**Distribution.** USA: TX, Big Bend Park; MEXICO: Chihuahua, may occur in NM.

**Habitat.** Creosotebush scrub.

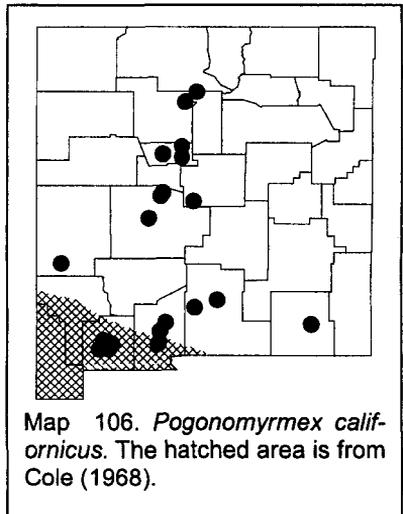
**Biology.** This species nests in the soil.

***Pogonomyrmex  
californicus* (Buckley)**

Figs. 261, 264; Map 106

**Discussion.** This species can be distinguished from most of the other species, as the propodeal spines are completely absent.

It is difficult to separate from *Po. maricopa*, but can be distinguished as the intrarugal spaces are smooth and shining. This species never has spines of the propodeum, at least some of the workers in a nest of *Po. maricopa* usually have tiny spines.



**Distribution.** USA: Common throughout southwestern United States; NM: Bernalillo Co., 20 mi W Albuquerque (Cole, 1954b), Embudo (Cole, 1954b), Sandia Mts. (Cole, 1954b), Catron Co., Mogollon Mts., Doña Ana Co., Las Cruces, 15 mi. N Las Cruces, 45 k NE Las Cruces (Long Term Ecological Research site), Eddy Co., 30 mi E Carlsbad (Cole, 1954b), Grant Co.,

San Juan, **Luna Co.**, Deming (Cole, 1954b), 25 mi E Deming (Cole, 1954b), 5 mi. W Deming, 6 mi W Deming (Cole, 1954b), **Otero Co.**, Alamogordo (Cole, 1954b), White Sands National Monument (Cole, 1954b), **Rio Arriba Co.**, Española (Cole, 1954b), **Sandoval Co.**, 1 mi. S Indian Pueblo, **Socorro Co.**, Bernardo (Cole, 1954b), 13 mi N Bernardo (Cole, 1954b), 25 mi N Socorro (Cole, 1954b), **Torrance Co.**, 10 mi S Mountainair (Cole, 1954b); **MEXICO**: Common throughout northern Mexico.

**Habitat.** Nearly all arid environments ranging from weedy bajadas to grasslands on to creosote-bush scrub.

**Biology.** This species usually nests in sandy soils where it has small mounds (20 cm diameter). This species does not clear vegetation surrounding the nest. Nest populations are about 2000 individuals, with a nest depth of 2 meters. It is primarily a seed harvester. Foragers are often active during relatively hot times of the day, during which the ants run stiff-legged with the gaster elevated, apparently in an attempt to distance themselves from the hot surface. They can often be seen mounting small pebbles and stones and waving their legs, apparently attempting to lower their body temperatures. It is very pugnacious and is one of the two ants in New Mexico with the most painful sting (the other species is *Po. maricopa*). The sting is barbed and becomes detached to remain in the flesh, as occurs in the honeybee. It is possible to watch the sting apparatus apparently pump venom into one's tissues, especially through a

microscope. Reproductives are found in nests from May to July. Flights occur from May to July and a single nest may participate in several nuptial flights. Horned lizards (*Phrynosoma* spp.) are major predators.

Wheeler, 1910a; Michener, 1942; Cole, 1954b, 1966; Erickson, 1972; Wheeler and Wheeler, 1973

### *Pogonomyrmex desertorum* Wheeler

Map 107

**Discussion.** This species can usually be recognized by the well-developed propodeal spines and the fine, silky cephalic rugae, with shiny posterior-lateral corners of the posterior lateral lobes.

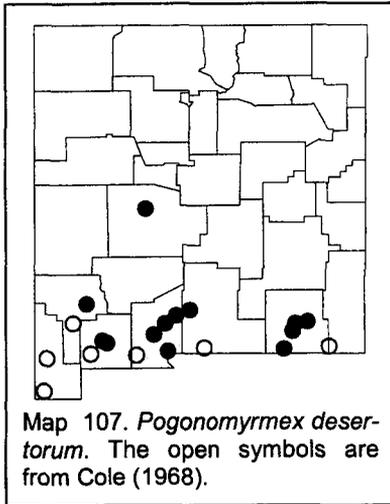
The propodeal spines separate this species from others that lack the spines. It could be confused with *Po. barbatus*, but is smaller and the sculpture is much finer. *Pogonomyrmex barbatus* also lacks the smooth and shiny area on the posterior lateral corners. It is unlikely to be confused with any other members of the genus.

**Distribution.** USA: Southwestern United States; NM: **Doña Ana Co.**, Las Cruces, 45 k NE Las Cruces (Long Term Ecological Research site), 2 mi. SW Haldeman Air Force Base, 2.9 m N Mesquite, **Eddy Co.**, Carlsbad Caverns, 30 mi E Carlsbad (Cole, 1954b), White's City (Cole, 1954b), Texas-New Mexico border on Highway 180 (Cole, 1954b), **Grant Co.**, Bayard (Cole, 1954b), **Luna Co.**, Deming (Cole, 1954b), 5 mi. W Deming, **Otero Co.**, White Sands National Monument, **Sierra Co.**, Elephant Butte;

MEXICO: Common in northern Mexico (Sonora, Chihuahua, Coahuila, Durango, Tamaulipas, and San Luis Potosí).

**Habitat.** Chihuahuan Desert in rocky or sandy soils, including dunes.

**Biology.** This is a species of



seed harvesters (individual and group forager) with small nest populations (few hundreds?). They are very docile ants. They nest in sandy areas, or even gravel soils, with a small mound surrounding the nest entrance. Flights occur in June and July. During the mating flights, sexuals search for the highest object in an area, which in its typical habitat is usually the myrmecologist! It can be a very interesting experience, and additionally the females can deliver a painful sting.

Cole, 1968; Whitford and Bryant, 1979; Rojas-Fernández and Fragoso, 1994, 2000

## *Pogonomyrmex huachucanus* Wheeler

Fig. 257; Map 108

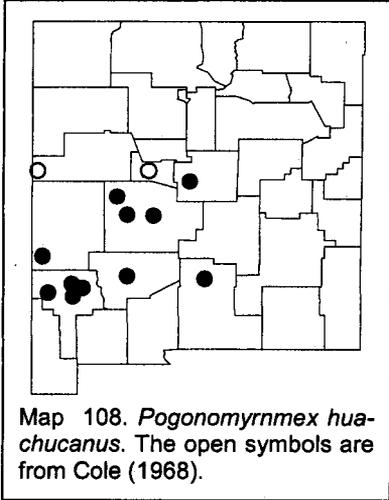
**Discussion.** This is a member of the “Ephebomyrmex” group of species, although it serves as a ideal link between this group (“Ephebomyrmex”) and the other species in the genus. The propodeal spines are somewhat united by a carina, but the psammophore is reasonably well developed. It is a very coarsely sculptured species. The propodeal spines separate this species from others that lack spines. The rough sculpture (the area between the rugae on the head is punctate, the area between the rugae on the mesosoma is shiny, but the rugae are reticulated) separates it from many of the species which have propodeal spines.

It could be confused with *Pogonomyrmex occidentalis*, but lacks the offset basal mandibular tooth.

**Distribution.** USA: AZ; NM: **Catron Co.**, Glenwood, **Grant Co.**, Mimbres, Silver City (Cole, 1954b), 20 mi N Silver City (Cole, 1954b), 60 k E Silver City, **Otero Co.**, 7 mi E Tularosa (Cole, 1954b), **Sierra Co.**, Elephant Butte Reservoir, **Socorro Co.**, Magdalena Mts. (17 k S Magdalena), Socorro (Cole, 1968), Water Canyon, 33°48'32.2"N 107°22'57.2"W, **Torrance Co.**, Mountainair (Cole, 1954b, Cole, 1968); MEXICO: Chihuahua, Durango.

**Habitat.** Mesic or riparian areas along the edges of the Chihuahuan Desert, often in grasslands, thorn scrub, oak forests or pinyon-

juniper forests, up to the edges of pine forests.



Map 108. *Pogonomyrmex huachucanus*. The open symbols are from Cole (1968).

**Biology.** This species nests in the soil, with the entrance hole often surrounded by a small, soil mound (up to 10-cm diameter), in fine sand soils or loam with scattered stones, or rocky soils. This species also nests under stones. Nests are usually difficult to find and may be simply small entrance holes. They are occasionally surrounded by seed hulls, which makes them easier to locate. Rarely there are a few pebbles around the entrance. Nests contain about 125 - 150 workers, although large nests may contain 400 - 500 workers. Brood is found in nests from June to July, reproductives in July and August. It forages diurnally, and uses a mixture of seeds, excrement, and dead insects as the food source and stores seeds in the nests.

It is the only North American species that has multiple wingless female reproductives in the nest, although it is not clear whether more than one is involved in reproduction

(*Po. anergismus*, a parasitic species, may also have several females in the nest). Mating may occur in the nests, and at least some of the females are brachypterous (have small wings). Cole (1954b) suggests the females mate in flight, and return to the nest, and then subsequently leave the nest to form colonies at a later time. Workers are preyed upon by *Dorymyrmex smithi*. It is very docile and a pleasure to work with, and this fascinating species should be studied in detail.

Creighton, 1952b; Cole, 1968; Rojas and Fragoso, 2000

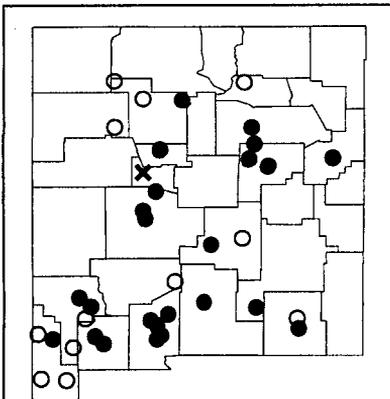
### ***Pogonomyrmex imberbiculus* Wheeler**

Figs. 256, 258; Map 109

**Discussion.** This is a common member of the "Epebomyrmex" group, which is very easily recognized as the clypeus is bent as a flange anterior to the insertions of the antennae. This is very easy to see by looking from the top of the head towards the mandibles. This is the only North American species of *Pogonomyrmex* with this characteristic.

Thus, this species would not be confused with any other North American species. *Pogonomyrmex huachucanus* differs from *Po. imberbiculus* in lacking the clypeal projection anterior to the antennal fossa (compare Figs. 257 and 258). *Pogonomyrmex pima* (southern Arizona, unknown from New Mexico) can be separated from both of these species as the petiolar node is rounded at the apex, not angular as in the other two species.

**Distribution.** USA: south-western states; NM: **Bernalillo Co.**, Taylor Ranch, **Chaves Co.**, 12 mi. W Hope (Cole, 1954b), **Doña Ana Co.**, Aguirre Springs, 23 mi N Las Cruces (Cole, 1954b), 40 k NNE Las Cruces, 45 k NE Las Cruces (Long Term Ecological Research site), 3 mi. E Las Cruces, **Eddy Co.**, Carlsbad, **Grant Co.**, 18 mi SE Bayard



Map 109. *Pogonomyrmex imberbicus*. The open symbols are from Cole (1968), the "X" represents an unknown locality.

(Cole, 1954b), **Guadalupe Co.**, Dilia (Cole, 1954b), Santa Rosa Lake, **Grant Co.**, 100 k N Silver City, **Hidalgo Co.**, Lordsburg, **Lincoln Co.**, Malpais Lava Beds, near Carrizozo (Cole, 1954b), **Los Alamos Co.**, Rio Grande, **Luna Co.**, Deming (Cole, 1968), 6 mi NW Deming (Cole, 1954b), **Otero Co.**, 8 mi W Alamogordo (Cole, 1954b), **Quay Co.** 7 mi. S Quay, **Socorro Co.**, 20 mi N Bernardo (Cole, 1954b), 7 mi W Socorro (Cole, 1954b), Water Canyon, **Valencia Co.**, without locality; MEXICO:

Sonora, Chihuahua, Durango, Coahuila.

**Habitat.** Chihuahuan Desert in grasslands, open weedy areas, creosotebush scrub, up into juniper forests and oak forests.

**Biology.** This species nests under stones or in nests in the soil, sometimes surrounded by a small mound (approximately 4 cms in diameter). Rarely they will nest under stones. Nests are located in sandy soils, to coarse rocky gravel. Nests appear to be small, perhaps 50 to a few hundred workers. Brood is found in nests in August. This is primarily a single foraging, seed harvester, dead insect collector, apparently specializing on grass seeds. Workers forage individually. It is very docile and easy to study. Flights occur in mid July.

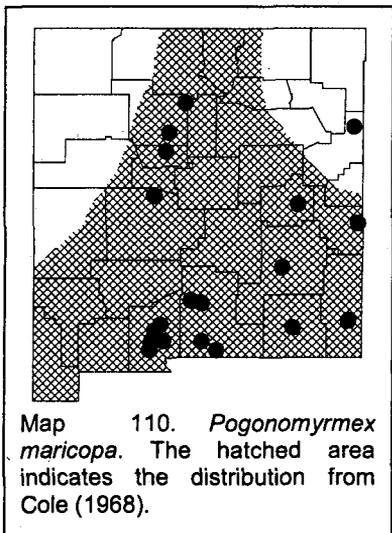
Creighton, 1956 (as *Ephebomyrmex*); Cole, 1968

### *Pogonomyrmex maricopa* Wheeler

Figs. 262, 263; Map 110

**Discussion.** This species is very similar to *Po. californicus* and it is usually difficult to separate the two. If a large series is available, usually at least a few will have poorly developed propodeal spines, which are always lacking in *Pogonomyrmex californicus*. It is slightly larger than *Po. californicus* and the intrarugal areas (head and mesonotum especially) are more strongly punctured. The anterior edge of the clypeus is straight or weakly convex, which would separate this species from *Po. apache* and

*Po. texanus*, which have a concave margin. It can be separated from the remainder of the species in the genus, by the lack of well developed spines on the propodeum.



**Distribution.** USA: Southwestern United States; NM: **Bernalillo Co.**, Albuquerque, **Chaves Co.**, Bottomless Lakes State Park, **De Baca Co.**, Sumner Lake, **Doña Ana Co.**, 1.5 mi. W Mesilla, Las Cruces, 5 mi. W Las Cruces, 45 k NE Las Cruces (Long Term Ecological Research site), 1.5 mi. W Mesilla, **Eddy Co.**, Carlsbad Caverns, **Lea Co.**, 20 mi. WSW Hobbs, **Los Alamos Co.**, Los Alamos, Rio Grande, **Otero Co.**, Fort Bliss, Lake Lucero, North MacGregor Range, White Sands National Monument, **Quay Co.**, 6 m SW Nara Visa, **Roosevelt Co.**, 1 k E Oasis State Park, **Sandoval Co.**, Santa Ana Pueblo, **Socorro Co.**, Sevilleta National Wildlife Refuge; MEXICO: northern states (Baja California, Sonora, Sinaloa, Chihuahua, Durango).

**Habitat.** This species is found in all communities of the Chihuahuan Desert, especially areas with sandy soils. This is one of the few species which can nest in loose sands, such as at White Sands National Monument.

**Biology.** This species usually has nests very similar to those of *Po. californicus*, and usually occurs in sandy soils. In some areas, for example the sandy soils east of El Paso, TX, the nests are immense, with clearing up to 7 meters in diameter with the mounds approaching 2 meters in height. Typical nests are also found in the same area. Unfortunately most of these nests have been eliminated by urbanization, and will probably be completely eliminated in the future. These ants are extremely pugnacious and have a very painful sting. Flights occur from June to August; new colonies are formed in July - October. They are individual foragers collecting seeds, excrement and dead insects. The myrmecophilous scarabaeid beetle genus *Cremastocheilus* occurs in the nests.

Gregg, 1963; Cole, 1968; Wheeler and Wheeler, 1973; Rojas-Fernández and Frago, 1994, 2000

### *Pogonomyrmex occidentalis* (Cresson)

Fig. 267; Map 111

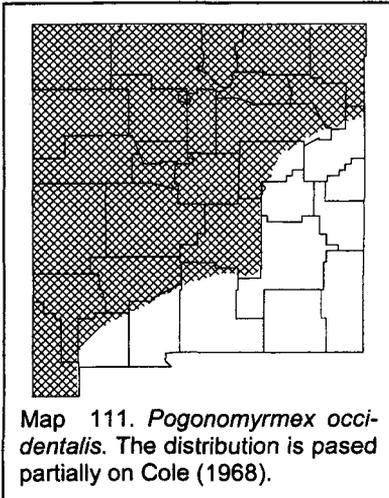
**Discussion.** The course intrarugal spaces usually distinguish this species from others in the genus. In addition, the basalmost tooth is offset (Fig. 267), which would separate to species from all others in the genus. They also have a very typical mound

that is rarely seen in other species, a mound covered with gravel with a diameter of about a meter and a height of about 50 cms. It is the only species of *Pogonomyrmex* that is common at higher elevations in New Mexico.

Cole (1954b) reported *Pogonomyrmex occidentalis comanche* from 7 mi S of Albuquerque, 18 mi SE Bayard and Silver City, but these are apparently misidentifications.

**Distribution.** USA: Throughout western United States; NM: Very common in the mountains of New Mexico, throughout the state; MEXICO, Common in the state of Chihuahua.

**Habitat.** Never found in completely arid habitats, most common in higher elevation grasslands, sagebrush sites, oak forests, pinyon juniper forests into pine forests, but always in clearings.



**Biology.** This is one of the most common and obvious ants in the state. It is especially conspicuous due to the large gravel mounds.

Foragers are active during the day, retreating into the nest or into protected sites during the hot part of the day. During the night the ants often block the nest entrance with pebbles. It feeds on seeds and dead insects. It colonizes a disturbed area rapidly, as it is present on a waste site (Los Alamos) on plots 5 years old. Brood and reproductives are found in the nests throughout the summer. It is a very aggressive species and can inflict numerous painful stings in a surprisingly short period of time. Mounds play a role in thermoregulation of the nest. Surfaces exposed to the sun are warmer. The nests are usually covered with pebbles, snail shells or even Indian beads and fossil mammal teeth. The function of the gravel is unknown, but may protect the mound from erosion or may mark the entrance hole (in species with no mound or smaller mounds) to make it easier to find. *Monomorium minimum* is found in the nests. The scarabaeid beetle *Cremastocheilus saucius* is found in nests.

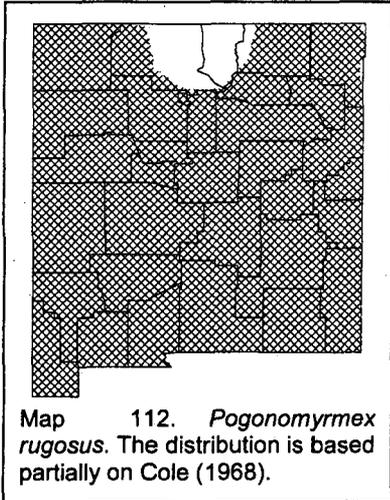
Cole, 1934c, 1934d, 1934e; Gregg, 1963; Wheeler and Wheeler, 1963; Usnick, 2000

### *Pogonomyrmex rugosus* Emery

Figs. 40, 41, 259, 260, 266; Map 112

**Discussion.** This is a very common ant in southern New Mexico and is easily recognized. Its color (and large size, over 8-mm total length) usually separates it from all others in the genus: dark brown, almost black head and mesosoma with a somewhat lighter colored gaster.

The cephalic rugae are very coarse, which separates it from dark colored *Po. barbatus* specimens.



**Distribution.** USA: southwestern United States; NM: **Bernillo Co.**, Albuquerque, West Mesa, **Curry Co.**, near Clovis, **De Baca Co.**, Summerlake, **Doña Ana Co.**, Anthony (2 mi. E Cemetery), Dripping Springs, Las Cruces, 15 mi. N Las Cruces, 3 mi. E Las Cruces, 5 mi. W Las Cruces, 45 k NE Las Cruces (Long Term Ecological Research site), San Agustín Pass, **Eddy Co.**, Carlsbad, 1 mi. E Loco Hills, 5.3 k SE Sitting Bull Falls, **Grant Co.**, Whitewater, 15 mi. SSE Silver City, 60 k E Silver City, 14 k E White Signal, **Guadalupe Co.**, Lake Santa Rosa, Perch Lake (1.5 mi. SE Santa Rosa), **Hidalgo Co.**, 3 mi. N Rodeo, **Lea Co.**, 20 mi. E Tatum, **Lincoln Co.**, Oak Grove Camp, **Los Alamos Co.**, Los Alamos, Rio Grande, **Otero Co.**, 8 mi. NE Tularosa, White Sands National Monument, **Quay Co.**, Logan/Ute Lake, 6 mi. SW Nara Visa, **Rio Arriba Co.**, 2 k N Dixon,

Española, 10 k SW Española, 4 k NW Navajo City, **Sandoval Co.**, Bandelier National Monument, Coronado State Park, 1 mi. S Indian Pueblo, **San Juan Co.**, 4k E Aztec, Chaco Canyon, **San Miguel Co.**, Infield, **Santa Fe Co.**, Galisteo, **Sierra Co.**, Caballo Lake, Truth or Consequences, **Socorro Co.**, 11 k NW Magdalena, 19 k S Magdalena, **Torrance Co.**, Corona, 5 m NE Corona, 13 m NE Corona, 10.7 k SW Corona, **Union Co.**, 15 m SW Clayton, **Valencia Co.**, 66 k E Albuquerque, 13.8 mi. W Los Lunas; MEXICO: Common throughout the northern part of the country, especially in the state of Chihuahua.

**Habitat.** Found primarily in Chihuahuan Desert communities, including grasslands, creosotebush scrub and riparian habitats

**Biology.** This species forms large crater-like mounds similar to those of *Po. barbatus*. Rarely it forms a small mound a few cm higher than the surface of the ground. Nests are large, containing several thousand workers. Workers are individual or group foragers, depending on the conditions. Food sources are primarily seeds (especially those of *Erodium cicutarium*), but also includes dead insects. The soil surface temperature limits foraging activity. The myrmecophilous scarabaeid beetle genus *Cremastocheilus* occurs in the nests. These ants deposit seed hulls and other debris around the edge of the mound, where it is eaten by tenebrionid beetles of the Genus *Eleodes*. The black widow spider is one of the main predators of this species.

Gregg, 1963; Wheeler and Wheeler, 1973; Mackay, 1981, 1982; Mackay and Mackay, 1989; Rojas-Fernández and Fragoso, 1994, 2000

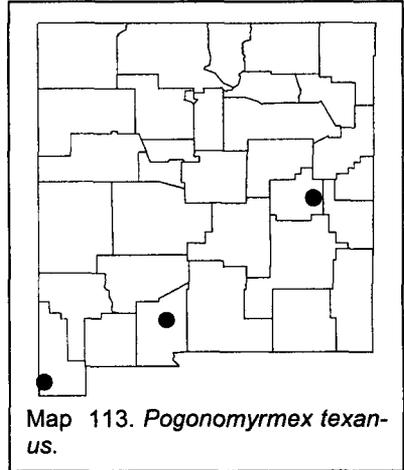
***Pogonomyrmex texanus***  
**Francke & Merickel**

Map 113

**Discussion.** Workers of this species can be recognized as being large ants (total length greater than 9 mm), which lack propodeal spines. The anterior border of the clypeus is concave, but not to the extent of the clypeus of *Po. apache* (Fig. 265). The rugae on the dorsum of the head are fine, nearly parallel, directed straight back to the posterior margin, the posterior lateral corner is smooth and shining.

It can be separated from most of the species in the genus by the lack of propodeal spines. It is much larger than *Pogonomyrmex californicus* and most workers of *Po. maricopa*. It can also be separated from these two species, in which the anterior border of the clypeus is nearly straight.

**Distribution.** USA: TX: NM: De Baca Co., 4 mi. N Taiban, Doña Ana Co., 45 k NE Las Cruces (Jornada Long Term Ecological Research Site), Hidalgo Co., Peloncillo Mts. (N Highway 9).



**Habitat.** Rocky areas within the Chihuahuan Desert.

**Biology.** This ant nests in the soil, with the entrance hole surrounded by a small (10 - 15 cm diameter) mound.

## Genus *Rogeria*

(Key: Kugler, 1994)

This is a Latin American genus (24 species) and one of the rarest of the genera in the United States. Only 1 species, *R. foreli* is found in New Mexico. The eyes are usually

small and the clypeus has 3 prominent carinae, which diverge anteriorly, but never form clypeal teeth. Most surfaces of these ants are roughly sculptured.

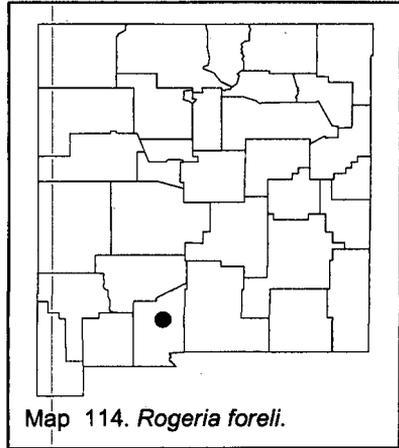
***Rogeria foreli* Emery**

Fig. 50; Map 114

**Discussion.** This is easily recognized as a small (about 2 mm total length), light brown species. The three-segmented antennal club is much longer than the remainder than the remainder of the funiculus (Fig. 50). The eyes are very small (about 8 ommatidia). The anteroinferior pronotal angle is well developed (Fig. 50), which is nearly as large as the angle on the propodeum. *Rogeria huachucana* Snelling is a synonym.

**Distribution.** USA: South-east AZ, and south central New Mexico south to northern South America; NM: Doña Ana Co., 45 k NE Las Cruces, Jornada Long Term Ecological Research Site.

**Habitat.** Rocky areas within

Map 114. *Rogeria foreli*.

the Chihuahuan Desert, extending into juniper woodland at 1800m.

**Biology.** The habits of this ant are little known, they apparently nest under stones, as that is where stray workers have been found.

Snelling, 1973a; Kugler, 1994

**Genus *Solenopsis***

(Key: Creighton, 1950)

This genus can easily be distinguished from all others in New Mexico by the 10-segmented antenna with a two-jointed club.

Most common species are polymorphic and such species could only be confused with *Pheidole*. The form of the antenna, lack of spines on the propodeum, the extension of the clypeal carinae as tooth-like projections past the antennal border of the clypeus (except in the majors of the rarely collected *S. amblychila*),

and the mandibles with more than 2 well developed teeth easily separate this genus from *Pheidole*. Most of the species in this genus are small, monomorphic ants with tiny eyes. These species are rarely collected, although they are common, but subterranean ants. They are not likely to be confused with other genera as they also have the 10-segmented antenna with the 2-jointed club (it is very difficult to count the segments due to their small size). Most species

in New Mexico are yellow or pale yellow in color, which allows them to be easily separated from the tiny black workers of most of the species of *Monomorium* which occur in New Mexico. There are no spines on the propodeum, which separates them easily from small, pale *Pheidole* workers. The eyes are very small, consisting of only a few ommatidia, whereas in the other genera the eyes are large. Thus, even though the workers of these ants are tiny and difficult to examine, they are not likely to be confused with workers of other genera.

The larger, polymorphic species are most commonly collected. They build large nests in lawns and place the soil on top of the grass, making the yard unsightly. They have a moderately painful sting, which is usually not serious unless a large number of workers stings a gardener. These larger species are usually found in dry areas nesting in the soil or under stones. They feed primarily on seeds, but may feed on dead insects. These are common urban and house pests and include the imported fire ant, which is a notorious pest.

Most colonies of the smaller species are found in the soil without an entrance hole, unless nuptial flights are occurring. Occasionally nests are discovered under stones. Nests are usually found while one is excavating the nest of another ant species. They are considered thief ants, which pilfer the nests of other ants. As they are so small, other ants may not even notice them.

This is a relatively common group in New Mexico, and is found

in a number of habitats. Cole (1953e) discusses the distribution of the genus in New Mexico. The smaller species in this genus are in desperate need of revision; identification is nearly impossible.

### Key to the workers of *Solenopsis*<sup>4</sup>

1. Workers dimorphic or polymorphic; eye of minor with total of more than 20 ommatidia (Fig. 268); second and third funicular segments longer than broad (Fig. 269) ..... 2

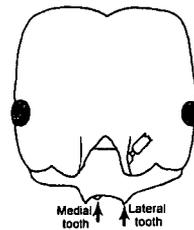


Fig. 268. Head of a major worker of *S. invicta*. The medial tooth is indicated.

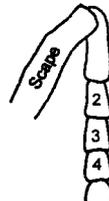


Fig. 269. Scape and first part of the funiculus of a worker of *S. invicta*.

<sup>4</sup> All of the thief ants known from the United States are included in the key. Species listed in Smith (1979) which are not in the key are synonyms of others. Some of the new species which are found in or near New Mexico are included in the key.

- Workers monomorphic; or if dimorphic, eye of minor with total of fewer than 15 ommatidia (Fig. 270); second and third funicular segments at least as broad as long (Fig. 270) ..... 5

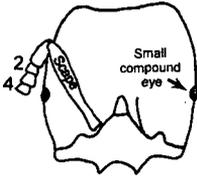


Fig. 270. Head and scape with first 4 funicular segments of a worker of *S. krockowi*.

2(1). Workers with two lateral teeth on anterior border of clypeus, with at least 1 tooth between them (Fig. 268); mesopleuron striate (Fig. 271); subpeduncular tooth small or absent (Fig. 271) .... *invicta* Buren

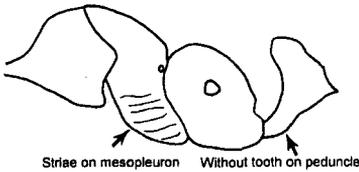


Fig. 271. Mesosoma and petiole of a major worker of *S. invicta*, showing the striated mesopleuron and the lack of a developed subpeduncular process.

- Workers with either two lat-

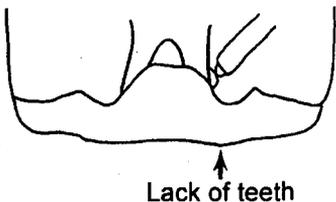


Fig. 272. Anterior border of clypeus of a major worker of *S. amblychila*.

eral teeth on anterior border of clypeus (Fig. 270), or none (Fig. 272), medial tooth absent; mesopleuron usually smooth and shining; subpeduncular tooth usually well developed ..... 3

3(2). Major worker with 2 well developed, lateral teeth on anterior border of clypeus (Fig. 270) ..... 4

- Largest major worker without lateral teeth (Fig. 272) on anterior border of clypeus (caution: smaller majors and minor workers usually have 2 lateral teeth) .....

..... *amblychila* Wheeler

4(3). Eye of major worker with about 70 - 80 ommatidia, eye of minor worker with more than 40 ommatidia; gaster often black, remainder red or yellow .. *xyloni* McCook

- Eye of major worker with about 50 - 60 ommatidia, minor with up to 35; gaster usually light brown .....

..... *aurea* Wheeler

5(1). Eyes tiny, nearly absent (Fig. 273, left); head elongate, with coarse punctures; postpetiole circular in shape as seen from above (Fig. 279) .....

..... 6

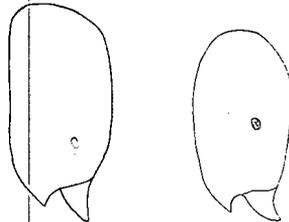


Fig. 273. Side of the head of workers of *S. subterranea*, showing the small, poorly defined eye (left) and of *S. molesta* (right) showing the moderately well developed eye. Figure courtesy of Isidra Moreno.

- Eyes small, but visible, black, with several ommatidia (Fig. 273,

right); head not greatly elongate, punctures on head may be coarse; postpetiole usually oval in shape (Fig. 280) ..... 12

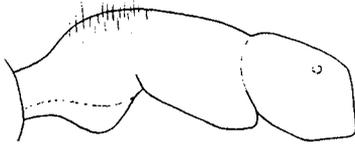


Fig. 274. Mesosoma of a worker of *S. tennesseensis*. Figure courtesy of Isidra Moreno.

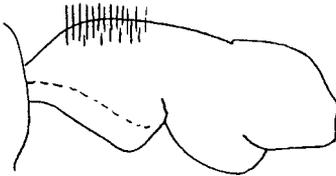


Fig. 275. Mesosoma of a worker of *S. subterranea*. Figure courtesy of Isidra Moreno.

6(5). Pronotum with more than 12 erect hairs (Fig. 274 & 275) ; not reported from New Mexico ..... 7

- Pronotum with fewer than 10 erect hairs (undescribed species) ... 9

7(6). Most hairs on pronotum about same length (Fig. 275) ..... 8

- Hairs on pronotum of various lengths (Fig. 274) .....

..... *tennesseensis* Smith

8(7). Head slender when viewed in profile (Fig. 273, left), dorsal and ventral surfaces nearly parallel, nearly straight; minor segments (antennal segments between pedicel and club, or antennal segments 3 - 8, see Fig. 277) of funiculus about 0.06 mm in total length; Texas south to northern South America .....

*subterranea* Mackay and Vinson

- Head thickened when viewed

in profile (Fig. 276), ventral surface convex, not parallel to dorsal face; minor segments of funiculus about 0.08 mm in total length; Florida and Texas ..... *tonsa* Thompson

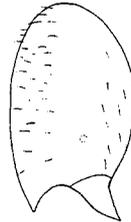


Fig. 276. Side view of the head of a worker of *S. tonsa*. Figure courtesy of Isidra Moreno.

9(6). Eyes poorly developed or absent (Fig. 276) ..... 10

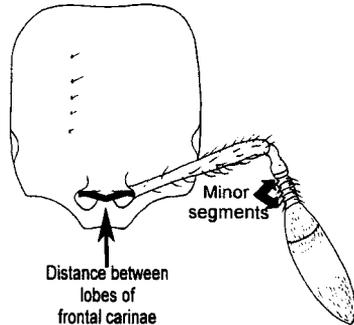


Fig. 277. Head of a worker of *S. abdita*, showing the minor segments of the funiculus. Figure courtesy of Isidra Moreno.

- Eyes obvious (Fig. 277) and consisting of at least 1 ommatidium ..... 11

10(9). Pronotum without erect hairs; head not extremely elongated; western Texas .....

new species A

- Pronotum with few erect hairs; head extremely elongate; southern New Mexico .....

..... new species B

11(9). Head thick in profile (0.18 mm dorsal to ventral surface); clypeus with 2 teeth along anterior surface (2 additional, poorly defined bumps may be present); southern New Mexico ..... new species C

- Head slender in profile (0.15 mm); clypeus with 4 teeth along anterior border; SE Arizona .....  
 ..... new species D 12(5). Minor segments (Fig. 277) of funiculus (antennal segments between pedicel and club, or antennal segments 3 - 8) longer than the greatest distance between the lobes of the frontal carinae (usually more than 0.12 mm in length) ..... 13

- Minor segments of funiculus about equal to, or shorter than greatest distance between frontal lobes (less than 0.10 mm in length, rarely up to 0.12 mm) ..... 18

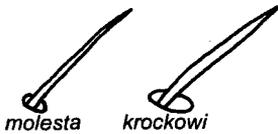


Fig. 278. Cephalic hairs and punctures on the dorsum of the heads of workers of *S. truncorum* and *S. krockowi*.

13(12). Punctures on head small, not much greater in diameter than hairs arising from them (Fig. 278, left); funicular segments 3 - 8 usually only slightly longer than 0.10 mm; common in New Mexico ..... 14

- Punctures on head coarse, larger than diameter of hairs arising from them (Fig. 278, right); funicular segments 3 - 8 usually longer than 0.12 mm; not common in New Mexico ..... 15

14(13). Yellow or pale brown .....  
 ..... *molesta* (Say)

- Medium to dark brown .....  
 ..... *validiuscula* Forel 15(13). Postpetiole nearly circular as seen from above (Fig. 279) .....  
 ..... *pergandei* Forel

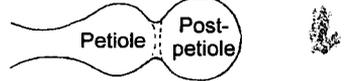


Fig. 279. Petiole and postpetiole of a worker of *S. pergandei*.

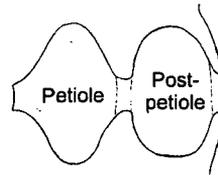


Fig. 280. Petiole and postpetiole of workers of ) and *S. pilosula*.

- Postpetiole oval-shaped (Fig. 280); occurs in New Mexico ..... 16  
 16(15). Posterior tibia with abundant erect and suberect hairs on all surfaces (Fig. 283, lower figure); eastern and central Texas .....  
 ..... *pilosula* Wheeler

- Posterior tibia with few erect and suberect hairs (Fig. 283, upper figure) ..... 17  
 17(16). Larger ant (total length over

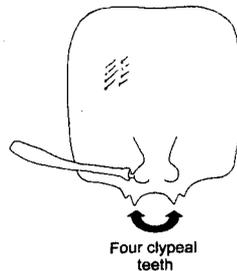


Fig. 281. Head of a worker of *S. krockowi*. Figure courtesy of Isidra Moreno.

2.25 mm); 4 well developed teeth along anterior clypeal border (Fig. 281) ..... *krockowi* Wheeler

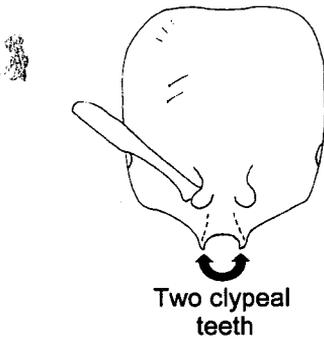


Fig. 282. Head of a worker of *S. salina*. Figure courtesy of Isidra Moreno.

- Smaller ant (TL under 2.25 mm); 2 teeth along anterior border of clypeus (Fig. 282) . *salina* Wheeler 18(12). Brown (head, mesosoma and gaster), appendages, especially legs, pale yellow; Florida ..... *nickersoni* Forel

- Usually concolorous yellow, gaster may be darker, if brown, legs not pale yellow; widely distributed ..... 19

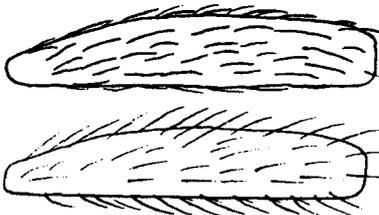


Fig. 283. Posterior tibiae of workers of *S. texana* (upper) and *S. carolinensis* (lower).

19(18). Most hairs on posterior tibia appressed (Fig. 283, upper figure);

occasionally brown; female with small eye (diameter ~ 0.18 mm) ..... 20

- Most hairs on posterior tibia suberect or erect (Fig. 283, lower figure); usually yellow; female with large eye (diameter ~ 0.25 mm); not reported from NM ..... *carolinensis* Forel

20(19). Female yellow; scape of worker relatively long (Scape index [scape length/ head length X 100] ranges from 63 - 66); worker petiole relatively narrow (petiole index [petiole width/postpetiole width X 100] ranges from 76 - 82) widely distributed from Ontario south along New England to Florida, west to central Texas ..... *texana* Forel

- Female dark brown; scape of worker relatively short (SI 58); worker petiole relatively broad (PI 88 - 89); Florida . *abdita* Thompson

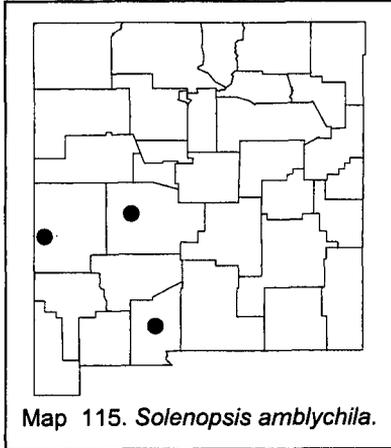
### *Solenopsis amblychila* Wheeler

Fig. 272; Map 115

**Discussion.** This species is not common in New Mexico. The largest workers are easily recognized due to the lack of teeth on the anterior border of the clypeus.

Intermediate sized and minor workers are difficult to separate from other species, especially from the common *S. xyloni*. They are usually lighter in color and the gaster is mostly light brown, whereas the gaster of *S. xyloni* is usually partially or completely black. The majors of *S. aurea* have lateral teeth on the clypeus, which separates them from

this species. The smaller workers appear to be indistinguishable from those of *S. aurea*.



Map 115. *Solenopsis amblychila*.

**Distribution.** USA: southern AZ (Cochise Co.), western TX, NM: **Catron Co.**, 21 k N Glenwood, **Socorro Co.**, 17 k S Magdalena, Trager (1991) lists the Doña Ana Mts.; MEXICO: northern States.

**Habitat.** These ants are usually found in well-watered lawns in urban habitats, or in riparian areas in arid regions, although they may be found in dry habitats. They are often found at higher elevations (1,500 - 2,500 m) than *S. aurea*.

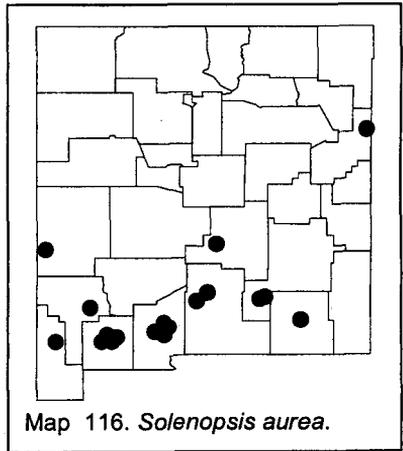
**Biology.** This species nests in the soil, often under stones or wood. Reproductives were collected in a nest in April. This species nests together with *Camponotus festinatus*.

### *Solenopsis aurea* Wheeler

Map 116

**Discussion.** This species is not as common as is *S. xyloni*, and is usually lighter in color with a light colored gaster, often with brown

patches. The eyes are smaller (about 50 ommatidia in the major, 20 in the minor), being separated from the insertion of the mandibles by about twice the maximum diameter of the eyes. The majors have lateral teeth on the clypeus, which separates this species from *S. amblychila*. The minors are impossible to separate reliably from minors of *S. amblychila*.



Map 116. *Solenopsis aurea*.

**Distribution.** USA: CA east to TX; NM: **Catron Co.**, 21 k N Glenwood, **Chaves Co.**, 14 mi. W Hope (Cole, 1953e), 20 mi. W Hope (Cole, 1953e), **Doña Ana Co.**, 6 mi N Las Cruces (Cole, 1953e), 23 mi N Las Cruces (Cole, 1953e), 31 mi N Las Cruces (Cole, 1953e), 45 k NE Las Cruces (Long Term Ecological Research site), 3 mi. E Las Cruces, **Eddy Co.**, 13 mi N Carlsbad (Cole, 1953e), **Grant Co.**, 18 mi SE Bayard (Cole, 1953e), **Hidalgo Co.**, Lordsburg, **Lincoln Co.**, Malpais Lava Beds, near Carrizozo (Cole, 1953e), **Luna Co.**, Deming, 5 mi. W Deming, 6 mi NW Deming (Cole, 1953e), 17 mi E Deming (Cole, 1953e), **Otero Co.**, Alamogordo, White

Sands National Monument (Cole, 1953e), **Quay Co.**, Glenrio; MEXICO: Chihuahua, Durango, Jalisco, Nuevo León, Zacatecas.

**Habitat.** Chihuahuan Desert in a variety of habitats (black grama grassland, creosotebush scrub, mesquite and thorn scrub), as well as in urban habitats.

**Biology.** Colonies are often found under stones (or other objects, such as pieces of wood or cow manure) in loam or coarse gravelly soils. Nests may be in the soil, surrounded by a small mound. Dealate females were collected in July and August.

Wheeler, 1908; Rojas-Fernández and Frago, 1994, 2000

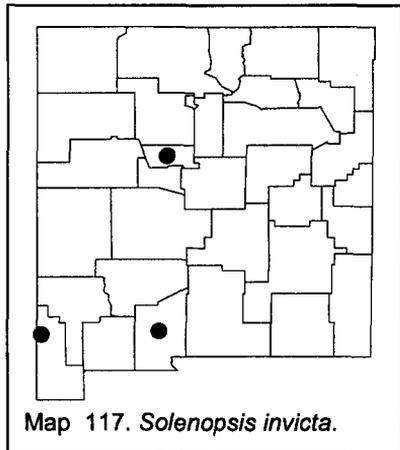
### ***Solenopsis invicta* Buren**

Figs. 268, 269, 271; Map 117

**Discussion.** This species, the introduced (from South America) red imported fire ant, is found only in watered lawns in cities at the present time, but may be able to exist in mesic habitats throughout the state. The distribution of this species is rapidly expanding, and is being found in areas where its presence was not predicted. It can nearly always be recognized by the presence of a third tooth (usually on right side of middle of clypeus) between the 2 lateral clypeal teeth (Fig. 268). Occasionally there are a total of 4 teeth along the anterior border of the clypeus. This character allows the recognition of workers of all sizes, as well as the females, as the workers and females of all of the other species in the state have a maximum of 2 teeth. The striate mesopleuron and

the small (or absent) subpetiolar process will serve to confirm the identification.

It is difficult to separate this species from *S. xyloni* in the field, but it is notably more aggressive, attacking in large numbers. Small, white, pustules form at the site of the sting, after about 1 day. These pustules do not form after stings of the other species of fire ants in New Mexico.



Map 117. *Solenopsis invicta*.

**Distribution.** USA: All through southeastern United States as far north as VA, west to NM; southern CA; NM: **Bernalillo Co.**, Albuquerque, **Doña Ana Co.**, Las Cruces, **Hidalgo Co.**, Steins (eradicated).

**Habitat.** Restricted to more mesic areas, when in forested areas, found only in clearings. Presently it can only be found in urban habitats in New Mexico.

**Biology.** This is probably the most aggressive ant species in the United States. It has a painful sting and easily eliminates most other ant species as well as other insects, birds

and small mammals. Although it is well established in New Mexico, it will probably never be an outstanding pest and its distribution will be limited to urban environments. It undoubtedly occurs in other areas in New Mexico. The colony at Steins was the result of the dumping of soil and the species would not be expected to establish there.

### *Solenopsis krockowi* Wheeler

Figs. 270, 278, 281; Map 118

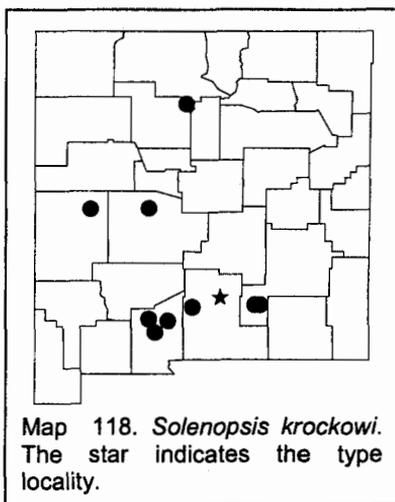
**Discussion.** This is a member of the thief ant group, and due to their small size, they are difficult to identify. The punctures on the dorsum of the head are much larger in diameter than the hairs arising from them. The postpetiole is oval in shape, wider than long (see Fig. 280).

It is difficult to separate from *S. salina*, but is slightly larger (2.25 - 2.5 mm total length).

**Distribution.** USA: TX, NM: **Catron Co.**, Datil (Cole, 1953e), **Chaves Co.**, 12 mi. W Hope (Cole, 1953e), 20 mi. W Hope (Cole, 1953e), **Doña Ana Co.**, Las Cruces, 15 mi. N Las Cruces, 45 k NE Las Cruces (Long Term Ecological Research site), **Los Alamos Co.**, Rio Grande, **Otero Co.**, Sacramento Mts. (Box Canyon, type locality), White Sands National Monument (Cole, 1953e), **Socorro Co.**, 20 mi N Bernardo.

**Habitat.** Chihuahuan Desert scrub, riparian, juniper, sagebrush, urban habitats.

**Biology.** *Solenopsis krockowi* nests under stones, or simply in the soil with no external evidence of the nest. This species is predominantly subterranean. Sexuals were found in nests in July and August. Foragers can be captured with subterranean traps in southern NM.



Map 118. *Solenopsis krockowi*. The star indicates the type locality.

### *Solenopsis molesta* (Say)

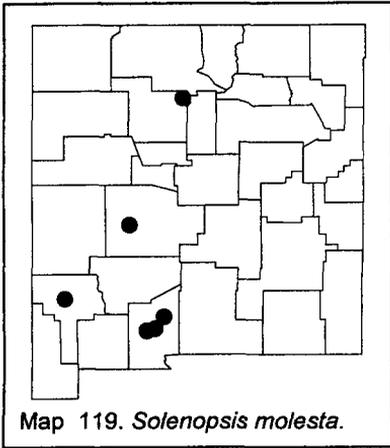
Figs. 273, 278; Map 119

**Discussion.** This is another member of the "thief ant" group. Due to their small size, they are very difficult to distinguish from other species in the group. It is usually a clear yellow ant that can be separated from the similar, brown *S. validiuscula*. The punctures on the dorsum of the head are small, only slightly larger in diameter than the hairs that arise from them (see Fig 278).

**Distribution.** CANADA: Ontario; USA: most of continental United States; NM: **Doña Ana Co.**, Las Cruces, 15 mi N Las Cruces, 45

k NE Las Cruces, Grant Co., 2 mi NW Luna, Los Alamos Co., Rio Grande, Socorro Co., Magdalena Mts. (17 k SSE Magdalena).

**Habitat.** Found in a number of habitats, including dryer sites, riparian; pinyon-juniper; pinyon pine-riparian; ponderosa pine, oak woodlands, meadows, sagebrush; disturbed areas.



**Biology.** This is a common, widely distributed species. Nests are found in the soil (often under stones) and often adjacent to the nests of other species, where it steals food or brood from its host. Reproductives and brood are present throughout the summer. This is also a household pest, although it may not be noticed due to its small size. It hollows out seeds, thus destroying seed in beds. Colonies contain up to a few thousand workers. Sexu- als are found in nests from July to October. Nuptial flights occur from late July to early fall, individuals mate in the air. These ants are predaceous, but are also omnivorous (feeding on seeds) and eat dead insects. They also tend Homoptera. It has been collected in

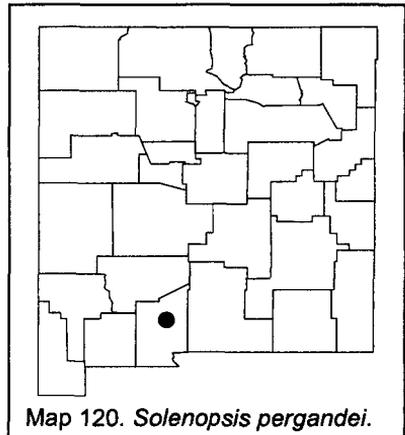
the nests of *Myrmica americana*, *Manica invidia*, *Pogonomyrmex occidentalis*, *Po. montanus*, *Messor lobognathus*, *Monomorium minimum*, *Pheidole bicarinata*, *Ph. pilifera*, *Dorymyrmex insanus*, *Campnotus vicinus*, *Lasius crypticus*, *L. neoniger*, *L. sitiens*, *L. umbratus*, *Acanthomyops claviger*, *A. interjectus*, *A. murphyi*, *Formica argentea*, *F. neogagates*, *F. limata*, *F. rubicunda*, *F. bradleyi*, *F. altipetens*, and *F. fusca*.

Mallis, 1941; Grundmann and Peterson, 1953; Ayre, 1963a; Gregg, 1963; Wheeler and Wheeler, 1963, 1973; Smith 1965

### *Solenopsis pergandei* Forel

Fig. 279; Map 120

**Discussion.** This species is rarely collected in New Mexico. It is a small, pale yellow species, in which the scape nearly reaches the posterior lateral corner. The punctures on the dorsum of the head are especially large and coarse. The



postpetiole is nearly circular in shape. These 3 characteristics should separate this species from the others in the genus.

**Distribution.** USA: eastern United States; NM: **Doña Ana Co.**, 40 k NNE Las Cruces (Long Term Ecological Research site).

**Habitat.** Chihuahuan Desert (in New Mexico).

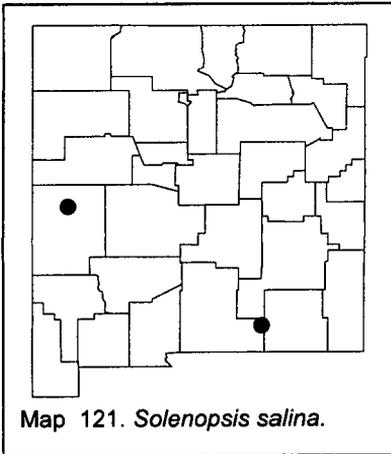
**Biology.** This species nests in soil.

Smith, 1931, 1944

### ***Solenopsis salina* Wheeler**

Fig. 282; Map 121

**Discussion.** This species is difficult to distinguish from *S. krockowi*, which the most abundant of the small species found in arid regions. It is slightly smaller than *S. krockowi* (1.8 - 2.0 mm total length), the form of the subpeduncular process is not a reliable character. This species is apparently rare in New Mexico and occurs predominately in more mesic sites than does *S. krockowi*.



**Distribution.** USA: CA east to TX; NM: **Catron Co.**, 37 k N Apache Creek, **Otero Co.**, 41.4 Km. NW Sitting Bull Falls (Bates Pk. Turnoff, N side of Rd.); MEXICO: Chihuahua.

**Habitat.** Number of habitats, but usually in more mesic sites. Gregg (1963) records this species from several communities in Colorado, but at least some of these could be *S. krockowi*.

**Biology.** This species nests under stones and logs, often near other ant species. Reproductives were found in nests in July and August.

### ***Solenopsis tennesseensis* M. Smith**

Fig. 274

**Discussion.** This species has not been collected in New Mexico, but is common in El Paso Texas. It can be recognized by the elongate head, in which the scape falls far short of reaching the posterior lateral corner. The punctures on the head are coarse, and the postpetiole is circular in shape. This species was previously known as *Solenopsis longiceps* Smith.

**Distribution.** USA: CA east to MS, north to KS, Texas (El Paso); NM: Not known from the state, but would be expected in southern New Mexico.

**Habitat.** Found in a variety of habitats, especially in urban habitats.

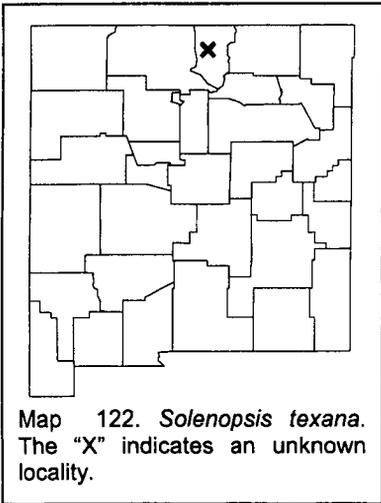
**Biology.** These ants are almost entirely subterranean, and can usually be collected only with sub-

terranean baits. Occasionally they are found in extractions of leaf litter.

### ***Solenopsis texana* Forel**

Fig. 283; Map 122

**Discussion.** Workers of this species are small, pale yellow to medium brown specimens, with the minor (smaller) segments of the funiculus being shorter than 0.10 mm in total length, less than the greatest width between the frontal lobes. The anterior clypeal teeth are usually developed only into small, blunt angles.



It is easy to confuse workers of *S. texana* with those of *S. carolinensis* (which apparently does not occur in New Mexico). The posterior tibial hairs are mostly appressed, whereas they are mostly suberect in *S. carolinensis*, although there is

considerable variability in this characteristic. This species is also difficult to separate from *S. salina*. The punctures on the dorsum of the head are tiny, barely noticeable, and the clypeal teeth are usually straight (usually poorly developed). The punctures on the dorsum of the head of *S. salina* are very obvious, moderately coarse, and the clypeal teeth are often bent inward. This species could be confused with *S. molesta*. *Solenopsis texana* are slightly smaller, with the length of the minor segments of the funiculus being less than 0.10 mm (these segments of *S. molesta* are usually about 0.12 mm), and the clypeal teeth are poorly developed (well developed in most *S. molesta*).

It is usually necessary to have a female as part of the series, in order to identify this species. The female is small, medium brown to yellowish-brown, with small eyes (0.18 mm in greatest diameter). The eyes of the females of *S. carolinensis* are much larger, occupying about half of the side of the head.

**Distribution.**: USA eastern states south to MS west to NM: Taos Co., without locality; south into Eastern Mexico.

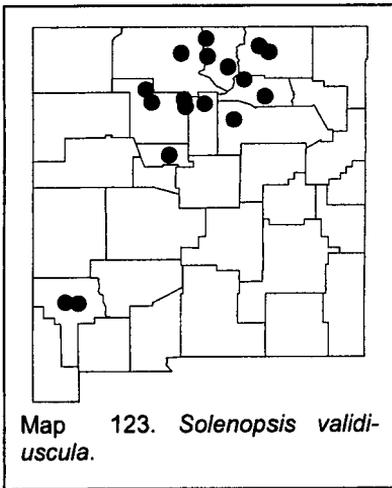
**Habitat.** Forested areas.

**Biology.** *Solenopsis texana* nests under ground, most specimens are collected in pitfall traps or in litter extractions.

***Solenopsis validiuscula***  
**Emery**

Map 123

**Discussion.** This is the only monomorphic, small, brown (caution: may be pale brown with darker brown gaster) *Solenopsis* in the state. The punctures on the head are fine, like those of *S. molesta*, but *S. molesta* are always yellow with a predominantly yellow gaster. It tends to be a little larger than most of the other species of "thief ants" (usually over 2 mm total length).



**Distribution.** USA: AZ east to FL, north to NC; NM: **Bernalillo Co.**, Albuquerque, **Colfax Co.**, 16 k E Eagle Nest, 41 k E Eagle Nest, **Grant Co.**, 77 k E Silver City, 88 k E Silver City, **Los Alamos Co.**, Los Alamos, 4 k N Los Alamos, 8 k N Los Alamos, Rio Grande, **Mora Co.**, Coyote Creek State Park, 2 k E Wagon Mound, **Rio Arriba Co.**, 7 k S Cebolla, **Sandoval Co.**, Bandelier National Monument, 4 k W Cuba, 11

k E Cuba, **San Miguel Co.**, 20 k NW Las Vegas, **Santa Fe Co.**, Santa Fe, **Taos Co.**, 14 k SE Tres Piedras, 6 k SW Tres Piedras, 20 k S Taos. Cole (1953e) reports that it is common in the northern third of the state.

**Habitat.** Most common in mesic forests (ponderosa pine, spruce), although may occur in semi arid habitats. Gregg (1963) lists a number of habitats, including mixed montane forests, aspen, ponderosa pine, pine-oak woodland, and even greasewood desert.

**Biology.** This ant nests under stones near other ant species (*Camponotus*, *Lasius*). Reproductives and brood were found in nests in August and September.

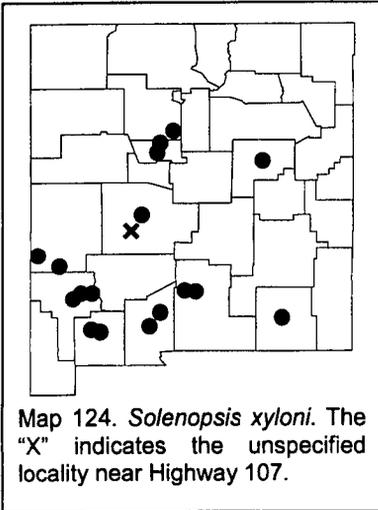
Gregg, 1963 (as *S. truncorum*)

***Solenopsis xyloni* McCook**

Figs. 15, 28; Map 124

**Discussion.** These ants are often concolorous dark in color, although they are also bicolored with a red head and mesosoma, and a black gaster. The gaster rarely has any light brown areas. This is a commonly collected and widely distributed species in New Mexico. The lighter colored ants may come from polygynous nests, the darker ants from monogynous nests, as occurs in *Solenopsis invicta* and *S. geminata*.

This species can usually be separated from the lighter *S. amblychila* and *S. aurea* on the basis of the darker color. It is difficult to separate this species from *S. invicta* in the field. They are aggressive, but notably less aggressive than *S. invicta*, attacking in lower numbers. Pustules



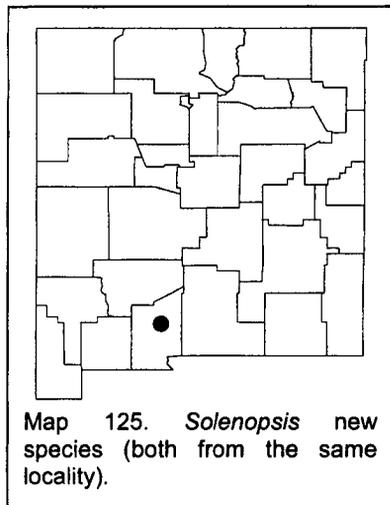
do not appear at the site of the sting, as occurs with *S. invicta*. It is necessary to carefully examine the clypeus with a microscope to separate this species from *S. invicta*. *Solenopsis geminata maniosa* Wheeler is considered to be a synonym.

**Distribution.** USA: CA east to FL north to NC; NM: **Bernalillo Co.**, Albuquerque (Fagerlund, pers. comm.), Taylor Ranch, **Catron Co.**, 21 k N Glenwood, Mogollon Mts., **Doña Ana Co.**, Las Cruces, 45 k NE Las Cruces (Long Term Ecological Research site), **Eddy Co.**, Carlsbad Caverns, 13 mi N Carlsbad (Cole, 1953e, listed as *S. geminata*), **Grant Co.**, Leopold Vista, 60 k E Silver City, Whitewater, **Guadalupe Co.**, Perch Lake (1.5 mi SE Santa Rosa), **Luna Co.**, Deming, 18 k NW Deming, **Otero Co.**, Lake Lucero, White Sands National Monument, **Sandoval Co.**, Placitas (Fagerlund, pers. comm.), **Socorro Co.**, 8 mi. from Highway 107, Highway 1 near I-10 [near Socorro]; MEXICO: Chihuahua, Sinaloa, Coahuila, Nuevo León.

**Habitat.** Chihuahuan Desert, from grasslands and cottonwood forests.

**Biology.** This species nests in open areas in soil or under stones, it may build unsightly nests of loose soil on lawns. Reproductives are found in the nest throughout the year, nuptial flights occur from May through September. Flights occur in the afternoon and are usually announced by large numbers of very aggressive ants milling around the nest entrance. These ants are aggressive with a painful sting, although not nearly as aggressive as the introduced red fire ant, *S. invicta*. The derive the name "native fire ant" from their sting. It causes considerable damage to seed banks, kills newly hatched birds, girdles agricultural plants, attacks agricultural products, attacks electrical equipment, and is a serious, stinging kitchen pest.

Gregg, 1963; Wheeler and Wheeler, 1973



**Solenopsis new species**

Map 125

**Discussion.** There are at least

two undescribed species of thief ants in New Mexico, both collected in **Doña Ana Co., Las Cruces, 45 k NE Las Cruces** (Long Term Ecological Research site).

**Genus Stenamamma**

(Key: Smith, 1957, Snelling, 1973)

This genus is rarely collected in the southwest, and nests under stones or logs. Little is known of the genus (Cole, 1952b), but it is usually considered to be carnivorous.

These ants are difficult to separate from the other genera. Important morphological characteristics would include: a 12-segmented antenna, which does not reach the posterior lateral corner of head; the eyes are usually small or vestigial; the clypeus has a pair of longitudinal carinae; the promesonotum is somewhat convex, and without distinct suture between the two (pronotum and mesonotum); the metanotal region is constricted and lower than the promesonotum.

This genus may be confused with *Aphaenogaster*, but the mesosoma is more robust (compare Figs. 123 & 285), the eyes are smaller and the scapes extend past the posterior lateral corner in *Aphaenogaster*. It is more likely to be confused with *Leptothorax*, from which it can be distinguished by the 12-segmented antenna (11 segments in some of the *Leptothorax* spp.), and by the relatively smaller eye (larger eye in most *Leptothorax* species).

The species are difficult to identify, see Smith (1957) and Snel-

ling (1973) for keys. The following key is greatly simplified, but will hopefully allow the identification of the species that will occur in New Mexico.

**Key to the workers of *Stenamamma***

- 1. Lower mesopleuron predominantly rugose (Fig. 284) .....  
 ..... ***diecki* Emery**

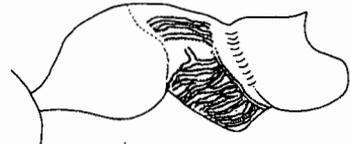


Fig. 284. Mesosoma of a worker of *S. diecki*, showing the rugose lower mesopleuron. The sculpture is shown only on the middle of the mesosoma.

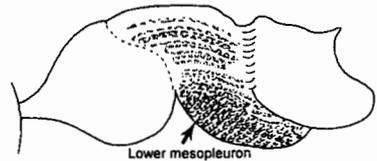


Fig. 285. Mesosoma of a worker of *S. chiricahua*, showing the predominantly punctate lower mesopleuron. The sculpture is shown only on the middle of the mesosoma.

- Lower mesopleuron predominantly punctate (Fig. 285) ... **2 2(1)**. Anterior border of clypeus notched or indented (Fig. 286, caution: difficult to see if mandibles are closed); mesopleuron punctate or rugulose; pronotal sides either conspicuously punctate or rugulose or both; first gastral tergite conspicuously striate at base (Fig. 287) or not; larger species (total length 2.5 - 4 mm) ..... **snellingi** Bolton

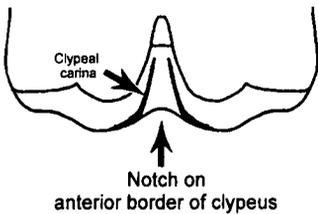


Fig. 286. Anterior border of the clypeus of a worker of *S. snellingi* showing the indented or notched clypeus.

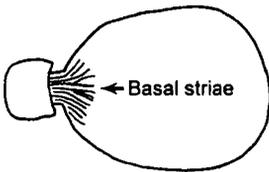


Fig. 287. Postpetiole and first gastral tergum of a worker of *S. snellingi*, showing the basal striae.

- Anterior border of clypeus without notch, possibly concave (Fig. 288); mesopleuron densely punctate and sides of pronotum smooth and with reduced sculpture on lower half at least; smaller species (usually less than 2.6 mm total length) ..... **3 3(2)**. Clypeal carinae absent or

poorly developed (Fig. 288); first tergite without basal striae .....  
 ..... **huachucanum** Smith

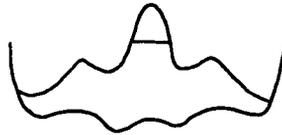


Fig. 288. Clypeus of a worker of *S. huachucanum*.

- Clypeal carinae well developed (Fig. 286); first tergite with basal striae (see Fig. 287) .....  
 ..... **chiricahua** Snelling

***Stenamma chiricahua*  
 Snelling**

Fig. 285

**Discussion.** Workers of this species have well developed carinae on the clypeus, but the region between the carinae on the anterior border of the clypeus is at most only weakly concave, thus separating it from *S. snellingi*, in which the clypeal carinae are similar. The predominantly punctate lower mesopleuron will separate it from *S. diecki*, in which the clypeal carinae are similar. Finely, it is easily separated from *S. huachucanum*, in which the clypeal carinae are poorly developed.

**Distribution.** USA: Southern AZ (Chiricahua Mts.), may occur in southwestern NM.

**Habitat.** Riparian, found in a shaded creek bed, also found in pine-Douglas fir-oak forest in shady areas.

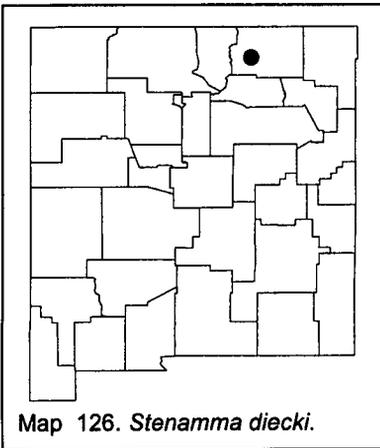
**Biology.** This species nests in the soil under stones.

### *Stenamamma diecki* Emery

Fig. 284; Map 126

**Discussion.** The predominantly rugose lower mesopleuron will separate this species from all of the others in New Mexico. Snelling (1973) lists several differences between this species and the closely related *S. snellingi* (listed as *S. occidentale*). Most of the mesosoma is covered with rugae, with the intrarugal spaces mostly smooth and shining. The propodeal spines are poorly developed.

**Distribution.** USA: This is the most widely distributed species of the genus in the United States, known to occur in all western states except AZ (Snelling, 1973b), south into Mexico (Baja California); NM: Colfax Co., near Eagle Nest.



Map 126. *Stenamamma diecki*.

**Habitat.** This species is highly adaptable to various ecological habitats ranging from open areas to dense forests or swamps to semi-

arid habitats. It is found from low to moderate elevations up to about 2500 meters.

**Biology.** This species nests in the soil and in rotting wood, usually under stones or other objects, and nests have a depth of about 30 cms, with few chambers. Nests are apparently monogynous with fewer than 200 workers. Sexuials are found in nests from midsummer to early fall, with flights occurring in from spring to fall. Sexuials may overwinter in the nests. Workers are timid and feign death when the nest is disturbed. They eat collembolans, thysanurans and fly larvae.

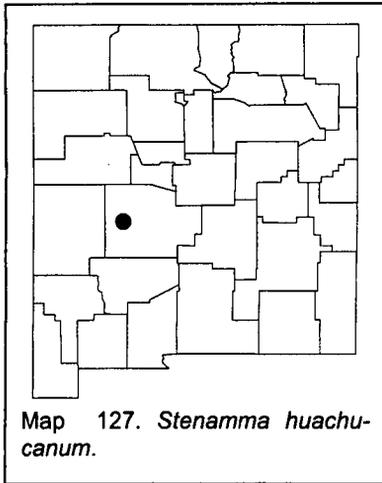
Smith, 1957

### *Stenamamma huachucanum* M. Smith

Fig. 288; Map 127

**Discussion.** This species is easily separated from all of the other species in New Mexico by the poorly developed clypeal carinae. Much of the mesosoma is punctate, the remainder mostly covered with poorly developed to moderately developed rugae. Part of the side of the pronotum is smooth and shiny (usually the lower  $\frac{1}{3}$ ).

**Distribution.** USA: AZ (Huachuca Mts. [head of Carr Canyon, summit of Montezuma Pass] and Santa Catalina Mts., Springer-ville, Chiricahua Mts.), CO, Blue Creek Canyon (Gunnison Co.); NM: Socorro Co., Grassy Lookout (33°47'13.3"N 107°28'18.6") (first record from NM).



**Habitat.** Mixed canyon forest, open grassy areas in pine forests, 1200 - 3000 meters in elevation.

**Biology.** This species nests under stones in harsh, stony soil. Nests contain fewer than 200 workers.

Gregg, 1963

### ***Stenammina snellingi* Bolton**

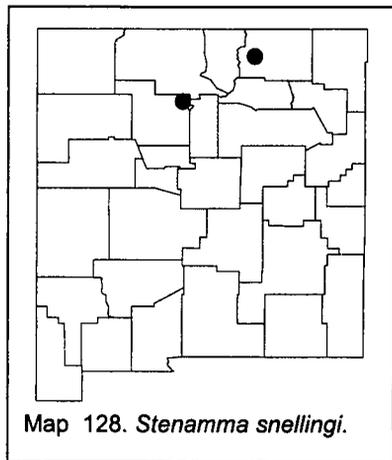
Figs. 286, 287; Map 128

**Discussion.** This species is slightly larger than the other 3 species that occur in New Mexico. The indentation between the clypeal carinae along the anterior border of the clypeus easily separates this species from the others. If the mandibles are closed, the indentation is difficult or impossible to see. It will be necessary to find a worker with the man-

dibles partially open, or pry the mandibles open to check the identification. This species was previously referred to as *S. occidentale*.

**Distribution.** USA: Western North America; NM: Colfax Co., 16 k E Eagle Nest, Los Alamos Co., Mortandad Canyon.

**Habitat.** Ponderosa pine-riparian, oak woodland, birch forest at altitudes ranging from 200 - 2700 meters.



**Biology.** This species nests in soil under stones. We could find only 37 workers in one nest, and apparently captured the majority of the inhabitants. They are slow and docile. Sexuials are found in the nests in August to October and flights occur in September. Reproductives probably overwinter in nests.

Smith, 1957; Gregg, 1963

## Genus *Strumigenys*

(Key: Bolton, 2000)

Ants of this genus are easily recognized due to the elongate mandibles each with three apical teeth. The antennae have 6 segments with a very long apical segment (Fig. 289). The propodeum has a pair of spines with a lamella beneath each. The postpetiole has spongiform (resembling a sponge) processes on the ventral and posterior borders.

These ants are superficially similar to *Odontomachus* as the mandibles of both are elongate with teeth at the apex, but can be easily distinguished by the presence of a postpetiole (they are in different subfamilies) and the antenna of *Strumigenys* has only 6 segments.

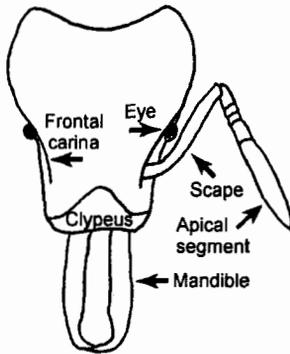


Fig. 289. Head of a worker of *S. louisianae*.

This is a large genus of ants that are very difficult to identify. They are also a special treat for myrmecologist as they are very un-

usual in habitus (general form of the ant), especially with the greatly elongate mandibles and the strangely shaped hairs (greatly thickened).

### *Strumigenys louisianae* Roger

Figs. 26, 289

**Discussion.** This species could not be confused with most other genera, simply because of the elongate form of the mandibles (Fig. 289). These mandibles are superficially similar to the mandibles of *Odontomachus clarus*, which is in another subfamily (Ponerinae). The 2 genera are easily separated, as *Strumigenys* has a well-defined postpetiole, *Odontomachus* does not. Additionally, the head of *Strumigenys* has several hairs, with the ends greatly thickened, *Odontomachus* does not have these specialized hairs.

**Distribution.** USA: Eastern United States south to ARGENTINA, AZ; NM: This species has not been reported from New Mexico, but may occur within the state.

**Habitat.** Mesic sites, such as tropical forests.

**Biology.** The small colonies are found under stones. These ants are specialized to feed on collembolans.

Creighton, 1937; Dennis, 1938; Wilson 1950; Kempf 1958

## Genus *Tetramorium*

(Key: Bolton, 1979)

Most New Mexican species of this genus have an 11-segmented antennae and the head is marked by a distinct carina, which is parallel to the scape. The posterior border of the clypeus forms a distinct ridge or welt in front of the insertions of the antennal scape. This character is difficult to describe, but once it is noted, it will serve to easily distinguish this genus from all others (except *Myrmica rugiventris*). The propodeum has well-developed spines. The petiole has a short peduncle and a high node (Fig. 290).

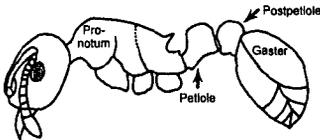


Fig. 290. Side view of a worker of *T. spinosum*.

This is a rarely collected genus, which is usually found in hot, dry habitats in New Mexico, especially foothills and areas of rough terrain. Nests are found in the soil or under stones. They are probably predeceous.

### Key to the workers of

#### *Tetramorium*

(See Bolton, 1979)

- 1. Antenna with 12 segments (Fig. 291, left); found only in cities (presently only Albuquerque) ..... *caespitum* (Linnaeus)
- Antenna with 11 segments

(Fig. 291, right); desert and urban habitats ..... 2

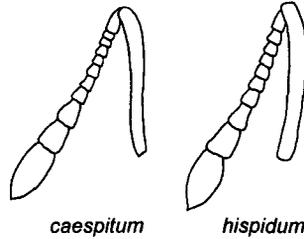


Fig. 291. Antennae of workers of *T. caespitum* and *T. hispidum*.

- 2(1). Erect hairs on pronotal dorsum and upper frontal carina short and straight, usually stubble like, shorter than maximum diameter of eye (Fig. 292); eyes relatively large (Fig. 292), maximum diameter at least 0.26 X head width ..... *hispidum* (Wheeler)

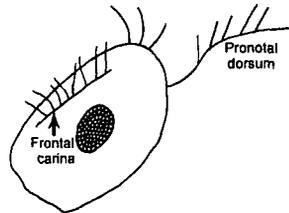


Fig. 292. Side of the head and pronotum of a worker of *T. hispidum*.

- Erect hairs on pronotal dorsum and upper frontal carina long (Fig. 293), fine, often curved, many longer than maximum diameter of eye; eye relatively small (Fig. 293), maximum diameter at most 0.25 X HW ..... *spinosum* (Pergande)

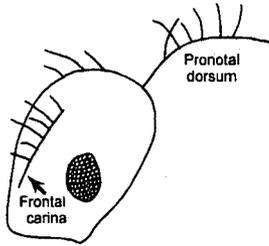


Fig. 293. Head and pronotum of a worker of *T. spinosum*.

### *Tetramorium caespitum* (Linnaeus)

Fig. 291; Map 129

**Discussion.** This species is easily separated from the other 2 species that may occur in New Mexico by the 12-segmented antenna. Additionally, the propodeal spines are poorly developed and the mesopleuron is covered with punctures. The spines are well developed in the other 2 species and the mesopleura are covered with rugae. This species would probably only be found in mesic sites within cities, whereas the other species occur primarily in arid habitats.

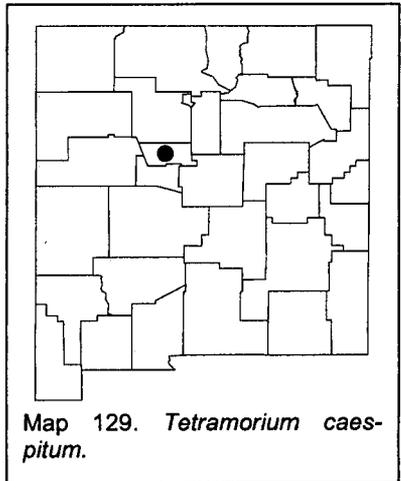
**Distribution.** USA: Throughout much of United States, Europe, sporadic records from Mexico, Belize and Chile; NM: Bernalillo Co., Albuquerque.

**Habitat.** In New Mexico, this species would probably only be found in houses and other well-protected sites.

**Biology.** This is a common house-infesting ant throughout much of the United States. It is especially abundant along the Atlantic coast, but occurs sporadically in other ar-

eas. They attack a number of food-stuffs and are an intermediate host of tapeworms (poultry). Nests are found under stones or logs in mesic habitats. This species is found throughout the world and was probably introduced into the New World.

Mallis, 1941; Brown, 1957a, 1964; Lange, 1961; Smith, 1965; Weber 1965; Brian et al., 1967; Bruder and Gupta, 1972a, 1972b; Gurney, 1975



Map 129. *Tetramorium caespitum*.

### *Tetramorium hispidum* (Wheeler)

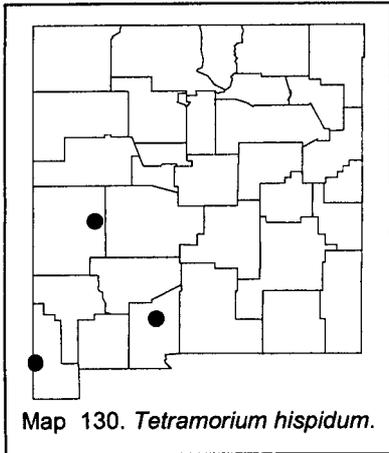
Figs. 291, 292; Map 130

**Discussion.** This species is difficult to separate from *T. spinosum*. The larger eye and the shorter, stubble-like hairs on the frontal carina and pronotum, appear to reliably separate this species from *T. spinosum*. It is easily separated from *T. caespitum* (see *T. caespitum* discussion).

**Distribution.** USA: Southern Arizona, western Texas; NM: Doña

Ana Co., 45 k NE Las Cruces (Long Term Ecological Research site), Hidalgo Co., Rodeo, Socorro Co., 49 k SE Datil (first records from NM).

**Habitat.** Desert scrub (fluff



Map 130. *Tetramorium hispidum*.

grass communities, creosotebush scrub).

**Biology.** This ant nests in soil with small mounds surrounding the nest entrance.

### *Tetramorium spinosum* (Pergande)

Figs. 37, 290, 293

## Genus *Trachymyrmex*

(Key: Creighton, 1950)

This is a large genus of primarily South American ants, which are nearly impossible to identify due to the lack of keys. Dr. Brandão of Brasil is working on a revision at the present time. Fortunately only a few species occur in North America, which can be identified using Creighton (1950). Our species are in

**Discussion.** This species is not commonly collected, but is more common than *T. hispidus* in some places. It is difficult to separate from *T. hispidum*. The smaller eye and the longer, curved hairs on the frontal carina and pronotum, appear to reliably separate this species from *T. hispidum*. It is easily separated from *T. caespitum* (see *T. caespitum* discussion). There is considerable variation in the amount of sculpturing on the dorsum of the gaster and the length of the propodeal spines, as well as in other characters (Bolton, 1979).

**Distribution.** USA: southern AZ, TX; NM: We have no records; MEXICO: Throughout the northern half of the country.

**Habitat.** Creosotebush scrub, arroyos, arid grassy sites.

**Biology.** This species nests in the soil, with the entrance surrounded by a small mound, or under stones. It feeds on seeds and dead insects.

Rojas-Fernández and Frago, 1994, 2000

need of revision, due to possibly undescribed species and a few questionable subspecies.

It can be distinguished from all other genera in New Mexico due to the numerous spines on the head and mesosoma, and by the tubercles on the gaster. The antenna consists of 11 segments without a well-

defined club, and with the antennal insertion covered by a lobe of the frontal carina. The frontal carinae extend to the posterior border of the head (Fig. 34). A carina near the inner border of the eye extends either posteriorly or posteromesially. The petiole, postpetiole and gaster are covered with tubercles, each with a short, stout curved hair. The body is often covered with a substance, which gives the ant a gray color.

It can be distinguished from *Acromyrmex* as it is not polymorphic. Characteristics in the introduction of *Cyphomyrmex* will distinguish the latter genus from *Trachymyrmex*.

**Key to the workers of  
*Trachymyrmex***

1. Posterior corners of head each with cluster of rather slender tubercles with blunt tips and all about same length (Fig. 294); largest may be bidentate, but not much larger than others; ferruginous red, sometimes with grayish cast .....  
..... *arizonensis* (Wheeler)

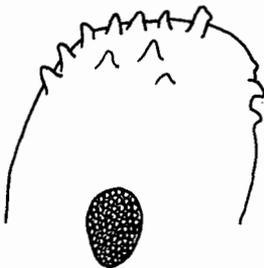


Fig. 294. Posterior corner of the head of a worker of *T. arizonensis*.

- Posterior corners of head each with 1 prominent, usually bi-

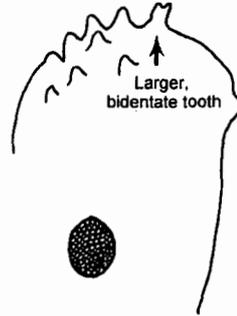


Fig. 295. Posterior corner of the head of a worker of *T. smithi neomexicanus*.

dentate tubercle, and several shorter and smaller tubercles which are not bidentate, differences in size of smaller tubercles with larger tubercle notable (Fig. 295); black with grayish cast .....  
..... *smithi neomexicanus* Cole

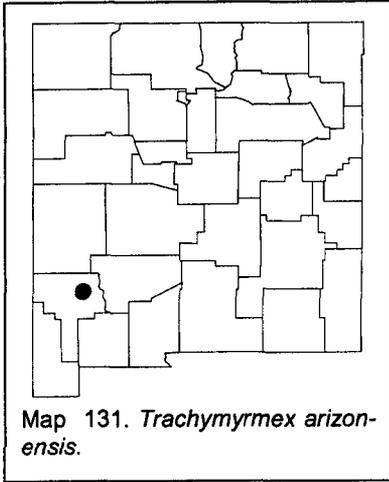
***Trachymyrmex  
arizonensis* (Wheeler)**

Fig. 294; Map 131

**Discussion.** This species is difficult to separate from *T. smithi*, but the ferruginous red color will nearly always separate it from the black *T. smithi*. The tubercles on the posterior corners of the head are nearly all the same size, whereas there is 1 larger tubercle on the head of *T. smithi*.

**Distribution.** USA: AZ: Huachucana Mountains, Chiricahua Mts.; NM: Grant Co., 60 k E Silver City; MEXICO: Chihuahua.

**Habitat.** Rocky desert canyons, pinyon-juniper, grasslands.



**Biology.** These ants nest under stones in sites with rocky loam. A dealate female was found under a stone in late July. A colony was nesting together with *Camponotus ocreatus*.

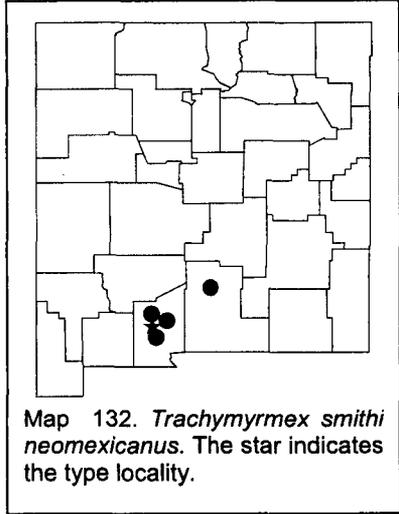
Essig, 1926; Weber, 1972

***Trachymyrmex smithi*  
*neomexicanus* Cole**

Figs. 32, 34, 295; Map 132

**Discussion.** The taxon from New Mexico is usually referred to as *T. smithi neomexicanus* Cole, and differs from the nominate species (*Trachymyrmex smithi smithi*) as it is covered with dusty, gray wax. This phenomenon commonly occurs in species of the genera *Trachymyrmex* and *Acromyrmex* and should be considered of little taxonomic importance. Cole (1952c) lists other char-

acteristics to separate the two subspecies.



**Distribution.** USA: AZ, TX; NM: Doña Ana Co., 45 k NE Las Cruces (Long Term Ecological Research site) vicinity of Las Cruces (Cole, 1953e, including 4 mi N, 6 mi N (type locality), 11 mi N, 23 mi N), Otero Co., 3 mi E Tularosa (Cole, 1953e); MEXICO: Chihuahua.

**Habitat.** Creosotebush scrub, especially in temporarily riparian habitats such as edges of desert playas and bottoms of arroyos. It is often found in sandy soils.

**Biology.** This species cultivates fungi in their nests, using mesquite (*Prosopis glandulosa*) leaves as a substrate.

Cole, 1952c

## Genus *Tranopelta*

(key available at <http://www.utep.edu/leb/antgenera.htm>)

### *Tranopelta* sp.

Figs. 27, 29, 296, 297, 298, 299;  
Map 133

This taxon is represented by an undescribed species (or possibly even an undescribed genus?), which occurs in southern California, southeastern Arizona and southern New Mexico as far north as the center of the state. They are undoubtedly widely distributed across the southwestern United States and into northern México. The worker is a small, pale colored ant (Fig 296),

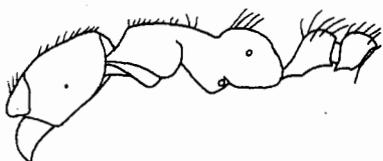


Fig. 296. Side view of the head, mesosoma, petiole and postpetiole of a worker of *Tranopelta* sp.

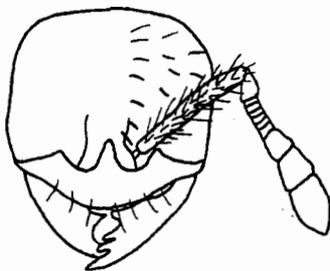


Fig. 297. Head, of a worker of *Tranopelta* sp.

which is superficially similar to

those of the thief ants in the genus *Solenopsis*, except that that the antenna has 11 segments (nearly impossible to count the tiny segments), with a 3-segmented club (Fig. 297). The eyes are tiny (nearly impossible to see, at least in frontal view of the head), and most of the erect hairs are very short (0.01 - 0.02 mm). These characters will separate this genus from *Solenopsis*. They can be separated from the similar sized *Monomorium* by the pale yellow color (*Monomorium* in New Mexico are usually black) and by the 11-segmented antenna (*Monomorium* has a 12-segmented antenna with a 3-segmented club). The mandible has 4 teeth, the apical most 3 teeth are similar in size and position, the basal most tooth (closest to head) is offset from the rest and directed medially, not partially anteriorly as are the remainder of the teeth (Fig. 297). The node of the petiole is thick in profile, not slender as in most of the species of *Solenopsis*.

The females are large and medium brown in color. The basal most tooth of the mandible (Fig. 298) is not offset to the same degree as it is in the worker. Rarely there is a fifth tooth near the basal margin of the mandible. The head (excluding the mandibles) is wider than long; the antenna is 11-segmented with a 3-segmented club (Fig. 298). The club would separate it from members of *Solenopsis* (with a 2-segmented club); the 11-segmented antenna would separate it from females of *Monomorium* (with a 12-segmented

antenna). The eyes and ocelli are well developed (Fig. 298).

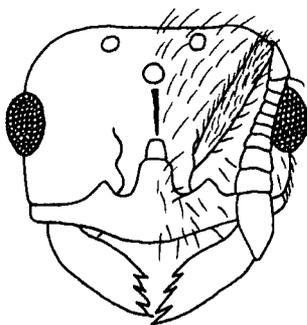


Fig. 298. Head of a female of *Tranopelta* sp.

The males are small, dark specimens, superficially appearing to be those of thief ants. The 11-segmented antenna (Fig. 299) with a 3-segmented club (not as well defined as in the worker), easily separate these males from those of *Solenopsis* (12-segmented antenna without a club) or *Monomorium* (13-segmented antenna without a club).

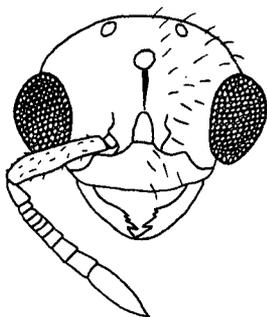


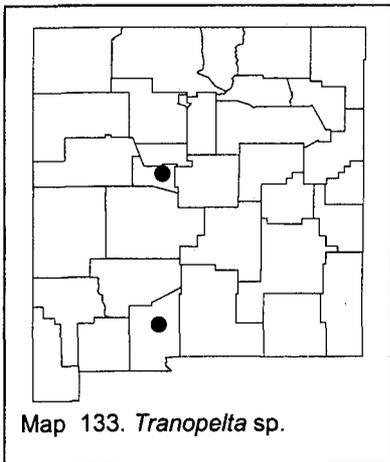
Fig. 299. Head of a male of *Tranopelta* sp.

The first segment of the funiculus is

elongate, not circular as in males of *Solenopsis*.

The generic placement of these specimens presents numerous difficulties. They are not members of the South African genus *Diplomorium* (to which they would key with difficulty in Bolton, 1987), as workers differ in several important characters: the eyes are tiny, the 3-segmented antennal club is well differentiated from the remainder of the funiculus, the metanotal suture is deeply impressed, and laterally compressed as seen from above, the petiole is bulbous in profile (not nodiform as in *Diplomorium*), the postpetiolar node is smaller than the petiolar node, and the postpetiole is not broadly attached to the gaster. They are likewise apparently not closely related to *Anillomyrma* (but see Hölldobler and Wilson, 1990:65). They are not similar to any other genus, except *Tranopelta*, and by a process of elimination are provisionally placed here. Workers share many characteristics with *Tranopelta*: they lack a medial seta on the anterior border of the clypeus, but have 2 well defined lateral setae, in addition to a few other setae, the clypeus is convex without a lateral carinae, and the 3-segmented antennal club is well defined. The petiole is not nodiform (in form of knot) as in *Tranopelta*, and the attachment of the postpetiole to the gaster is more constricted. The eyes are smaller than in other species of *Tranopelta* (which normally have 6 - 18 ommatidia), but one (apparently undescribed) species from Panamá has tiny eyes with about 3 ommatidia.

The females are similar to those of *Tranopelta*, in that the head is wide, and the scapes are short. The ocelli are well developed, but are smaller than in the species of *Tranopelta* (in which the diameters are greater than the distance between the ocelli). The petiole is bulbous as in the worker, not as nodiform as in *Tranopelta*. The postpetiole is broadly attached to the gaster, as in *Tranopelta*.



The male is similar to those of *Tranopelta*, with a slender, 3-

toothed mandibles, relatively short scapes, the pedicel is elongate, the ocelli are well developed (but again smaller than those of species in *Tranopelta*, in which the diameter is greater than the distance between the ocelli), the three-segmented antennal club is more developed than in *Tranopelta*, and the postpetiole is very broadly attached to the gaster.

**Distribution.** USA: CA, AZ, Cochise Co. (Chiricahua Mts.); NM: **Doña Ana Co.**, 45 k NE Las Cruces (Jornada Long Term Ecological Research Site), **Socorro Co.**, Sevilleta National Wildlife Refuge.

**Habitat.** Creosotebush scrub and mesquite dominant zones, often near desert playas or arroyos, sometimes in open desert or in forest meadows. Occasionally they are found in salt flats or in saltbush communities.

**Biology.** This species nests in the soil, alates are attracted to black lights. Sexu- als were found in a nest in August, flights occur in September and October.

## SUBFAMILY DOLICHODERINAE

Ants of this subfamily can usually be recognized in the field by a characteristic disagreeable smell, which can be easily noted when holding an individual between the thumb and forefinger. Other characteristics would include a slit shaped terminal orifice at the tip of the gaster, the stinger is absent, the pedi-

cel consists of a single segment (petiole), the antennal fossa touches the posterior border of the clypeus, the antenna has 12 segments, without a club, the body sculpture is weak, the basal border of mandible is often with denticles or teeth and the workers are monomorphic (or weakly polymorphic). Shattuck (1992) has

completed a generic revision of the subfamily.

Nests are usually located in the soil or under stones, pupae are naked (not enclosed in cocoons). These ants feed on nectar, tend Ho-

moptera and feed on dead insects. Nest populations of many species are small (few hundred workers), although some of the species have very large nests (*Liometopum*). Many of the species are major house pests.

## Genus *Dorymyrmex*

(Key: Snelling, 1995)

Ants of this genus can be easily distinguished from all other genera in New Mexico on the basis of a single character: the propodeum has a pyramid-shaped structure on its dorsum (Fig. 55). Additional characters would include long hairs on the ventral surface of the head (psammophore), the apex of mandible has a long, well developed tooth, followed by several smaller teeth, the maxillary palp has six segments, with the third segment long, about as long as the fourth, fifth and sixth combined. They also produce a strong, aromatic odor when held between the thumb and index finger.

This is a relatively small genus that is greatly in need of revision, even though several have made attempts at the species in the United States (recent attempts include Trager, 1988 [as *Conomyrma*], Johnson, 1989 [as *Conomyrma*], Snelling, 1995). Cuzzo is currently planning a revision of the South American species, and may include all of the New World species. There are probably several undescribed species (DuBois and Danoff-Burg, 1994). Species in this genus were previously referred to as *Conomyrma* in the United States. Species are very difficult to distinguish. It seems that

color works about as well as anything else, interested readers may refer to Creighton (1950) or Johnson (1989) for other characters that may be useful. These ants are very abundant in many areas, especially the desert southwest.

### Key to workers of *Dorymyrmex*

1. Color reddish-brown or yellowish brown with a strongly contrasting black gaster; eye relatively large, greatest diameter equal to or less than distance between anterior edge of eye and insertion of mandible (Fig. 300); posterior margin usually concave (Fig. 300) .....  
..... *bicolor* Wheeler



Fig. 300. Head of a worker of *Dorymyrmex bicolor*.

- Essentially concolorous dark brown to pale brown or yellow; gaster may be slightly darker; if bicolored, then eye relatively larger, greatest diameter equal to or more than distance to insertion of mandible (Fig. 301) and margin of vertex usually straight or even convex (Fig. 302) (caution: may be concave) ... 2  
**2(1)**. Color primarily dark brown or black ..... 3  
 - Entire ant pale brown or yellow ..... *flavus* **McCook 3(2)**. Margin of vertex distinctly concave (Fig. 301); eye relatively small, distance between eyes at least 1.7 times greatest eye diameter; rare in eastern New Mexico . *smithi* **Cole**

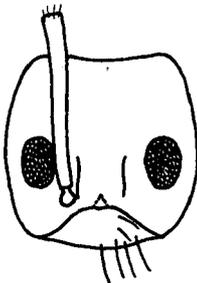


Fig. 301. Head of a worker of *Dorymyrmex smithi*.

- Margin of vertex straight, convex or only weakly concave; eye



Fig. 302. Head of a worker of *Dorymyrmex insanus*.

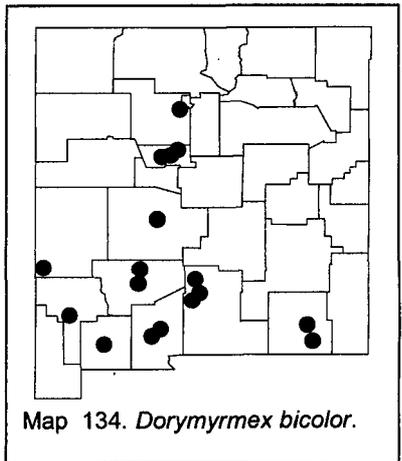
larger, distance between eyes less than 1.7 times greatest eye diameter (Fig. 302); common throughout New Mexico ..... *insanus* (**Buckley**)

***Dorymyrmex bicolor***  
**Wheeler**

Fig. 300; Map 134

**Discussion.** Many specimens can be distinguished from others of the genus by the color pattern, a red head and mesosoma, and a black gaster. Specimens that are yellowish-brown with a black gaster are difficult to identify, and it will be necessary to make measurements, which do not always reliably separate the species. Occasionally specimens are collected that cannot be separated into species.

This species is most easily confused with *C. smithi*, and can apparently be separated only on the basis of color.



Map 134. *Dorymyrmex bicolor*.

**Distribution.** USA: The southwestern United States and northern Mexico; NM: **Bernalillo**

Co., NE Albuquerque, Petroglyph Park, West Mesa, **Catron Co.**, Frisco Hot Springs, **Doña Ana Co.**, 45 k NE Las Cruces (Long Term Ecological Research site), Mesilla Park, **Eddy Co.**, 32°19.7'N 103°46.9'W, 32°22.2'N 103°47.4'W, **Grant Co.**, 14 k NW White Signal, **Luna Co.**, 18.5 k NE Deming, **Otero Co.**, 8 mi. NE Tularosa, White Sands National Monument, Lake Lucero, **Sandoval Co.**, 1 mi. S Indian Pueblo, **Sierra Co.**, Elephant Butte, Truth or Consequences, **Socorro Co.**, 28 k N Socorro, without locality; MEXICO: Chihuahua.

**Habitat.** Occurs in a variety of communities ranging from creosotebush scrub, annual zones, grama grasslands, mesquite forests up to the edges of pine forests at 1900 meters elevation.

**Biology.** This species typically nests in the soil in open areas. The entrance is surrounded by a small mound (few cms in diameter). It often nests in loose, sandy soil, in sites where few other ants occur. Brood is found in nests in March. Flights occur at night in June and sexuals are attracted to blacklight traps. A loose female was collected at the end of August. This species is primarily carnivorous, feeding on dead insects. They also tend Homoptera.

Eckert and Mallis, 1937; Mallis, 1941; Cole, 1966; Wheeler and Wheeler, 1973; Möglich and Alpert, 1979

***Dorymyrmex flavus***  
**McCook**

Map 135

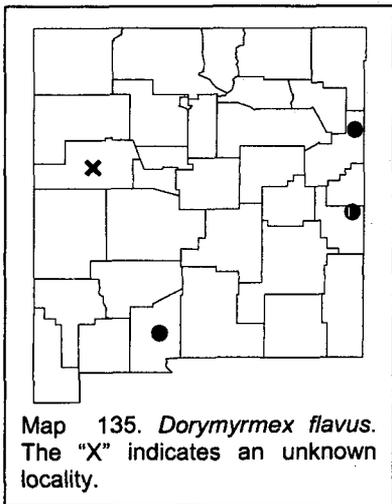
**Discussion.** This species is not common in New Mexico. It is usually a concolorous yellow species; occasionally the gaster is darker than the remainder of the ant. The head is relatively narrow (width/length > 0.88), and the eyes are large. The mesonotum is usually angulate, but in some specimens it is evenly convex.

This species is difficult to separate from *D. flavopectus* (Smith) of Florida. It differs in minor color variation, being concolorous (one color) and lighter in color than *D. flavopectus* (Johnson, 1989). Snelling (1995) also separates it by having an angulate mesonotum. Color is a notoriously poor character in ants. It will probably be necessary to synonymize *D. flavopectus* or consider the specimens with an angulate mesonotum as being *D. flavus*, and those with an evenly convex mesonotum as being *D. flavopectus*, regardless of the color of the specimen. The former suggestion is probably the most sound, as there is considerable variability in the shape of the outline of the mesosoma, even in specimens from a single nest series. If the latter occurs, *D. flavopectus* will be found to occur at least as far west as central Texas, and may occur in New Mexico.

**Distribution.** USA: Colorado south to New Mexico, east to Kansas and western Louisiana; NM: **Cibola Co.**, Benni [?], **Doña Ana Co.**, 45 k NE Las Cruces (Long Term Ecological Research site), **Quay Co.**, 6 mi. SW Nara Visa, **Roosevelt Co.**, 1 k E Oasis State Park.

**Habitat.** Although this species is not common in New Mexico,

it can be found in a number of arid sites in the southwest, such as rocky creosote bush scrub, annual plant bajadas, grama grasslands, mesquite woodlands and sandy desert sites.



**Biology.** This species nests in the soil with small (5 cm diameter) mounds. Reproductives were found in nests in June and July.

DuBois and Danoff-Burg, 1994

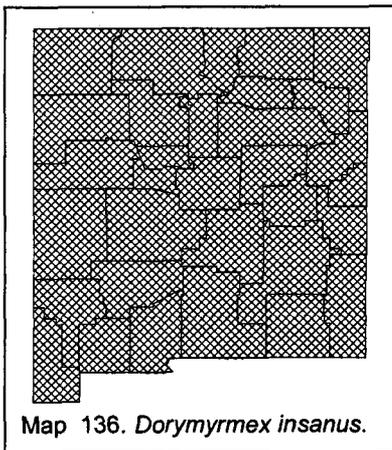
### *Dorymyrmex insanus* (Buckley)

Figs. 55, 302; Map 136

**Discussion.** These ants are usually nearly concolorous dark brown with a well-developed propodeal cone, characters which usually distinguishes the species from most of the other common species. Additionally, the eyes are very large (Fig. 302), the margin of the vertex is slightly concave, or straight, and the pronotum usually has a pair of obvi-

ous setae, one on each side (caution, both may be missing).

These characters usually distinguish this common species from



others, although other species may have 1 or more of these characters.

**Distribution.** USA: Most of southwestern North America; NM: Entire state; MEXICO: Nayarit, Sinaloa, Chihuahua, Durango, Nuevo León, Veracruz.

**Habitat.** This ant occurs in a variety of habitats, ranging from deserts (fluff grass areas, creosote scrub, mesquite woodlands, and grasslands) to pinyon-juniper and pine forests. This ant is especially common in disturbed areas, where it nests in open, sunny areas. It nests in extreme habitats where few other species can exist.

**Biology.** This ant has similar habits as *D. bicolor*. It nests in soil in open areas, with the entrance hole surrounded by a small mound (few cms in diameter). Occasionally there are multiple entrances into the same nest. Nests are often found in fine, sandy areas, but they also nest in rocky soils. Brood and

reproductives are found in the nest throughout the summer. Nest populations are apparently about 1000 workers. Workers are predaceous, but also feed on dead animals and honeydew. A nuptial flight occurred at 1600 on 27 July 1986, 66 k E Albuquerque. It is possible to obtain sexuals by pouring water into the nest. Within ½ hour, the reproductives may be found at the nest entrance. It is easily recognized in the field by its behavior. If one blows on the nest, the ants will race violently around the nest. It commonly nests in the disk of *Pogonomyrmex* spp. nests (especially *Po. Rugosus* and *Po. occidentalis*), and seems to get along reasonably well with these larger harvester ants, which ignore them for the most part. The scarabaeid beetle *Cremastocheilus stathamae* occurs in the nests.

Gregg, 1963; Wheeler and Wheeler, 1963, 1973; Smith, 1965; Cole, 1966; Rojas-Fernández and Frago, 1994, 2000

### ***Dorymyrmex smithi* Cole**

Fig. 301; Map 137

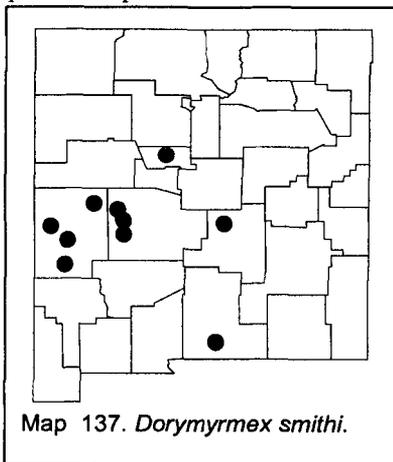
**Discussion.** This species can be recognized as being a relatively large species (over 3 mm), with a deeply impressed border of the vertex (Fig. 301). It is predominantly brown or black, although the gaster may be darker than the remainder of the body, making it appear weakly bicolored. The eyes are small.

This species is most easily confused with *D. bicolor*, and the

two species can apparently be separated only on the basis of color.

**Distribution.** USA: Eastern US, as far west as North Dakota south to New Mexico; NM: **Bernalillo Co.**, Albuquerque, **Catron Co.**, Mogollon Mts., Ox Spring Canyon, 7.6 k NNW Reserve, Snow Lake, **Lincoln Co.**, 33°57'08.45" 105°42'44.95", **Otero Co.**, north MacGregor Range, **Socorro Co.**, Magdalena Mts. (Water Cyn.), Bear Mt. (18 k NE Magdalena), 16k S Magdalena.

**Habitat.** This species is most common at higher elevations, from 1000 - 2050 meters, in communities ranging from grasslands and urban habitats to pinyon-juniper - oaks and ponderosa pine.



Map 137. *Dorymyrmex smithi*.

**Biology.** This species nests in the soil, and usually has the entrance hole surrounded by a small (3 cm diameter) mound, fine sand with stones, to rocky soils. Rarely it nests under stones. Brood and reproductives are found in nests in early August. Workers prey on *Camponotus* spp., *Pogonomyrmex imberbiculus* and *Po. huachucanus*.

## Genus *Forelius*

(Key: Cuezso, 2000)

This genus can best be recognized by characters, which are lacking in other genera in this subfamily. The petiole is relatively large (Fig. 303), which distinguishes it from *Tapinoma*, although the petiole is usually angled anteriorly and partially covered by the gaster as in *Tapinoma*. There is no cone or pyramid on the propodeum as is found in *Dorymyrmex*. The area between the mesonotum and propodeum is depressed, which distinguishes it from *Liometopum* (but not from *Linepithema*). The hairs on the clypeus are very long, extending nearly to the edge of the mandibles; these hairs are shorter in *Linepithema*. There is usually a pair of long, erect hairs on the pronotum (Fig. 303), which are lacking in *Linepithema* (USA species), but this characteristic must be used with caution, as one or both may be missing.

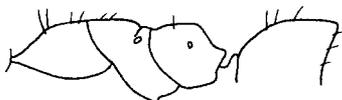


Fig. 303. Side view of the mesosoma, petiole and first gastral tergum of a worker of *F. pruinosus*.

They are the first ants to become active in the late afternoon during the summer in desert ecosystems. They collect nectar from the flowers of *Euphorbia* spp. They are very common in arid zones of New Mexico.

*Iridomyrmex pruinosum* and its subspecies were transferred to *Forelius* by Snelling and George (1979) and Shattuck (1992). We are recognizing only two forms in New Mexico, although in some series the separation into only two forms appears to be somewhat arbitrary.

### Key to the workers of *Forelius*

1. Antennal scapes and tibiae with several erect, short bristly hairs (Fig. 304); often pale orange to yellow, usually with tip of gaster darker; southwestern USA, Mexico, Jamaica ..... *mccooki* (McCook)  
- Scapes (Fig. 305) and tibia usually without short, erect, bristly hairs (a few hairs may be present); color varies from dark brown to orange on the head and mesosoma, gaster often dark brown or black; USA, México south to Colombia ..... *pruinosus* (Roger)

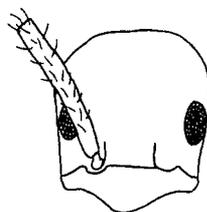


Fig. 304. Head of a worker of *F. mccooki*, showing the erect hairs on the scapes.

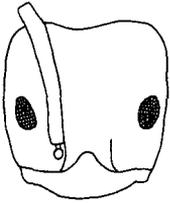


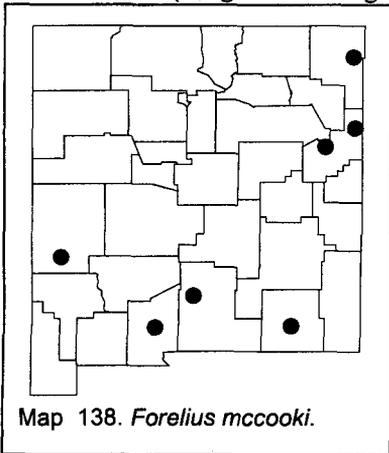
Fig. 305. Head of a worker of *F. pruinus*.

***Forelius mccooki*  
(McCook)**

Fig. 304; Map 138

**Discussion.** This species is easily recognized as it has at least a few erect hairs on the antennal scape and on the tibiae.

**Distribution.** USA: Southern United States; NM: **Catron Co.**, Mogollon Mts., **Doña Ana Co.**, 45 k NE Las Cruces (Long Term Ecologi-



Map 138. *Forelius mccooki*.

cal Research site), **Eddy Co.**, 10 mi. S Carlsbad, **Otero Co.**, White Sands National Monument, **Quay Co.**, 6 mi. SW Nara, 7 mi., S Quay, **Union Co.**, 6 mi. E Clayton; MEXICO: Sonora, Sinaloa, Guerrero,

Chihuahua, Coahuila, Durango, Nuevo León, Tamaulipas, San Luis Potosí, Guanajuato, Veracruz, and Yucatán.

**Habitat.** Most common in arid habitats, but also occurs in mesic sites ranging from grasslands to cottonwood forests.

**Biology.** This species nests in the soil, with the entrance surrounded by a small mound (few cms diameter); it also nests under stones. Nests may be found at the bases of desert plants. Reproductives were found in nests in June and July. This species has multiple queens in their nests. Workers are group foragers, which can be found in rapidly moving groups early in the hot afternoon when no other ants are active. Foragers capture living insects, feed on dead insects and collect nectar from a variety of desert plants ranging from the small, prostrate *Euphorbia* spp. to foraging in the flowers of cholla (*Opuntia* spp). They nest at the edges of *Pogonomymex rugosus* nests.

Cole, 1937a,b; Mallis, 1941; Lindquist, 1942; Wheeler and Wheeler, 1973; DuBois and Danoff-Burg, 1994; Rojas-Fernández and Fragoso, 1994

***Forelius pruinus* (Roger)**

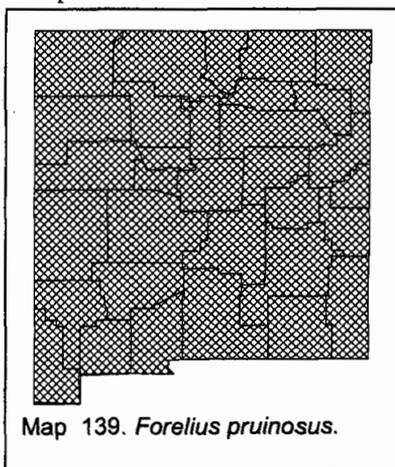
Figs. 58, 303, 305; Map 139

**Discussion.** Snelling and George (1979) transferred this ant from *Iridomyrmex* to *Forelius* based on the structure of the proventriculus. Shattuck (1992) supported this position with additional characters. The subspecies *F. analis* (André)

was recognized as a valid species by Cuezco (2000), but there are no consistent characters to separate it from *F. pruinosus*. The amount of appressed pubescence on the head and thorax, used by Creighton (1950) to separate the two subspecies, is simply too variable to be of any significance. Cuezco (2000) used the concave posterior margin of the head to separate *F. analis* from *F. pruinosus*, which is said to have a straight posterior margin. Unfortunately this character is also poor, due to the variability in the form of the head. In fact, Fig. 10 showing *F. analis* (Cuezco, 2000) has a convex posterior margin. Thus we agree with Wheeler and Wheeler (1986) and consider *F. analis* to be identical to *F. pruinosus*.

**Distribution.** USA: Most of North America south to Colombia; NM: **Bernalillo Co.**, Albuquerque, **Catron Co.**, 2 mi N Frisco Hot Springs, Glenwood, 20.6 k N Glenwood, Mogollon Mts., 8 k NNE Reserve, near Snow Lake, **Curry Co.**, near Clovis, **De Baca Co.**, 4 mi. N Taiban, **Doña Ana Co.**, Aguirre Springs, Las Cruces, 45 k NE Las Cruces (Long Term Ecological Research site), 5 k E Las Cruces, **Eddy Co.**, Carlsbad Caverns, 12 mi. N Carlsbad, **Grant Co.**, 60 k E Silver City, **Hidalgo Co.**, Guadalupe Canyon, 5.2 mi. N Hachita, **Los Alamos Co.**, Los Alamos, Rio Grande, **Mora Co.**, 12 k N Wagon Mound, 2 k E Wagon Mound, **Otero Co.**, Guadalupe Mts., 8 mi. NE Tularosa, White Sands National Monument, **Quay Co.**, Logan/Ute Lake, 7 mi. S Quay, Tucumcari, **Rio Arriba Co.**, Abiquiu Dam, 2 k N Dixon, 57 k SW Dulce, 16 k SW Española, 4 k NW

Navajo City, **San Juan Co.**, 4 k E Aztec, **Sandoval Co.**, Bandelier (Pippin and Pippin, 1984), **Santa Fe Co.**, 24 k NE Santa Fe, 34 mi. S Santa Fe, **Sierra Co.**, Truth or Consequences, **Socorro Co.**, Bear Mt., Beartrap Canyon, 17 k S Magdalena, 19 k S Magdalena, 21 k S Magdalena, **Union Co.**, 15 mi. SW Clayton, 10 mi SE Clayton, **Valencia Co.**, 22 k S Fence Lake; MEXICO: Chihuahua, Sonora, Sinaloa, Nayarit, Colima, Guerrero, Durango, Zacatecas, Coahuila, Nuevo León, San Luis Potosí, Veracruz, Morelos, Tabasco, Chiapas.



**Habitat.** Widely distributed in many habitats in New Mexico. Most common in arid habitats (desert scrub, including open weedy areas, grama grasslands, fluff grass areas, creosote scrub, mesquite woodlands), although also occurs in Juniper, sagebrush, riparian and even into pine forests.

**Biology.** This ant usually nests in the soil, in open areas, but may be found nesting under stones. The nest usually consists of a small

mound (diameter of few cms) with the entrance hole in the center. Reproductives were found in nests from May to August. Multiple queens are present in nests. The habits are very similar to those of *F. mccooki*. Food consists of living and dead insects; this species also tends Homoptera

and feeds on flower nectar. It can be a serious house pest.

Wheeler, 1905a; Smith, 1930, 1965; Warter et al., 1962; Wheeler and Wheeler, 1963, 1973; DuBois and Danoff-Burg, 1994; Rojas-Fernández and Fragoso, 1994

## Genus *Linepithema*

(Key: Creighton, 1950)

These ants can be recognized by the numerous teeth and denticles on the mandibles (10 - 20) and the scarcity of erect hairs, with usually only a significant number of hairs on the clypeus. The hairs on the clypeus are relatively short (do not extend past the outer edge of the closed mandibles) and nearly straight. The pronotum is without erect hairs (Fig. 306). The promesonotum is a continuously convex unit, the metanotal suture is depressed below the level of the unit and below the propodeum. The petiole is small and the apex is poorly developed and inclined anteriorly.



Fig. 306. Side view of the mesosoma, petiole and first gastral tergum of a worker of *L. humile*.

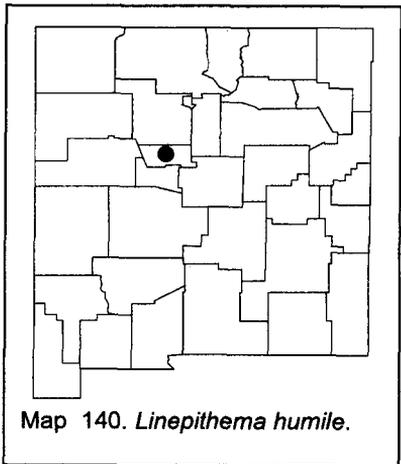
This genus could be confused with *Forelius*, but can be easily separated by the shorter hairs on the clypeus (extend to near the outer edge of the mandibles in *Forelius*), and lacking hairs on the pronotum

(*Forelius* has at least 2 erect hairs on the pronotum).

### *Linepithema humile* (Mayr)

Figs. 59, 306; Map 140

**Discussion.** The workers of this species can be recognized by the short, erect hairs on the clypeus, which fall far short of reaching the



Map 140. *Linepithema humile*.

tips of the closed mandibles (Fig. 59), and by the lack of erect hairs on the dorsum of the mesosoma (Fig.

306), including the lack of a pair of long, erect, hairs on the pronotum.

These characteristics would separate it from the similar and closely related genus *Forelius*. This species is most common in mesic and urban habitats, and is rarely found in arid regions where *Forelius* is especially common. This species was previously referred to as *Iridomyrmex humilis*.

**Distribution.** USA: Most of North America; NM: Bernalillo Co., Albuquerque (Fagerlund, pers. Comm.).

**Habitat.** This species occurs in a number of different habitats, but apparently does not occur in arid

habitats. Nests are most common in urban habitats, where they are persistent house infesting ants. This species was introduced into the United States from South America.

**Biology.** This species usually nests in the soil, often under objects (stones, logs etc). Colonies are large, often separated into various nests with multiple queens. They appear to be well established in Albuquerque, where they are commonly misidentified as *Forelius* or *Tapinoma* (Fagerlund, pers. Comm.). They are among the most difficult of ants to control when they infest a home (Fagerlund, pers. comm.).

## Genus *Liometopum*

(Key: Creighton, 1950)

Majors of this genus may be recognized by the large heads with a concave posterior border, the numerous teeth on the mandibles (including the basal border), the convex mesosoma, forming an essentially uninterrupted arch, and the gaster is covered with dense pubescence.

This genus may be confused with *Camponotus*, but differs in a number of easily seen characters. *Camponotus* is a member of the subfamily Formicinae, and has a circular orifice at the end of the gaster, it usually has only seven or fewer teeth on the mandible with no teeth on the basal border and the posterior edge of the head is rarely strongly con-

cave. They have a strong smell of the defensive secretions common in species of the subfamily Dolichoderinae, *Camponotus* have little odor, or smell like formic acid. The structure of the mesosoma should separate it from all other genera of ants.

Species of this genus are found in the Holarctic Region as far south as southern México. This genus is very common in New Mexico; nests are usually located under stones or in living trunks or dead logs. Colonies are very large, probably numbering in the thousands or tens of thousands. The ants are very aggressive, and although they do not sting, they can be very unpleasant.

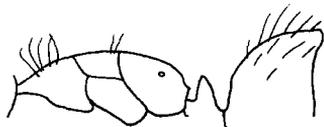


Fig. 307. Mesosoma, petiole and first gastral tergite of a worker of *L. apiculatum*. The fine pubescence which is abundant on the mesosoma is not shown.

### Key to the workers of *Liometopum*

1. Long erect hairs present on dorsum of gaster mixed with shorter erect hairs, some of the hairs nearly as long as those on the pronotum (Fig. 307); commonly collected ....

..... *apiculatum* Mayr

- Erect hairs on dorsum of gaster short (or absent) and of approximately equal length, usually shorter than erect hairs on pronotum (Fig. 308); rarely collected .....

..... *luctuosum* Wheeler

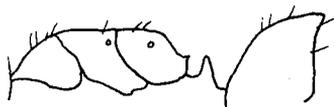


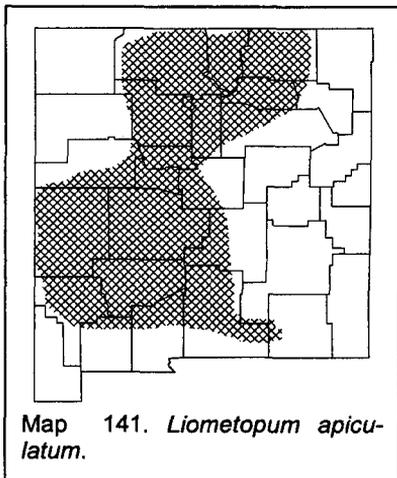
Fig. 308. Mesosoma, petiole and first gastral tergite of a worker of *L. luctuosum*.

### *Liometopum apiculatum* Mayr

Figs. 24, 57, 307; Map 141

**Discussion.** This is the most common of the two species which occur in New Mexico, especially at lower elevations. It can usually be

identified by the long hairs on the pronotum.



Map 141. *Liometopum apiculatum*.

The broadly convex mesosoma of the worker could cause this species to be confused with the genus *Camponotus*. The apex of the gaster is definitely slit-shaped, whereas that of *Camponotus* has an acidopore that has at least a few hairs.

**Distribution.** USA: AZ, CO, west TX; NM: **Bernalillo Co.**, Sandia Mts., **Catron Co.**, 4 k N Apache Creek, 13 k N Apache Creek, Catwalk, 15 k NNE Datil, 12 k W Datil, 15 k NW Datil, 1 mi. W Mogollon, Mogollon Mts., 7.5 k NW Reserve, Snow Lake, **Cibola Co.**, without locality, **Colfax Co.**, 41 k E Eagle Nest, **Doña Ana Co.**, Aguirre Springs Recreational Area, Dripping Springs, 18k E Las Cruces, 45 k NE Las Cruces (Long Term Ecological Research site), San Agustín Pass, **Eddy Co.**, Hidden Cave, 5.3 k SE Sitting Bull Falls, **Grant Co.**, Black Range, Mimbres, 5 mi. N Pinos Altos, 9 k ENE White Signal, **Lincoln Co.**, 2.5 mi. NNE Fort Stanton, Val-

ley of Fire State Park, **Los Alamos Co.**, Los Alamos, 2 k NE Los Alamos, Rio Grande, **Mora Co.**, 2 k E Wagon Mound, **Otero Co.**, Three Rivers Campground, **Rio Arriba Co.**, 37 k N Abiquiu, 4 k N Chama, 57 k SW Dulce, **Sandoval Co.**, 11 k E Cuba, Jémez Mts., **Santa Fe Co.**, Cedar Crest, Santa Fe, **Sierra Co.**, 21 k SW Hillsborough, 6 k W Kingston, **Socorro Co.**, 5 k N Camp Luna, 48 k SE Datil, Grassy Lookout, Magdalena Mts. (Water Canyon), Sevilleta, 8 mi. from Highway 107, 33°48'32.2"N 107°22'57.2"W, **Taos Co.**, Peñasco, **Valencia Co.**, 22 k S Fence Lake; MEXICO: Chihuahua, Coahuila, Guanajuato, Michoacán, Nuevo León, San Luis Potosí, Tamaulipas.

**Habitat.** Occurs sporadically in creosotebush scrub and grasslands, up to sagebrush zones and becomes much more common at higher elevations (1900m) in oak forests (most common habitat), pinyon pine, up to ponderosa pine and riparian sites.

**Biology.** This species nests under stones and in trunks of living and dead trees (especially oaks) and dead *Yucca* spp. stalks. It is polydomous with segments of nests scattered over the landscape under stones and logs. It is the dominant ant in most of the oak forests in the state and can be easily found foraging on the sides of oak trees. This species is predaceous, collects dead insects and tends Homoptera. It is extremely pugnacious and attacks without hesitation. Although it does not sting, it can be very irritating due to bites by large numbers of individuals. Sexu- als occur in nests from May to Au-

gust. Males and females were collected on the ground in June to August, foundress females were commonly collected in July and August under stones, cow manure or logs. They can be found from March to September, one was collected in December. This species nests together with *Paratrechina austroccidua*, *Lasius sitiens* (several nests), *L. pallitarsis*, *Tapinoma sessile*, *Forelius* and *Camponotus vicinus*. Inquilines appear to be especially common in the nests of this species. The small cricket, *Myrmecophila* spp., commonly occurs in the nests throughout its range. Staphylinids including *Apterionina schmitti* Wasmann and *Dinardilla liometopi* Wasmann are also found in nests.

Wheeler, 1905b, 1917;  
Gregg, 1963; Van Pelt, 1971

### ***Liometopum luctuosum* Wheeler**

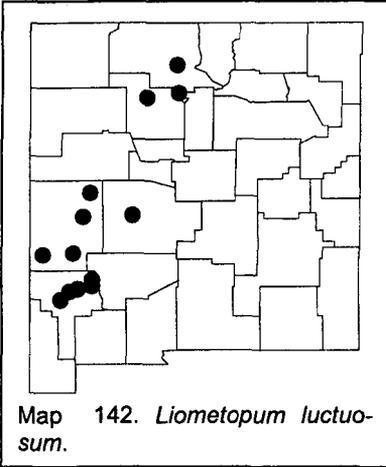
Fig. 308; Map 142

**Discussion.** This ant can be separated from *L. apiculatum* by the shorter hairs on the pronotum.

In the field the smaller workers look similar to *Tapinoma sessile*, but can be separated by the lack of an indentation at the metanotal suture (can be seen with a hand lens). It is also much more aggressive than is *Tapinoma sessile*.

This species has been considered a subspecies of *L. occidentale*, but occurs at higher elevations (usually above 2000 meters). The distributions of the two are parapatric or sympatric in a number of areas, especially the mountains of southern

California, with no apparent hybridization. Based on this evidence, Wheeler and Wheeler (1986) and



Map 142. *Liometopum luctuosum*.

Mackay et al. (1988) considered this taxon to be a valid species. This species is not common in New Mexico.

**Distribution.** USA: CA east to W TX, north to WY; NM: **Catron Co.**, Catwalk, 15 k NW Datil, Ox Spring Canyon, Snow Lake, **Grant Co.**, Gila Mts. (Iron Creek, Wright's

Cabin), 77 k E Silver City, 88 k E Silver City, 9 k NW White Signal, **Los Alamos Co.**, Los Alamos, Rio Grande, **Rio Arriba Co.**, Abiquiu Dam, **Sandoval Co.**, 26 k S Cuba, **Socorro Co.**, Magdalena Mts. (Water Canyon).

**Habitat.** Sagebrush, pinyon pine, oak forests, ponderosa pine-riparian, Douglas fir, riparian habitats at high elevations, mixed canyon forests, widely distributed in New Mexico.

**Biology.** Nests are found in living or dead tree trunks or in the soil under stones or logs. Soils are usually rocky loam, but it also occurs in sandy areas. These ants are very aggressive. Flights occurred during June and July; sexuals can be collected at blacklights or in bodies of water the day after flights. We have not found myrmecophiles in nests.

Wheeler, 1905b; Mallis, 1941; Gregg, 1963; Cole, 1966; Wheeler and Wheeler, 1973

## Genus *Tapinoma*

(Key: Creighton, 1950)

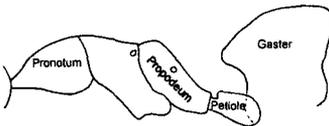


Fig. 309. Side view of the mesosoma, petiole and gaster of a worker of *Tapinoma sessile*.

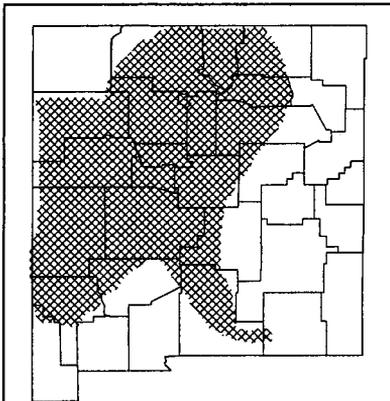
Workers of this genus can be recognized by the numerous small teeth on the mandibles, the strong metanotal constriction and rectangular shaped propodeum (Fig. 309), the petiolar node is very poorly developed and strongly inclined anteriorly, difficult to see due to the normal position of the gaster (Fig. 309).

Only one species of this genus occurs in New Mexico.

### ***Tapinoma sessile* (Say)**

Figs. 56, 309; Map 143

**Discussion.** In the field, this genus may be mistaken for *Lasius*, but can be easily distinguished by the characteristic odor. The small node of the petiole (Fig. 309) will separate it from all other genera in New Mexico. Additional characters include the suture between the mesonotum and propodeum is marked with a dark line, and the propodeum is narrowed at the dorsum (Fig. 309).



Map 143. *Tapinoma sessile*.

**Distribution.** USA: Most of North America; NM: **Catron Co.**, 30 k ENE Apache Creek, 15 k NW Datil, Mogollon Mts., Ox Spring Canyon, Sawtooth Mts., Snow Lake, **Cibola Co.**, Mt. Taylor (9000'), **Colfax Co.**, 16 k E Eagle Nest, 4 mi. W Eagle Nest, **Eddy Co.**, Hidden Cave, **Grant Co.**, Mimbres Preserve, 4 k W Mule Creek, 77 k E Silver City, **Lincoln Co.**, 2 mi. W Alto, Sacra-

mento Mts. (Bailey Canyon), **Los Alamos Co.**, Los Alamos, 4 KN, and 8 KN of Los Alamos, Rio Grande near Los Alamos, Mortandad Canyon, Camp May, **McKinley Co.**, 8 mi. S Gallup, **Mora Co.**, Coyote Creek State Park, **Otero Co.**, 9 k N Timberon, 14 k N Timberon, 9 k NE Timberon, **Rio Arriba Co.**, 7 k S Cebolla, Truchas, **Sandoval Co.**, Bandelier National Monument, 100 k E Cuba, 45 k W Cuba, Jémez Mts., 12 mi. NE Jémez, **San Miguel Co.**, 20 k NW Las Vegas, **Socorro Co.**, 43 k SE Datil, Grassy Lookout, Mt. Withington, San Mateo Mts., **Taos Co.**, 20 k S Taos, 2 k W Tres Ritos, **Torrance Co.**, 24 k S Mountainair.

**Habitat.** Areas ranging from grasslands through oak forests into high elevation pine forests, including juniper forests, sagebrush, pinyon-juniper, pine-riparian, riparian, and aspen. It is never found in completely arid zones, but occurs in most other habitats. It is often one of the most common species at higher elevations in pine forests.

**Biology.** This species nests in open soil, under stones and logs or in dead wood, in cavities of plants or in plant galls or even bird nests. The site of the nest is changed often. Nests are populous (2000 - 5000 workers) and contain multiple queens. Brood is found in nests from April until September. Reproductives are found in nests from May until October, flights occur in June and July. This species is a group forager, which tends Homoptera and feeds on dead insects or the juices of decaying fruits and vegetables. It is strongly attracted to sweet substances. It is a common house-infesting ant in the

area. Although it does not sting, it can be very annoying as it attacks in large numbers and swarms over the body of the intruder. One nest was found together with a nest of *Cam-*

*ponotus modoc*, another with *Lasius pallitarsis*.

Smith, 1928b, 1965; Weber, 1941; Kanno, 1959; Gregg, 1963; Wheeler and Wheeler, 1963; Bobb, 1965; Kulman 1965b

## SUBFAMILY FORMICINAE

Ants of this subfamily are common ants throughout the state, especially in cooler, moister habitats. They can be recognized by the circular acidopore at the end of the gaster. Many of the genera, especially *Formica*, spray a formic acid mixture at enemies through this orifice. The pedicel consists of a single segment (petiole) and there is no constriction between the first and second segments of the gaster. The eye is well developed and three ocelli are sometimes present, the antenna is 12 segmented except in the genus *Brachymyrmex*, which has a 9-segmented antenna, there is no an-

tennal club in any of the New Mexican species. These ants usually have smooth surfaces or are only weakly sculptured. Workers are usually dimorphic or polymorphic, although many genera have monomorphic species.

Pupae are usually in cocoons, but are naked in some species. Nests are in the soil, under stones, under logs or in plant cavities. Many species have very large nests, numbering in the thousands. Workers tend Homoptera, and feed on dead or living arthropods. Some of the species invade houses.

## Genus *Acanthomyops*

(Key: Wing, 1968)

This genus is similar to *Lasius*, but is distinguishable in that the maxillary palps have only 3 seg-



Fig. 310. Maxillary palp of a worker of *Acanthomyops*.

ments (Fig. 310) and cannot be easily seen (Fig. 311), as they rarely extend past the posterior border of the buccal cavity. The antennal fossa is extremely close to, or touches the posterior border of the clypeus. The eyes are small and the ants are usually golden yellow in color. They

smell similar to lemons or furniture polish (an odor which *Lasius* lacks). Otherwise they are indistinguishable from *Lasius*.

they become house pests. The females of some of the species are very peculiar, with large, flattened legs (Fig. 312). Most or all of the species

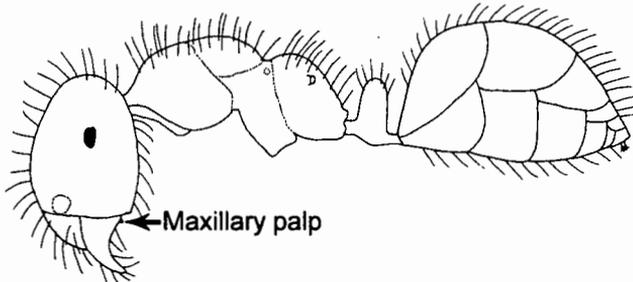


Fig. 311. Side view of a worker of *A. latipes*.

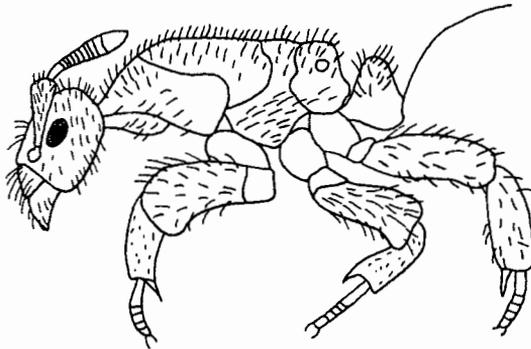


Fig. 312. Side view of a female of *A. latipes*.

These ants are difficult to identify, especially the workers, A number of species hybridize with others, which makes the identification of some specimens impossible. Several of the species that hybridize should be synonymized. There is apparently an undescribed species in Los Alamos (based on a single female).

Nests are usually located under stones, but may be in rotten wood. They tend Homoptera, mostly below the soil surface. Sometimes

are temporary social parasites on species of *Lasius* (Wing, 1968).

Cole (1954c) discusses the genus in New Mexico. Many of the workers in the state may be separated using the following key.

**Key to the workers of  
*Acanthomyops*  
(See Wing, 1968)**

1. Underside of head without erect hairs (rarely 1 or 2, which are shorter than hairs on clypeus - Fig.

313, left); erect hairs on gaster mostly or entirely confined to posterior edges of terga (as in Fig. 316); appressed pubescence on underside of head and gaster extremely dilute; southeastern Arizona, southwestern New Mexico . *arizonicus* (Wheeler)

side view, apex of petiolar moderately sharp (Fig. 314, right), usually emarginate (notched, see Fig. 319, right), standing hairs on dorsum of gaster often confined to the posterior edges of the tergites (except for the first tergite - see Fig. 316) ..... 3

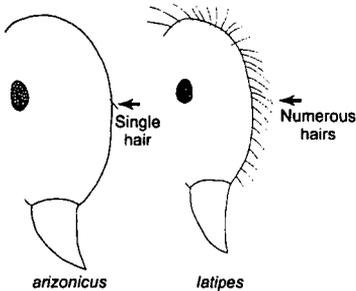


Fig. 313. Ventral surfaces of the heads of workers of *A. arizonicus* and *A. latipes*.

- Underside of head usually with several erect hairs (Fig. 313, right); erect hairs on dorsum of gaster usually scattered over surface (Fig. 315); appressed pubescence on underside of head and gaster moderate to dense ..... 2

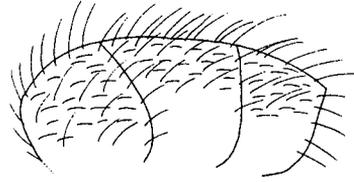


Fig. 315. Dorsum of the gaster of a worker of *A. colei*.



Fig. 316. Dorsum of the gaster of a worker of *A. interjectus*.

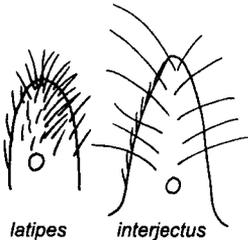


Fig. 314. Apices of the petioles of workers of *A. latipes* and *A. interjectus*.

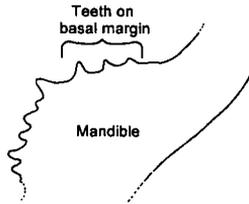


Fig. 317. Left mandible of a worker of *A. interjectus*.

- Standing hairs on dorsum of gaster usually less than 0.22 mm, those on the underside of the head usually less than 0.20 mm; apex of petiole variable (Fig. 314); standing hairs on dorsum of gaster usually uniformly distributed ..... 4  
3(2). Head width 1.08 mm or greater; erect hairs on second to last tergum mostly confined to posterior edge (Fig. 316); pubescence on head

2(1). Standing hairs of dorsum of gaster 0.23 mm or more in length (Fig. 315), those on underside of the head 0.20 mm or more in length; in

moderate to dense; mandibles with 1 or more denticles on basal border (Fig. 317) .... *interjectus* (Mayr)

- Head width 1.02 mm or less; at least a few hairs scattered over the surfaces of second to last tergum (Fig. 315); pubescence on head dilute to very dilute; mandibles rarely with denticle on basal margin .....

..... *colei* Wing 4(2). Apex of petiolar apex blunt (in profile, see Fig. 314 left), convex, straight or rarely concave as seen from front (Fig. 318); standing hairs on underside of the head almost always distributed over entire surface (as seen from side, Fig. 313, right) .....

..... 5



Fig. 318. Variation on the apices of petioles of workers of *A. latipes*.

- Apex of petiole at least moderately sharp, usually emarginate (Fig. 319, right); standing hairs on underside of the head usually cover-



Fig. 319. Petiole of a worker of *A. coloradensis*, as seen from the side (left) and from the front (right)

ing the posterior  $\frac{3}{4}$  or  $\frac{1}{2}$  of the surface (Fig. 320) .....

7 5(4). Erect hairs noticeably more numerous on propodeum than elsewhere on mesosoma (Fig. 321); lat-

eral surface and flexor edge of anterior femur usually with 10 or fewer erect hairs (Fig. 323, left), 0.05 mm or less in length; length of erect hairs on ventral surface of head, propodeum and dorsal surface of gaster usually 0.10 mm or less; antennal scapes with appressed pubescence .....

..... *murphyi* (Forel)

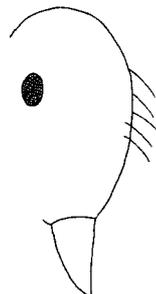


Fig. 320. Head of a worker of *A. coloradensis*, as seen from the side.

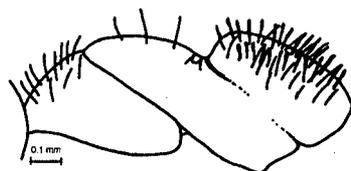


Fig. 321. Side view of the mesosoma of a worker of *A. murphyi*.



Fig. 322. Side view of the mesosoma of a worker of *A. latipes*.

- Erect hairs evenly distributed over dorsum of mesosoma (Fig. 322); other characters vary .....

6 6(5). Body hairs of female unevenly distributed, bent, tangled and

twisted, but not matted to surface (Fig. 324); underside of head with most hairs appressed; rare in New Mexico (known only from Los Alamos) ..... *pogonogynus* Buren



Fig. 323. Posterior left femora of workers of *A. murphyi* and *A. latipes*.

- Body hairs of female evenly distributed (Fig. 312), not as above; commonly collected in New Mexico ..... *latipes* (Walsh)

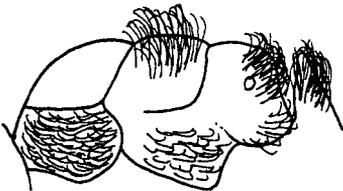


Fig. 324. Side view of the mesosoma of a female of *A. pogonogynus*.

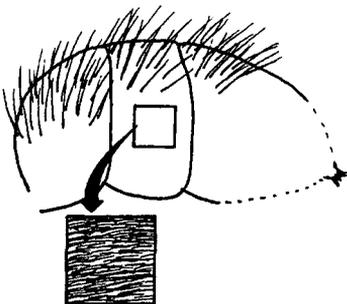


Fig. 325. Side view of the gaster of a worker of *A. occidentalis*, showing the pilosity on the second gastral tergite (inset).

7(4). Pubescence on sides of second tergum of gaster dense to very

dense (Fig. 325), distance between bases of hairs usually averaging less than 1/3 of their length, often contiguous; most of body and appendages quite densely pubescence ..... *occidentalis* (Wheeler)

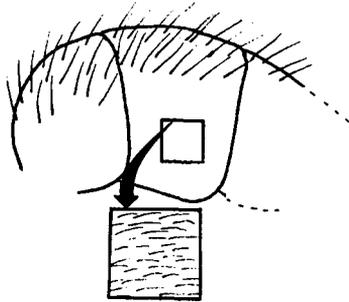


Fig. 326. Side view of the gaster of a worker of *A. coloradensis*, showing the pilosity on the second gastral tergite (inset).

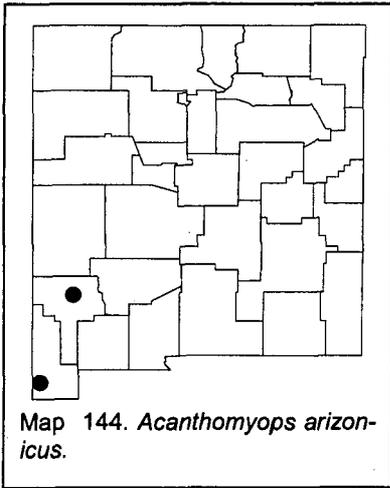
- Pubescence on sides of second tergum dilute to moderate (Fig. 326), distance between bases of hairs usually averaging more than 1/2 of their length, often several times their length; pubescence on remainder of body and appendages usually only moderate in abundance ..... *coloradensis* (Wheeler)

### *Acanthomyops arizonicus* (Wheeler)

Fig. 313; Map 144

**Discussion.** This is the only species in the genus in which the workers are easily recognized and separated from all of the others. The workers differ in that there are often no erect hairs on the ventral surface of the head, occasionally there are 1

or 2 hairs present. Additionally the gaster has only a few erect hairs. The females are similar, with a very reduced number of hairs. The males also have few hairs, usually limited to 1 pair of long, coarse hairs on the underside of the head (usually none present).



Map 144. *Acanthomyops arizonicus*.

**Distribution.** USA: SE AZ, NM: Grant Co., 5 mi. N Pinos Altos, Hidalgo Co., Peloncillo Mts. (Coronado National Forest); MEXICO: Chihuahua. These are the first records from New Mexico and from Chihuahua.

**Habitat.** Hardwood forests, especially in riparian areas, pinyon-juniper forests, pine oak transition.

**Biology.** Nests are found under stones, in areas with rocky loam. This species is very common in the Chiricahua Mountains of Arizona.

### *Acanthomyops colei* Wing

Fig. 315; Map 145

**Discussion.** This is one of the two species in which the erect hairs

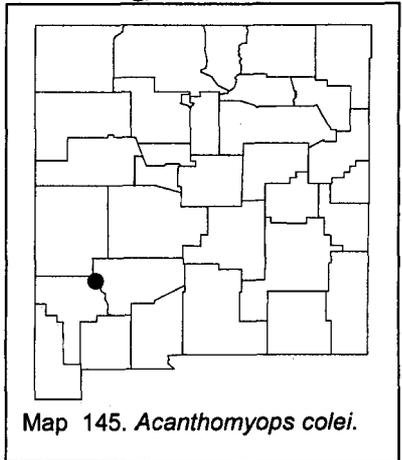
on the dorsum of the gaster are 0.23 mm or more in length and those on the underside of the head are 0.20 mm or greater in length. Most of the hairs on the dorsum of the gaster are found near the posterior edges of each tergum, although there are a few hairs scattered over the surface. The pubescence on the head is sparse, and the mandibles rarely have a denticle on the basal margin.

**Distribution.** USA: southern AZ, NM: Grant Co., Gila National Forest (Black Mt., Wing, 1968).

**Habitat.** Moist pine slopes.

**Biology.** This species nests under stones. Males were collected in a nest in late July, and a dealate female in July. Flights probably occur from late June to early August.

Wing, 1968



Map 145. *Acanthomyops colei*.

### *Acanthomyops coloradensis* (Wheeler)

Figs. 319, 320, 326; Map 146

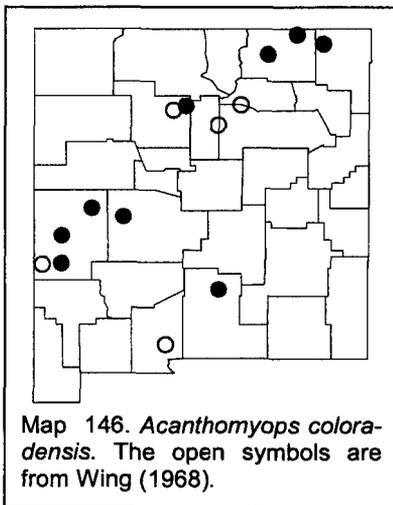
**Discussion.** The workers of this species have a petiole with a relatively sharp apex (as seen from

the side), which is usually concave or notched as seen from the front. The hairs on the underside of the head are usually 0.20 mm or less in length, and usually cover only the posterior  $\frac{3}{4}$  or  $\frac{1}{2}$  of the length, the hairs on the gaster are usually less than 0.22 mm in length, and are uniformly distributed across the surface. The side of the second tergum of the gaster has dilute to moderate, appressed pubescence, the pubescence on the remainder of the ant is usually only moderately abundant.

This species is difficult to distinguish from *A. occidentalis*. The sparse appressed pubescence on the second tergum will often separate workers. If females are present in the series, identification is much easier. The females of *A. coloradensis* appear black to the naked eye, those of *A. occidentalis* are yellow. The pubescence on the dorsum of the gaster of the females of *A. coloradensis* is sparse, and the surface of the gaster is easily seen. The same surface in *A. occidentalis* is covered with a dense, golden, appressed pubescence that hides much of the underlying surface of the gaster.

**Distribution.** USA: Western United States as far south as NM; NM: **Catron Co.**, 37 k S Apace Creek, 2 mi W Datil (Cole, 1954c as *A. claviger*), near Snow Lake, **Colfax Co.**, 16 mi E Ratón (Cole, 1954c, as *A. claviger*), Ute Park (Cole, 1954c, as *A. claviger*), **Otero Co.**, 5 mi S Mescalero National Monument (Cole, 1954c, as *A. claviger*), **Sandoval Co.**, Bandelier National Monument (Cole, 1954c, as *A. claviger*; Pippin and Pippin, 1984), **Socorro Co.**, Magdalena Mts.

(Water Canyon), **Union Co.**, Capulín Mountain National Monument (Cole, 1954c).



Map 146. *Acanthomyops coloradensis*. The open symbols are from Wing (1968).

**Habitat.** Ranging from prairies and deciduous forests, ponderosa pine - Gambel oak transition, to coniferous forests.

**Biology.** This species nests under stones in rocky soils or sandy soils. Brood and reproductives were found in nests from July to September. One colony was nesting together with *Monomorium cyaneum*.

Gregg, 1963; Wheeler and Wheeler, 1963 (as *A. claviger*); Wing, 1968

### *Acanthomyops interjectus* (Mayr)

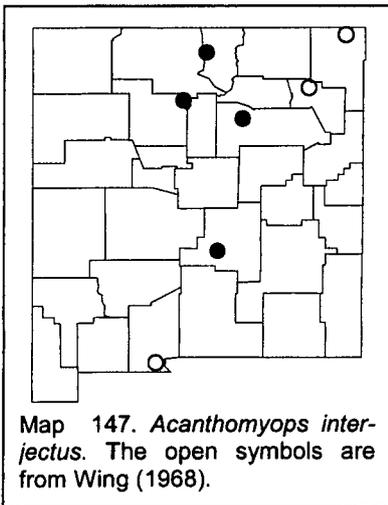
Figs. 314, 316, 317; Map 147

**Discussion.** The hairs of this species are long, those on the ventral surface of the head are often at least 0.20 mm in length, and those on the gaster are often at least 0.23 mm in length. Most of the hairs on the

gaster are confined to the posterior edges of each terga. The apex of the petiole is moderately sharp, usually concave or notched.

**Distribution.** USA: Most of United States; NM: Lincoln Co., Nogal, Los Alamos Co., Los Alamos, 8 k N Los Alamos, San Miguel Co., 20 k NW Las Vegas, Taos Co., 5 k W Tres Piedras,.

**Habitat.** Residential areas, grasslands and meadows near edges of forests up to pinyon-juniper, mixed forests and ponderosa pine forests.



**Biology.** This species is primarily subterranean and nests under stones or logs and in the soil, occasionally with a small mound. Reproductives were found in nests from March to August, dealate females were found in July and October. It is also a house-infesting ant, and nests near buildings. It is associated with pselaphids (*Batrisodes monstrosus*, *B. ferox*, *Adranes lecontei*, *Ceophyl-*

*lus monilis*), limulidids (*Limuloides paradoxus*), and scarabids (*Serica vespertina*).

Wheeler, 1905a; Smith, 1928a, 1965; Dennis, 1938; Carter, 1962; Gregg, 1963; Talbot, 1963; Wheeler and Wheeler, 1963; DuBois and Danoff-Burg, 1994

### *Acanthomyops latipes* (Walsh)

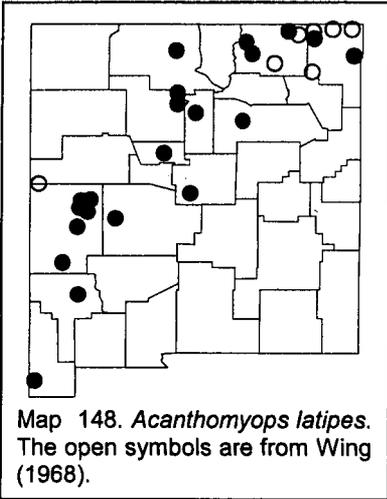
Figs. 311, 312, 313, 314, 318, 322, 323; Map 148

**Discussion.** The hairs on the ventral surface of the head of workers are relatively short (0.20 mm or less) and distributed over the entire surface. The hairs on the gaster are also short (0.22 mm or less) and are also scattered over the entire dorsal surface. The apex of the petiole is blunt (when viewed in profile) and convex or straight as seen from the front (rarely slightly concave). Specimens from the Sawtooth Mts. (field #16625) differ in that the body hairs are shorter and somewhat blunt-tipped or spatulate. They may represent an undescribed species.

The workers of *A. pogonogynus* usually cannot be separated from those of *A. latipes*, but the latter species is much more common than the former species in New Mexico. *Acanthomyops murphyi* workers may also key to *A. latipes*. *Acanthomyops latipes* is one of the most common species in New Mexico and therefore most or all samples that would key to one of these three species would be *A. latipes*.

If the females are in the sample, separation is much easier. Those

of *A. latipes* are very unusual and especially attractive. The funiculus of the antenna is widened at a point about  $\frac{2}{3}$  of its length (Fig. 312). The anterior femora is widened and plate-like (Fig. 312). The other two femora are similar in form, but less devel-



oped. Most surfaces of the body have well developed, erect hairs. *Acanthomyops murphyi* and *A. pogonognus* do not have the funiculi nor femora modified like this. The segments of the funiculi are approximately the same width throughout (slightly enlarged apically in *A. murphyi*). The femora of the latter 2 species are little modified. Both of these species have abundant, appressed hairs, few hairs are suberect or erect. The hairs of *A. murphyi* are dense enough to be matted, twisted and tangled. The appressed hairs on the dorsal surface of the gaster are small and sparse. The hairs of *A. pogonognus* are less dense and matted, but the appressed hairs on the dorsum of the gaster are well developed, similar to the hairs on the remainder

of the body (Fig. 324). Therefore, although the workers of the 3 species are similar and difficult or impossible to separate, they are definitely valid species. See Wing (1968) for further details.

**Distribution.** USA: Most of the United States; NM: **Bernalillo Co.**, NE Albuquerque, **Catron Co.**, 14 k N Datil, 10 k W Datil, 12 k E Datil, Mogollon Mts., Regarte, Sawtooth Mts., **Colfax Co.**, Cimarron Canyon (Cole, 1954c), 5 mi E Eagle Nest (Cole, 1954c), 16 mi E Ratón (Cole, 1954c), **Grant Co.**, 88 k E Silver City, **Hidalgo Co.**, Peloncillo Mts., (Clanton Draw), **Los Alamos Co.**, Los Alamos, Mortandad Canyon, Rio Grande, **Rio Arriba Co.**, 7 k S Cebolla, **Santa Fe Co.**, Santa Fe, **Sandoval Co.**, Banderlier National Monument, **San Miguel Co.**, Sapello Canyon (near Beulah) (Cole, 1954c), **Socorro Co.**, near Grassy Lookout, **Torrance Co.**, 24 k S Mountainair, **Union Co.**, **Union Co.**, Capulín Mountain National Monument (Cole, 1954c), Clayton (Cole, 1954c).

**Habitat.** Meadows and sagebrush communities, pinyon-juniper, ranging up to deciduous forests and ponderosa pine-riparian and fir forests.

**Biology.** This species nests under stones or logs and in the soil, occasionally with a small mound, in clay soils or fine, sandy loam, with scattered rocks. Brood was found in August, reproductives occurred in nests in July and August, dealate queens were found loose in August. Flights occurred in the afternoon (one flight began at 18:15 MST). This species is a temporary social

parasite of *Lasius alienus*, *L. neoniger* and *L. crypticus* and nests together with *Myrmica hamulata*. One nest also contained *Formica occulta*, *Lasius sitchensis* and *Myrmica hamulata*.

Wheeler, 1905a, 1917; Mallis, 1941; Cole, 1954c (listed as *A. coloradensis*), 1966; Gregg, 1963; Talbot, 1963, 1973; Wheeler and Wheeler, 1963; Smith, 1965; Wing, 1968

### *Acanthomyops murphyi* (Forel)

Figs. 321, 323; Map 149

**Discussion.** The hairs on the ventral surface of the head of workers are relatively short (0.20 mm or less) and distributed over the entire surface. The hairs on the gaster are also short (0.22 mm or less) and are also scattered over the entire dorsal surface. The apex of the petiole is blunt (viewed in profile) and convex or straight as seen from the front (rarely slightly concave).

The workers of this species are difficult to separate from those of *A. latipes*. They differ in that the erect hairs are more numerous on the propodeum than on the remainder of the mesosoma. The females of the two species are very different, and are usually necessary to separate these two species. See discussion of *A. latipes* for more details.

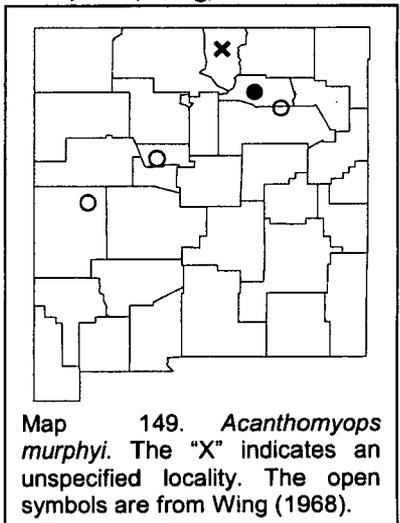
**Distribution.** USA: Most of United States; NM: Mora Co., 10 k SE Mora, Taos Co., without locality.

**Habitat.** Open woodlands or at edges of deciduous woodland for-

ests, ponderosa pine forests, especially in riparian habitats.

**Biology.** This species nests in sandy soils or fine loam under stones or logs. Reproductives were found in nests from June to September, dealate females were also found loose in August. Flights occur from mid July to early August. It is a social parasite of *L. neoniger*. It nests together with *Tapinoma sessile* and *Formica argentea*, and is a temporary social parasite of *Lasius* spp.

Wheeler, 1905a, 1917; Gregg, 1963; Talbot, 1963, 1973; Smith, 1965; Wing, 1968



Map 149. *Acanthomyops murphyi*. The "X" indicates an unspecified locality. The open symbols are from Wing (1968).

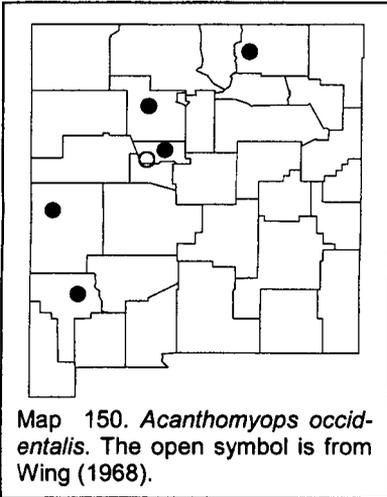
### *Acanthomyops occidentalis* (Wheeler)

Fig. 325; Map 150

**Discussion.** The apex of the petiole of workers of this species is moderately sharp, and is usually notched. The hairs on the underside of the head are relatively short (less

than 0.20 mm) and are present only on the posterior  $\frac{1}{2}$  to  $\frac{3}{4}$  of the surface (see Fig. 320). The erect hairs on the gaster are relatively short (less than 0.23 mm) and are scattered over the entire surface.

This species is difficult to distinguish from *A. coloradensis*. The pubescence on the side of the second tergum is denser, as it is on other body parts. If females are available, these species are easily separated. See the discussion of *A. coloradensis* for more details.



Map 150. *Acanthomyops occidentalis*. The open symbol is from Wing (1968).

**Distribution.** USA: Central and western North America south to NM: Bernalillo Co., Albuquerque, Catron Co., 32 k NE Apache Creek, Colfax Co., 41 k E Eagle Nest, Grant Co., 88 k E Silver City, Sandoval Co., 26 k S Cuba; MEXICO: Chihuahua.

**Habitat.** Meadows, pinyon-juniper, ponderosa pine forests, to spruce and aspen forests, including riparian meadows.

**Biology.** This species nests under stones or logs in sandy soil or

loam with scattered rocks. Nuptial flights occurred at night during July and August (sexuals are attracted to black light traps). A dealate female was found loose in September.

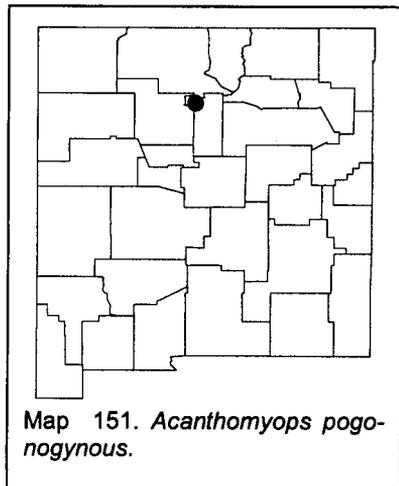
Wheeler, 1917; Gregg, 1963; Wing, 1968

### *Acanthomyops pogonogynus* (Buren)

Fig. 324; Map 151

**Discussion.** The hairs on the ventral surface of the head of workers are relatively short (0.20 mm or less) and distributed over the entire surface. The hairs on the gaster are also short (0.22 mm or less) and are also scattered over the entire dorsal surface. The apex of the petiole is blunt (when viewed in profile) and convex or straight as seen from the front (rarely slightly concave).

This species is listed as a hybrid of *A. murphyi* and *A. latipes* in Wing (1968), although it is difficult to believe that two species with



Map 151. *Acanthomyops pogonogynus*.

completely different females could interbreed. Workers cannot be distinguished from those of *A. latipes*. The females are easily separated (see discussion of *A. latipes*) and are necessary for the identification.

**Distribution.** USA: ID, IO, CO, AZ; NM: Los Alamos Co., Los Alamos.

**Habitat.** Ranging from residential areas to meadows and deciduous forests in Los Alamos.

**Biology.** This ant nests under stones. Dealate females were collected loose on the ground during June and July, and early August. Flights occurred from June to July.

Gregg, 1963

## Genus *Brachymyrmex*

(Key: Wheeler and Wheeler, 1978)

This genus is easily separated from all other genera of the subfamily Formicinae in the United States by the nine-segmented antenna.

This is a group of small, drab ants, which are extremely difficult to identify. Most of the species are found in Latin America, only 3 species occur in the United States (*B. depilis*, *B. musculus* and *B. obscurior*). They are normally very rare in the United States, but at certain times of the year they can be very commonly found under stones in almost any habitat.

### *Brachymyrmex depilis* Emery

Figs. 60, 327; Map 152

**Discussion.** This is the only ant species in New Mexico with a

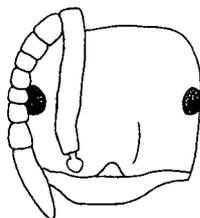
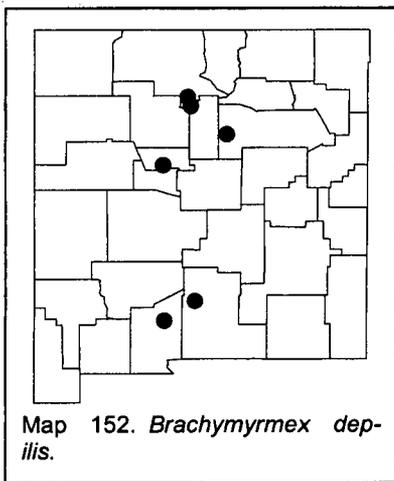


Fig. 327. Head of a worker of *B. depilis*.

nine-segmented antenna. Unfortunately they are very small and soft bodied and become distorted when dried, making it difficult to count the segments. These are monomorphic, inconspicuous ants, which are rarely collected. The antennal fossa touches the posterior border of the clypeus. The petiole is small and is covered by the anterior part of the gaster, which may make it easy to confuse with *Tapinoma*.



Map 152. *Brachymyrmex depilis*.

**Distribution.** USA: Most of United States; NM: Bernalillo Co., Bosque Forest, Doña Ana Co., 45 k NE Las Cruces (Long Term Ecological Research site), Los Alamos Co.,

along the Rio Grande, **Otero Co.**, White Sands National Monument, **Sandoval Co.**, Bandelier National Monument, **San Miguel Co.**, Beulah (Cole, 1954d).

**Habitat.** This species is found in arid deserts (especially in arroyos), creosotebush scrub, grasslands, juniper and sagebrush, oak woodland, up to ponderosa pine.

**Biology.** This species is rarely collected due to its primarily subterranean habits, although may be common in some areas at certain

times of the year. Nests are found under stones or in rotten wood. Females and nests are usually found from July to October. These ants tend subterranean aphids and mealybugs. This species nests in or near nests of *Myrmica emeryana*, *Formica fusca*, and *Messor lobognathus*.

Wheeler, 1905a; Smith, 1927c; Dennis, 1938; Headley, 1952; Gregg, 1963; Wheeler and Wheeler, 1963, 1973; DuBois and Danoff-Burg, 1994; Rojas-Fernández and Fragoso, 1994, 2000

## Genus *Camponotus*

(Key: Creighton, 1950)

This is the largest genus of ants (Wilson, 1976), with probably more than 1000 species (Brown 1973, Rojas-Fernández and Fragoso 1994). Bolton (1995) lists 1541 worldwide taxa (species, subspecies and varieties) that are currently valid. There are more than 360 valid species in the New World (Mackay, in prep.). Most of the species in New Mexico have a strongly arched mesosoma with none of the sutures breaking the outline of the arch (Fig. 328). The acidopore is round and well formed, but normally has few or

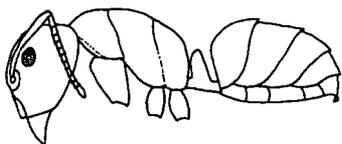


Fig. 328. Side view of a worker of *C. vicinus*.

no hairs on the lips. Most species are strongly polymorphic. One New Mexican species (*C. hyatti*) has a depression posterior to the metanotal suture, which breaks the outline of the arched back.

They can be confused with *Liometopum* (Dolichoderinae), but can be separated on the basis of the round acidopore which usually has at least a few hairs on the lips. Ants of this genus are not likely to be confused with those of any other genus in New Mexico. The genus is divided into a number of subgenera, which are identified in the following key.

This is a genus of common "carpenter" ants. A number of the species can damage houses. This is probably the only genus in North America, which tunnels through solid wood. The others use pre-

formed tunnels (termites, wood boring beetles). They often nest in logs and stumps or under stones. Cole (1954d) includes the distribution of the species in New Mexico. This genus is extremely common in New Mexico and can be found in all habitats in the state. You must be careful to collect major workers as identification is difficult or impossible without them.

**Key to the major workers of the subgenera of *Camponotus***

1. Anterior part of head of major circular and abruptly truncated in front, truncated portion consisting of clypeus and adjacent parts of cheeks with mandibles forming ventral part; majors and minors present in nest, intermediates absent; nests in twigs ..... **Subgenus *Colobopsis* (*Camponotus papago* Creighton)**

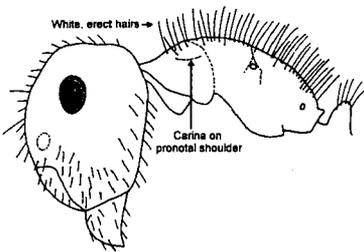


Fig. 329. Head and mesosoma of a major worker of *C. mina*. The arrows indicate the carina on the pronotal shoulder and the dense hair on the dorsum of the mesosoma.

- Anterior part of head of major not circular and not abruptly truncated in front, if truncated, slant is oblique and involves frontal lobes as

as well as clypeus (Fig. 330), intermediates often present; usually nests in soil or under stones (occasionally in logs, stumps, or branches) ..... **2 2(1)**. Front of head of major obliquely truncate (Fig. 330), the truncation involving frontal lobes, with large, bordered, irregular, concave hollow at either side which usually extends across cheek from insertion of antenna to level of middle of clypeus (Fig. 330); minor small (Fig. 331), concolorous black ant with evenly rounded mesosoma ..... **subgenus *Hypercolobopsis* (*Camponotus ulcerosus* Wheeler)**

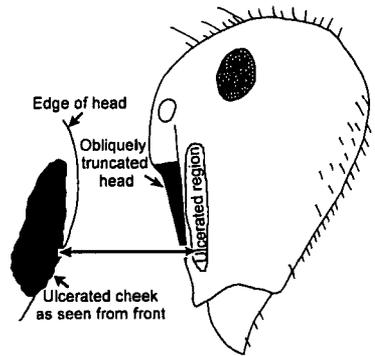


Fig. 330. Head of a major worker of *C. ulcerosus* as seen from the side. The arrows indicate the obliquely truncated clypeus, and the ulcerated cheek as seen from the front.

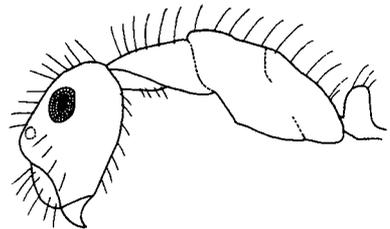


Fig. 331. Head and mesosoma of a minor worker of *C. ulcerosus*.

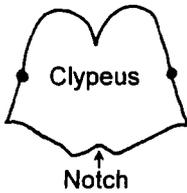


Fig. 332. Clypeus of a worker of *C. hyatti*, showing the notch along the anterior margin.



Fig. 333. Clypeus of a worker of *C. sansabeanus* showing the convex anterior margin of the clypeus.

- Front of head of major not obliquely truncate, more or less convex; clypeus convex or angular and distinctly higher than adjacent portions of cheeks ..... 3 3(2). Mesosoma short, that of major not much longer than head (excluding mandibles); humeral carina (at shoulder) of pronotum well marked (Fig. 329), monomorphic or not strongly polymorphic; known

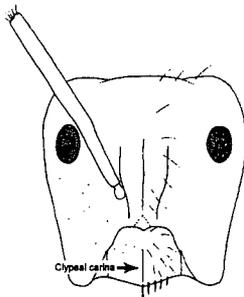


Fig. 334. Head of a major worker of *C. ocreatus*, showing the clypeal carina.

only from fossils in New Mexico ..... Subgenus *Myrmobrachys* (*Camponotus mina* Forel)

- Mesosoma of major longer than head; humeral angles rounded; strongly dimorphic or polymorphic; common in New Mexico ..... 4 4(3). Anterior border of clypeus feebly projecting, depressed in middle and with narrow, median notch (Fig. 332), behind which is a short, triangular impression; not common in New Mexico .....

..... Subgenus *Myrmentoma*

- Anterior border of clypeus not as above (Fig. 333), rarely with median notch and never with impression; very common in New Mexico .....

5 5(4). Clypeus with carina or ridge (Fig. 334); antennal scape often flattened at base; antennal fossae shallow; head of major as long or longer than broad; nests in soil or under stones; most common subgenus in New Mexico .....

..... Subgenus *Tanaemyrmex*

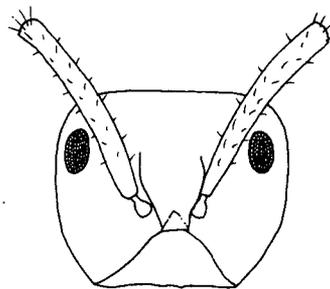


Fig. 335. Head of a major worker of *C. laevigatus*, showing the elongate antennal scapes with bristly hairs.

- Clypeus usually without carina (Fig. 335); antennal scapes never flattened at base; antennal fossae deep; head of major usually

wider than long (mandibles excluded); nest usually in logs or stumps; usually found in pine forests ..... Subgenus *Camponotus*

**Key to the major workers of the subgenus *Camponotus***

1. Anterior margin of clypeus of major worker with angle which median portion makes with lateral portions sharp and tooth-like (Fig. 336); antennal scape with scattered, erect hairs; concolorous yellowish red; nests in living oak trees or logs; uncommon ..... *schaefferi* Wheeler

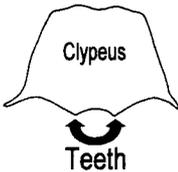


Fig. 336. Clypeus of a major worker of *C. schaefferi*, showing the teeth on the lateral portions.

- Anterior margin of clypeus not as above, usually scalloped and meeting lateral portions in blunt angles (Fig. 337); rarely concolorous yellow red, usually bicolored or dark brown; if yellow-red, scapes without

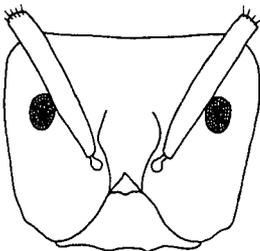


Fig. 337. Head of a major worker of *C. herculeanus*, showing the short antennal scape.

erect hairs; may nest in oak trees, but usually in logs or stumps ..... 2  
2(1). Antennal scape with numerous, short, white, erect hairs (Fig. 338); most surfaces strongly polished and black in color with bluish reflections ..... *laevigatus* (Smith)

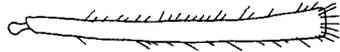


Fig. 338. Right antennal scape of a major worker of *C. laevigatus*, showing erect hairs along the shaft.

- Antennal scape without erect hairs, except for few at tip (Fig. 337); if black, surface not strongly polished ..... 3  
3(2). Antennal scapes of major worker just reaching, or barely surpassing posterior lateral corners (Fig. 337) ..... *herculeanus* (Linnaeus)

- Antennal scapes of major worker surpassing posterior lateral borders by more than 1 diameter (Fig. 335) ..... 4

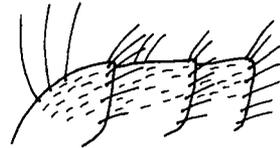


Fig. 339. Dorsum of the gaster of a major worker of *C. noveboracensis*.

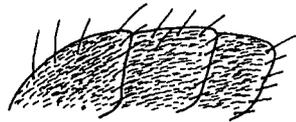


Fig. 340. Dorsum of the gaster of a major worker of *C. modoc*, showing the short, dense, appressed pubescence.

4(3). Pubescence on gaster absent or fine and sparse (Fig. 339), entire

surface of gaster distinctly shining; head and gaster brownish black, mesosoma red; rare in New Mexico  
 ..... *noveboracensis* (Fitch)  
 - Pubescence on gaster coarse and long and/or dense (Figs. 340 & 341), surface of gaster dull, except for narrow band at posterior edge of each tergum ..... 5

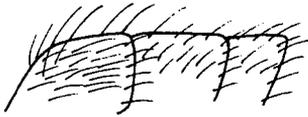


Fig. 341. Dorsum of the gaster of a major worker of *C. pennsylvanicus*, showing the sparse, decumbent pubescence.

5(4). Pubescence on gaster less than half as long as erect hairs (Fig. 340); clypeus with moderately developed carina; common in New Mexico ..... *modoc* Wheeler  
 - Pubescence on gaster about as long as erect hairs (Fig. 341); clypeus without carina; rare in New Mexico . *pennsylvanicus* (De Geer)

**Key to the major workers of the subgenus *Myrmentoma***

(see Snelling, 1988)

- 1. Gastral terga with roughened surfaces; appressed hairs abundant on terga, distance between hairs distinctly less than their length; west Texas and Chihuahua ..... *cuauhtemoc* Snelling
- Gastral terga shiny; appressed hairs sparse on gaster, distance between hairs distinctly greater than length (Fig. 342); New Mexico ..... 2
- 2(1). Mandible smooth and shiny

between fine punctures, which are separated by two puncture diameters or more; mesosomal profile distinctly depressed at metanotal suture (Fig. 342) ..... *hyatti* Emery

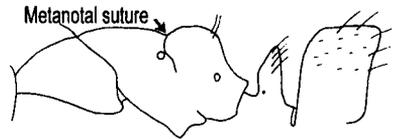


Fig. 342. Mesosoma, petiole and first gastral tergite of a major worker of *C. hyatti*.

- Mandible usually closely punctate or striatopunctate and with more or less definitely roughened interspaces; if punctures distinctly separated by smooth interspaces (*C. essigi*), metanotal suture not depressed (Fig. 343) ..... 3

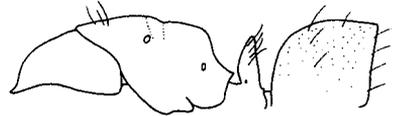


Fig. 343. Mesosoma, petiole and first gastral tergite of a major worker of *C. sayi*.

3(2). Propodeum, in profile, with dorsal face flat, or nearly so, almost entirely on same plane as mesonotum, abruptly rounded or subangulate at juncture with posterior face (Figs. 343); ..... *sayi* Emery  
 - Propodeum, in profile, curved or straight, but sloping toward broadly rounded juncture with declivity (Fig. 344) ..... 4

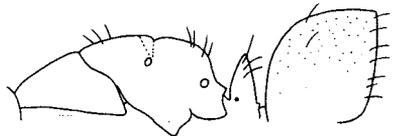


Fig. 344. Mesosoma, petiole and first gastral tergite of a major worker of *C. nearcticus*.

4(3). Clypeus distinctly broader than long and with 4 - 10 (usually more than 6) erect hairs along margins above level of tentorial pits; color various, but if head and mesosoma reddish, at least gastral tergum 1 also reddish or yellowish or clypeus is distinctly roughened or posterior margin of head straight

- ..... *nearcticus* Emery
- Clypeus about as long as broad or slightly longer and with 2 - 4 long, erect hairs along margin above level of tentorial pits; head, mesosoma, and appendages red to yellowish red; clypeus dull and densely tessellate, but not roughened; posterior margin distinctly concave in frontal view
- ..... *decipiens* Emery (see *C. nearcticus*)

**Key to the major workers of the subgenus *Myrmobrachys***

- 1. Head elongate (HW/HL of major ~ 0.73, of female ~ 0.90); eye of minor relatively large (maximum diameter ~ 0.35 mm)
- ..... *trepidulus* Creighton
- Head nearly square-shaped (HW/HL of major ~ 1.03, of female ~ 1); eye of minor small (~ 0.27 mm)
- ..... *mina* Forel

**Key to the major workers of the subgenus *Tanaemyrmex***

- 1. Cheeks with 6 or more erect hairs, if fewer, base of scape flattened and widened (Fig. 349) ..... 2
- Cheeks with 5 or fewer (usually none) erect hairs (Fig. 345), if

more, base of scape not flattened and widened ..... 5

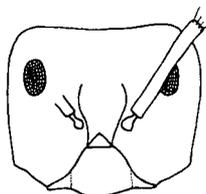


Fig. 345. Head of a major worker of *C. sansabeanus*.

- 2(1). Antennal scapes without erect hairs (except at tip, see Fig. 345) ..... 3
- Antennal scapes with erect hairs (Figs. 346, 347) ..... 4

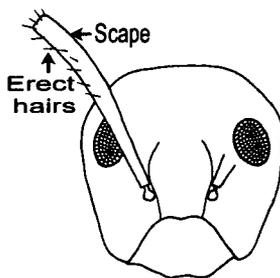


Fig. 346. Head of a minor worker of *C. festinatus*, showing the erect hairs on the antennal scape.

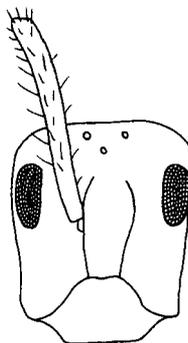


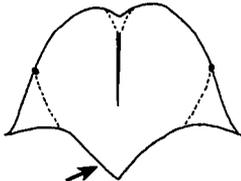
Fig. 347. Head of a female of *C. festinatus*.

3(2). Anterior border of clypeus rounded (Fig. 345); scapes barely reach posterior corner of head (Fig. 345) or surpass it by about one diameter ..... *sansabeanus* (Buckley)



Fig. 350. Base of antennal scape of a major worker of *C. vicinus*.

- Anterior border of clypeus pointed into beak-like structure (Fig. 348); scapes surpassing posterior corners of heads by two or more diameters ..... *acutirostris* Wheeler



Beak-like structure

Fig. 348. Clypeus of a major worker of *C. acutirostris*.

4(2). Female (queen) usually small, total length about 1 cm or less, about as large as largest worker; head elongate (Fig. 347), vertex convex; common and widely distributed in New Mexico ..... *festinatus* Buckley

- Female large, about 1.3 cm or

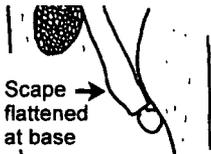


Fig. 349. Base of the antennal scape of *C. semitestaceus*.

greater in total length, larger than largest worker; head widened posteriorly, vertex concave; rarely collected and known only from SW AZ and SE NM ..... *vafer* Wheeler 5(1). Scape of major distinctly flattened at base, forming a small lateral lobule (Fig. 349); not reported from NM ..... *semitestaceus* Snelling

- Scape of major may be flattened, but lateral lobule absent (Fig. 350) ..... 6

6(5). Cheeks strongly shining, with small, inconspicuous punctures .....

..... *ocreatus* Emery

- Cheeks feebly shining or dull, the punctures coarser and conspicuous ..... *vicinus* Mayr

### *Camponotus acutirostris* Wheeler

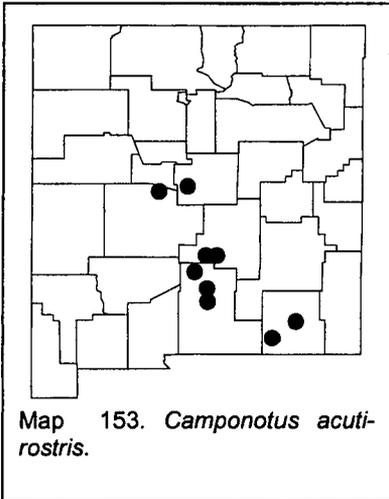
Fig. 348; Map 153

**Discussion.** The majors of this species are easily recognized as the clypeus is extended into a sharpened angle or beak-like protection (Fig. 348). The head is wide as seen from front. Major workers and females always have 10 or more erect hairs on the cheeks and malar area. The metanotal suture is well depressed, with the mesosoma in profile. The clypeus of the minor worker is similar, but not as elongate.

This species is not likely to be confused with others in the subgenus *Tanaemyrmex* due to the shape of the clypeus. It can be separated from *C. ocreatus* by the shape of the clypeus and by the presence of erect hairs on the cheeks and malar area. Species that have erect hairs in these

areas do not have a pointed clypeus. It can be easily separated from *C. sansabeanus* as the scapes are very long.

**Distribution.** USA: TX, AZ, NM: **Eddy Co.**, Carlsbad Caverns National Park (Cole, 1954d), Guadalupe Mts. (5.3 k SE Sitting Bull Falls), **Lincoln Co.**, Oak Grove Camp, 4 mi. W Alto (Rd. 532), **Otero Co.**, Three Rivers Campground, Timberon, 8 mi. NE Tularosa, **Socorro Co.**, Sevilleta National Wildlife Refuge, **Torrance Co.**, Manzano Mt.; MEXICO: Chihuahua.



Map 153. *Camponotus acutirostris*.

**Habitat.** Pinyon - juniper forests, oak forests, with grassy areas between trees, pine forests, usually found in more mesic sites in semiarid areas with yucca and cactus, at between 1560 - 2300 meters elevation.

**Biology.** This species is rarely collected. It nests under stones, in areas of rocky gravel. Brood was found in nests in March.

## *Camponotus festinatus* (Buckley)

Figs. 346, 347; Map 154

**Discussion.** This is a common yellowish-brown ant found throughout the deserts of New Mexico. The erect hairs on the antennal scapes distinguish this species from most of the others. The smaller queens separate it from *C. vafer*. Females of *C. festinatus* also have an oval shaped head which is convex posteriorly (Fig. 347); those of *C. vafer* are wider posteriorly which is strongly concave posteriorly. It is possible that *C. vafer* is a synonym of *C. festinatus*.

Creighton (1950) and Wheeler (1910b) list a number of characters to separate the majors of this species from *C. vafer*. None of the characters are consistent, and except for the differences in the females, we can not distinguish the two species. Wheeler (1910b) stated that *C. vafer* differed from *C. festinatus* in its greater size, the shape of the clypeus, coloration, had stiffer hairs on the scapes and coarser foveolae on the head. Wheeler also separated *C. vafer* from related species by a 5-6 toothed mandible, compared with other species that have 7 teeth. We compared three co-types of *C. vafer* with specimens of *Camponotus festinatus* collected from southern California, throughout southeastern Arizona, southern New Mexico, the western half of Texas south throughout the state of Chihuahua east to Coahuila, Mexico, and can see no consistent differences between the numbers of teeth of the

two species. With regards to size, cotypes of *C. vafer* are larger than most *C. festinatus*, but we have specimens that are equally large that are typical *C. festinatus*.

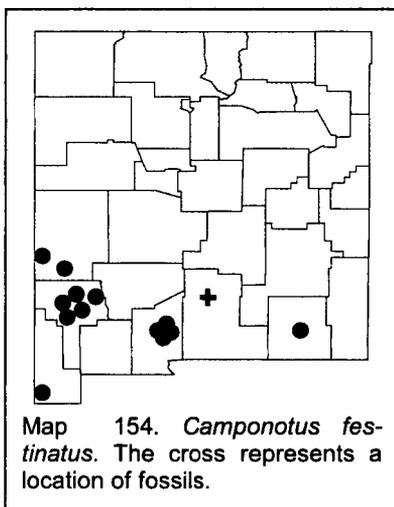
A considerable amount of variation is seen in the shape of the anterior clypeal border within many series. The clypeus of the cotypes could best be characterized as concave at the anterior medial margin (not actually notched as Wheeler describes). Specimens that could be considered *C. festinatus* range from a straight margin, to a broadly concave margin to a narrowly concave margin as in the cotypes of *C. vafer* (see illustration of *C. festinatus* in Snelling, 1968, Fig. 1). Thus the shape of the clypeal border is an unreliable character in *C. festinatus*.

The coloration of *C. festinatus* is variable, ranging from specimens with a nearly black head and gaster, clear yellow mesosoma, to specimens that are concolorous light yellow. Thus the color differences Wheeler used to separate *C. vafer* are insignificant.

Erect hairs on the scape of majors of *C. festinatus* range from few to abundant. Wheeler characterized those on the scape of *C. vafer* as being "stiffer" than those of *C. festinatus*. They do not appear to be any stiffer than those on the scape of *C. festinatus*, nor do they appear to be coarser or thicker. The foveolae on the head of *C. vafer* are supposed to be coarser. We can not see any difference when we compare workers of similar sizes. Finally one of the cotypes of *C. vafer* has 7 teeth, although the basal tooth is small. We cannot see the entire mandibles of

the other two cotypes and thus cannot count the teeth. The basal tooth on the mandible of *C. festinatus* is also normally small, similar to the *C. vafer* cotype. Creighton (1950) states that the hairs on the underside of the head are uneven in length in *C. festinatus*, and even in length in *C. vafer*. We cannot see any consistency in this character.

Thus workers of *C. vafer* do not appear to differ in any significant way from workers of *C. festinatus*. Therefore one must collect the females to be sure of the correct identification. *Camponotus vafer* apparently occurs only in the extreme SE (Hidalgo Co.) of New Mexico and most specimens collected in the state can be assumed to be *C. festinatus*.



Map 154. *Camponotus festinatus*. The cross represents a location of fossils.

**Distribution.** USA: CA, AZ, CO, TX; NM: **Catrón Co.**, 21 k N Glenwood, Mogollon Mts., **Doña Ana Co.**, Dripping Springs, 45 k NE Las Cruces, 3 mi. E Las Cruces, Organ Mts., La Cueva, **Eddy Co.**, Carlsbad Caverns, **Grant Co.**, Leopold Vista, Mimbres, 60 k E Silver

City, 100 k N Silver City, near White Signal, **Hidalgo Co.**, Coronado National Forest (Cloverdale Creek, Clayton Draw, Peloncillo Mts.), **Otero Co.**, Dog Canyon (fossil); MEXICO: northern part of country.

**Habitat.** Chihuahuan Desert scrublands, up to juniper forests at 1680 meters elevation.

**Biology.** This species nests under stones, and is active nocturnally. Brood was found in nests in March, sexuals were found in nests as early as March. Two colonies were nesting under stones with *Crematogaster cerasi*, one nest was mixed with that of *Solenopsis amblychila*. This species can be a problem in cities as they nest in rock walls and in bricks of houses, removing the mortar.

Wheeler, 1901

### ***Camponotus herculeanus* (Linnaeus)**

Figs. 62, 337; Map 155

**Discussion.** This is a common dark brown or black ant with a dark red petiole, antennae, legs, and base of first gastral segment. The scapes of the majors barely reach, or only slightly surpass the posterior lateral corners. Erect hairs are moderately abundant, being found specifically on the clypeus (along margins), on the dorsal surface of the head, ventral surface of the head, dorsal surface of the mesosoma, petiole and gaster, they are absent on the cheeks, scapes (except at apex) and tibiae (except for a double row on the flexor surface); appressed pubescence is sparse, and is limited to a

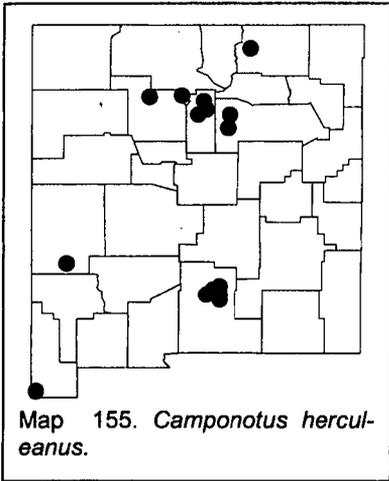
few tiny hairs on the head, dorsum of the mesosoma, and dorsal surface of the gaster.

The minors are similar except for size, having an oval shaped head, and the scapes extend well past the posterior lateral corners.

The females are large, mostly black specimens. The scape extends more than 2 funicular segments past the posterior lateral corners.

This species is relatively easy to recognize among the ants of the subgenus *Camponotus*, as the scape only reaches or barely surpasses the posterior lateral corners. The scape of the majors of all of the other species in the subgenus nearly always extends at least 1 - 2 (or more) funicular segments past the posterior lateral corners of the head. It would be most likely to confuse this species with *C. (Tanaemyrmex) sansabeanus*. Both of these species have relatively short scapes. In addition, the clypeus of *C. sansabeanus* has a poorly developed carina, which could result in it being confused with members of the subgenus *Camponotus*. The species can be separated, as the antennal scapes of *C. herculeanus* are never flattened at the base, whereas they nearly always are in *C. sansabeanus*. This species is also somewhat dull in appearance, whereas *C. sansabeanus* is usually shiny and little sculptured. The shape of the clypeus is different in the 2 species: *Camponotus herculeanus* has a wide clypeus, which is convex, but without any raised or depressed areas in the medial region. The clypeus of *Camponotus sansabeanus* is narrower (compare Figs. 333 & 337), and the central region is usu-

ally somewhat upraised, and occasionally there are longitudinal oblique depressions which point towards the medial region in *C. sansabeanus*. Finally, this species has no erect hairs on the cheeks, whereas *C. sansabeanus* normally does.



**Distribution.** CANADA: Quebec; USA: Most of United States; NM: **Catron Co.**, Mogollon Mts. (Cole, 1954d), **Colfax Co.**, 4 k W Eagle Nest, **Los Alamos Co.**, Los Alamos (Camp May), **Otero Co.**, Cloudcroft; Sacramento Mts., James Canyon, Cox Canyon, **San Miguel Co.**, Beulah, Pecos Mts., **Santa Fe Co.**, Hyde Park (Sangre de Cristo Mts.), near Santa Fe, Little Tesuque Canyon, **Sandoval Co.**, Jémez Canyon.

**Habitat.** Meadows, deciduous forests, and especially common in pine, aspen and spruce-fir forests. Widely distributed in northern New Mexico.

**Biology.** This very common species normally nests in rotten logs and stumps, but nests are occasion-

ally found under stones, especially incipient nests. This species may form a plesio-biotic relationship with *Formica neorufibarbis*. Foragers tend several species of aphids on many different plant species. Reproductives and brood were present in the nests from June to August, reproductives until September. Foundress females were found from late June to October.

Jones, 1929; Gregg, 1946, 1963; Brown, 1949, 1955; Weber, 1950b; Perttunen, 1955; Hölldobler, 1961, 1962a, 1962b; Ayre, 1963b; Wheeler and Wheeler, 1963; Sanders, 1964, 1972; Ayre and Blum, 1971

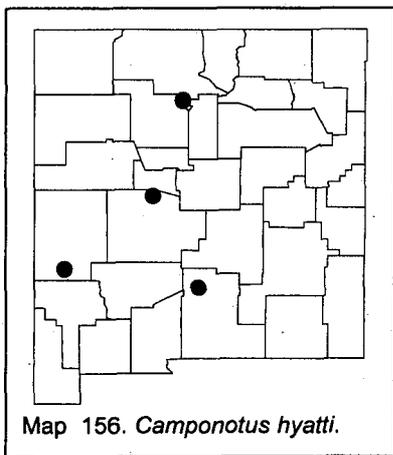
### *Camponotus hyatti* Emery

Figs. 332, 342; Map 156

**Discussion.** The majors of this species can be recognized by the deep impression at the metanotal suture, and by the convex dorsal face and concave posterior face of the propodeum (Fig. 342). They are generally bicolored, with the head and mesosoma reddish-brown, and the gaster dark brown. The antennal scapes fail to reach the posterior lateral corners by about 2 funicular segments. The petiole is slender as seen in profile (Fig. 342). The majors have few erect hairs, with none on the sides of the head, on the cheeks, or on the scapes. The dorsal and posterior faces of the propodeum are about equal in length. There are usually few erect hairs on the dorsum of the mesosoma, on the petiole, and dorsum of the gaster. Most surfaces

are at least moderately shining, the gaster is transversely striolate and shining. The area between the punctures on the mandibles and the dorsum of the gaster are smooth and shining. The minors are similar, with the metanotal suture impressed on the dorsum of the mesosoma, but not as deeply as in the major worker. The pilosity, sculpture, and color are similar to that of the major workers.

Both the majors and minors of this species can be separated from those of most other species by the depressed metanotal suture, and by the reduced numbers of hairs on the mesosoma, especially on the pronotum. Additionally, most of surfaces are moderately smooth and shining.



Map 156. *Camponotus hyatti*.

**Distribution.** USA: ID, NV, CA, TX, AZ, (Cochise Co.); NM: **Catron Co.**, Mogollon Mts., **Los Alamos Co.**, Rio Grande, **Otero Co.**, 8 mi. NE Tularosa, **Socorro Co.**, Sevilleta National Wildlife Refuge; MEXICO: Baja California.

**Habitat.** This species appears to be limited to areas of sagebrush at

around 1770 m elevation in New Mexico.

**Biology.** This species nests in the roots of sagebrush (*Artemisia* spp.) in New Mexico.

Cole, 1966

### *Camponotus laevigatus* (F. Smith)

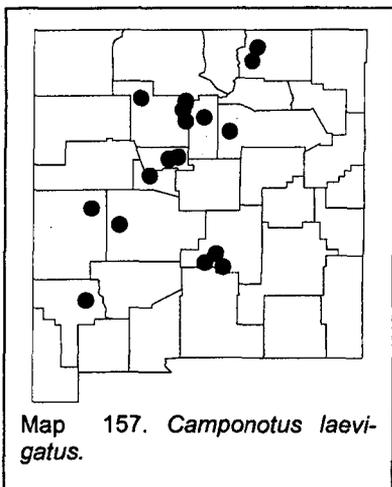
Figs. 335, 338; Map 157

**Discussion.** The majors, minors, and females are easily recognized, as it is the only species that is shiny black with small, erect hairs on the scape (Fig. 338), as well as other body parts. The males may be easily recognized by the abundant, white, erect hairs on many body parts including the head, scape, mesosoma, petiole, gaster, and tibiae.

The erect hairs on the scapes may cause confusion with *C. schaefferi*, which also has erect hairs on the scapes and is glossy and shiny. It can be easily separated as it is black, and *C. schaefferi* is yellowish-brown.

**Distribution.** CANADA: British Columbia; USA: Western United States, NM: **Bernalillo Co.**, Cupin Crest, Sandia Mts., **Catron Co.**, Ox Spring Canyon, **Colfax Co.**, Cimarron Canyon (Cole, 1954d), 13 mi N Eagle Nest (Cole, 1954d), **Los Alamos Co.**, Los Alamos, 4 k N Los Alamos, 2 k NE Los Alamos, **Grant Co.**, 88 k E Silver City, **Lincoln Co.**, 2 mi. SE Alto, 2 mi. W Alto, Flume Canyon (Sierra Blanca Rd.), **Los Alamos Co.**, Los Alamos, 4 k N Los Alamos, **Sandoval Co.**, Bandelier Nat. Mon., 4 k W Cuba, **San Miguel Co.**, Pecos, **Santa Fe Co.**, Santa Fe,

Socorro Co., near Grassy Lookout,  
Valencia Co., 57 k SW Grants.



Map 157. *Camponotus laevigatus*.

**Habitat.** Deciduous forests, oak forests (Gamble), pinyon-juniper, fir and pine forests at higher elevations or latitudes, 2130 - 2447 meters in elevation. Nests are occasionally found in urban areas.

**Biology.** This species nests in rotten logs and stumps and is an occasional pest in buildings. Brood was found in nests in August, new nests were established in August. They are prey of *Pogonomyrmex montanus* in southern California.

Wheeler, 1917; Eckert and Mallis, 1937; Furniss 1944; Gregg, 1963

### *Camponotus mina* Forel

Figs. 63, 329; Map 158

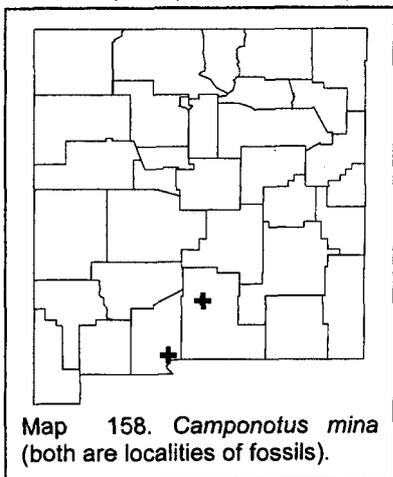
**Discussion.** The major of this species can be recognized as it has abundant erect hairs on most surfaces, nearly all with blunt tips, some are nearly spatulate, these hairs cover

the head, several similar hairs are found on the scapes, longer erect hairs are present on the mesosoma, as well as on the gaster. The appressed pubescence is sparse. The anterior border of the clypeus is concave, the ant is black with reddish-brown or brown mandibles, antennae, and the tibiae. The minor is similar, except the hairs are finer. The region posterior to the eye and the pronotal shoulder are swollen.

The minor workers of this species are easily confused with the minor workers of the sympatric *C. ulcerosus* (the obliquely truncate head of the majors of *C. ulcerosus* make them easily distinguished). This is apparently due to convergent evolution, as the 2 species are not closely related. The minors of *C. mina* have several erect or suberect hairs on the scapes, whereas the scape of the minor of *C. ulcerosus* has few or none. The posterior lateral corner of the head of *C. mina* is angulate (as seen in full-face view), that of *C. ulcerosus* is rounded. The clypeus of the minor worker of *C. mina* is proportionally wider (clypeal index [clypeal width at tentorial pits/clypeal length X 100] at least 123, compared with the CLI [clypeal index] of *C. ulcerosus* ranging up to 111). The region posterior to the eye of *C. mina* is swollen, that of *C. ulcerosus* is not. The pronotal shoulders of both species are swollen, although the swelling in *C. mina* is more developed. The propodeum of *C. ulcerosus* is lower than that of *C. mina*. *Camponotus mina* nests in plant cavities and forages primarily in vegetation, *C. ulcerosus* nests in the soil and forages mostly on the

soil surface. The clypeal carinae of the minors of both species are approximately equally developed. Hopefully these suggestions will help separate isolated minor workers, but will also underscore the need to collect majors of *Camponotus*.

Separation of this species from *C. trepidulus* is even more problematic. The shape of the heads of the two species may serve to separate them (see *Myrmobrachys* key).



Map 158. *Camponotus mina* (both are localities of fossils).

**Distribution.** USA: S AZ, TX; Fossils have been found (Mackay and Elias, 1992) in Texas and NM: Otero Co., Dog Canyon, Doña Ana Co., Shelter Cave; MEXICO: Baja California, Chihuahua, Sonora.

**Habitat.** Mesquite dominated desert.

**Biology.** This species was present in the Chihuahuan Desert from at least 40,000 years ago until nearly recent time (Mackay and Elias, 1992). Specimens often nest in mesquite shrubs (*Prosopis glandulosa*).

Wheeler, 1910b; Creighton, 1965

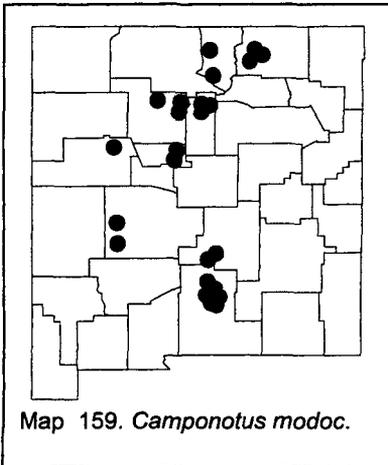
## *Camponotus modoc* Wheeler

Fig. 340; Map 159

**Discussion.** The majors, minors, and females of this species are predominantly black, dull ants, with slightly reddish legs and funiculi. The scapes are without erect hairs (except at the apex), the hairs on the clypeus are located mostly along the borders, the dorsal and ventral surface of the head have few erect hairs, the cheeks and sides of the head are without erect hairs. Most surfaces have golden, appressed hairs, which are scarce on the head and mesosoma, and slightly more abundant on the gaster, where at least a few of the hairs overlap adjacent hairs.

This species has been considered to be a subspecies of either *C. herculeanus* or *C. pennsylvanicus*. It can often be separated from both of these species, as the appressed hairs on the gaster are much shorter than the erect hairs (about equal in length in the other 2 species, but there is considerable variability in the length of the hairs). The appressed hairs on the mesosoma are sparse and do not overlap adjacent hairs, whereas the appressed hairs on the mesosoma of the other 2 species are abundant, and even extend on to the lateral surface of the propodeum, and many hairs overlap adjacent hairs. It is possible that this species is a synonym of *C. pennsylvanicus*. The scapes of the majors of this species extend nearly 1 funicular segment past the posterior lateral corner, which separates it from *C. herculeanus*.

**Distribution.** USA: Western North America; NM: **Bernalillo Co.**, Embudo Canyon, Sandia Mt. (Cole, 1954d), **Cibola Co.**, Mt. Taylor, **Colfax Co.**, 15 mi N Eagle Nest (Cole, 1954d), 18 mi E Eagle Nest (Cole, 1954d), Ute Park (Cole, 1954d), **Lincoln Co.**, Alto, Sierra Blanca, **Los Alamos Co.**, 2 k NE Los Alamos, **Otero Co.**, Cloudcroft, Timberon, (Timberon, Agua Chiquita, Jim Lewis Spring), 13 mi. S Mescalero (Cole, 1954d), 9 k NE Timberon, **Sandoval Co.**, Bandelier National Monument, 45 k SE Cuba, **Santa Fe Co.**, 12 k NE Santa Fe, mountains NE Santa Fe, Tesuque Canyon (Cole, 1954d), **Socorro Co.**, Grassy Lookout, San Mateo Mts., **Taos Co.**, 20 k S Taos, 6 k W Tres Piedras; MEXICO: Chihuahua, Nuevo León.



**Habitat.** Forested areas, ranging from deciduous through pinyon pine and ponderosa pine, pine-spruce-popular and spruce forests up to subalpine fir (2490 - 3000 meters altitude).

**Biology.** This species nests in rotten logs and stumps, or rarely under stones. Brood and reproductives occurred in nests from June to September, dealate females were found from July to October. Workers escape with brood when the nest is disturbed, and are preyed on by members of the *Formica rufa* species complex. One colony was nesting together with *Formica argentea*, another with *F. hewitti*, a third with *F. neoclara*. Another colony was together with *Tapinoma sessile*.

Wheeler, 1917; Eckert and Mallis, 1937; Mallis, 1941; Furniss, 1944; Gregg, 1963

### *Camponotus nearcticus* Emery

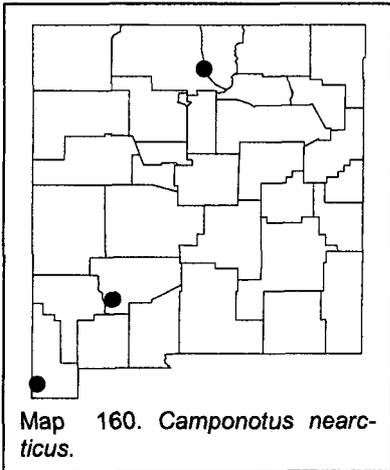
Fig. 344; Map 160

**Discussion.** This is a small, bicolored carpenter ant. The majors of this species can be recognized by the shiny gaster, by the dull surface of the mandible, lack of erect hairs in the sides of the heads and cheeks, and by the convex propodeum (and mesosoma). There are few erect hairs, specifically 1 - 2 pair on the basal margin of the clypeus, none on the cheeks or malar area, few on the dorsum of the mesosoma, petiole and gaster. *Camponotus rasilis* is a synonym, and *C. decipiens* is probably a synonym.

It is difficult to separate this species from *C. sayi*. The dorsal face of the propodeum is often rounded, that of *C. sayi* is usually flat. The angle between the two faces of the propodeum is evenly rounded, not angulate as in *C. sayi*. It is possible

that *C. sayi* is a synonym of *C. nearcticus*.

**Distribution.** CANADA: southern region; USA: Most of the United States; NM: **Hidalgo Co.**, Peloncillo Mts. (Coronado National Park, Clanton Draw, Cloverdale Creek), **Sierra Co.**, 21 k S Hillsboro, **Taos Co.**, Ojo Caliente.



**Habitat.** Prairies and woodlands, especially riparian habitats, ranging from deciduous forests, oaks, pinyon-juniper forests up to ponderosa pine forests (1490 - 1700 m).

**Biology.** This is an arboreal species, especially of oaks (*Quercus arizonica* in New Mexico), cottonwoods and even pines. In central and southern Texas, this species nests in galls of the cynipid *Disholcaspis cinerosa* in live oaks (*Quercus virginiana*). Specimens from the Everglades were collected in a dead branch hanging in the understory of a mature hammock forest. Brood and reproductives were found in nests in March. An typical nest contained 198 minors and 36 majors. The larg-

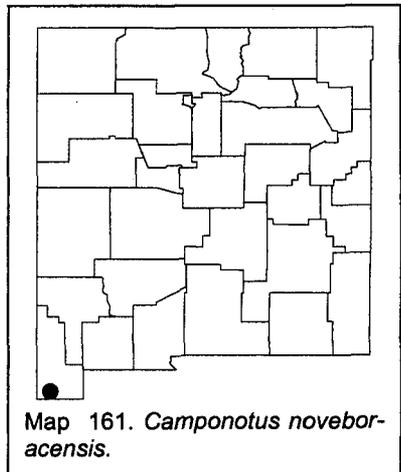
est complete nest we collected contained 531 minors, 188 majors, 5 alate females, 1 dealate nest gyne, and 144 males. All nests contained a single gyne. The brood was not counted. Reproductives were found in nests in March to October. This is a timid species that hesitates to rescue brood when the nest is disturbed. Workers tend coccids and aphids and carry pieces of dead insects to the nest. This is a house-infesting ant.

Wheeler, 1905a, 1910b; Davis and Bequaert, 1922; Kanno, 1959; Gregg, 1963; Wheeler and Wheeler, 1963; Smith, 1965; Deyrup et al., 1988; Wheeler and Longino, 1988 (reported as *C. decipiens*, *C. rasilis*); DuBois and Danoff-Burg, 1994

### *Camponotus noveboracensis* (Fitch)

Fig. 339; Map 161

**Discussion.** This is a large, attractive, red and black species. The majors, minors and females have a



black head and gaster, and a red mesosoma. The punctures on the head are 2 sizes, most are very fine, larger punctures are scattered over the surface of the head. The lateral clypeal angles are present, but are not well developed, the antennal scapes are without erect hairs (except at apex), the scapes extend nearly 1 funicular segment past the posterior lateral corner in both the majors and the females. Erect hairs are sparse on the head, mesosoma, petiole and gaster, and absent on the cheeks, malar area, sides and head, posterior lateral corners, and tibiae, except for 2 rows of hairs on the flexor surface. The pubescence on the gaster is very fine, with none of the hairs overlapping adjacent hairs.

These characteristics would separate this species from all others of the subgenus *Camponotus*.

**Distribution.** CANADA: Nova Scotia, Quebec; USA: northern part of country south to New Mexico NM: **Hidalgo Co.**, Guadalupe Canyon.

**Habitat.** Wooded areas.

**Biology.** This species nests in rotten logs and stumps. It is an occasional house pest.

Jones, 1929; Gregg, 1944, 1963; Wheeler and Wheeler, 1944, 1963; Kanno, 1959; Sanders, 1964, 1972; Gotwald, 1968; Wing 1968

### ***Camponotus ocreatus* Emery**

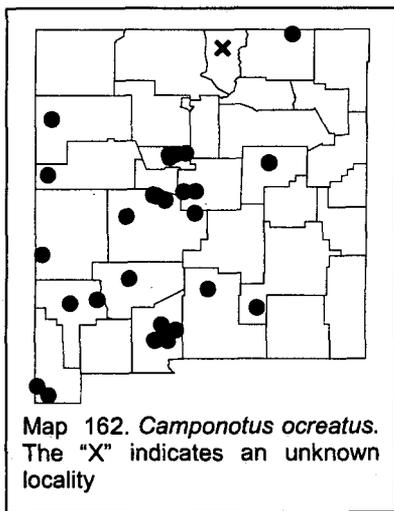
Fig. 334; Map 162

**Discussion.** Majors, minors and females can be recognized by

having no erect hairs on the cheeks or sides of the head, the bases of the scapes are not flattened, or even weakly flattened, the sides of the head are punctate, but moderately shining, the gaster is strongly shining, with the sculpture of the gaster consisting of punctures, appressed pubescence on the gaster is sparse and tiny ( $> 0.04$  mm). The scape extends well past the posterior lateral corner of the head. Color varies, but usually these ants have a black head with the remainder brown.

This species is difficult to distinguish from *C. vicinus*. The gaster of *C. ocreatus* is glossy and shining. Upon closer inspection one can see that it is finely punctate, or if striate, there are box-like structures in the striae. It also differs in that the genae are strongly shining with inconspicuous punctures. The reflection is very strong (enough to be uncomfortable under the scope when a strong light is reflected from the surface). It also has 10 or fewer erect hairs on the pronotum, *C. vicinus* has 7 or more (see discussion of *C. vicinus*). Additionally, the appressed pubescence is very sparse and short, with none of the hairs overlapping along their lengths. *Camponotus vicinus*, on the other hand, has a gaster with a dull surface, with distinct, transverse striae, and with long, abundant pubescence. *Camponotus ocreatus* is usually brown with a black head, whereas *C. vicinus* is usually black with a brown mesosoma (this is nearly always the case with the majors of the two species). Other minor characters would include the more shining cheeks in *C. ocreatus*, and the less flattened

antennal scape base. Occasionally specimens are found that are intermediate between the two species, but most can be easily separated.



**Distribution.** USA: CA, AZ, NV, TX, NM: throughout the mountains of the state, including **Bernalillo Co.**, Albuquerque, Elena Gallego, several k E Sandia Mts., **Catron Co.**, 21 k N Glenwood, **Chaves Co.**, 12 mi. W Hope (Cole, 1954d), **Cibola Co.**, 22 k S Fence Lake, **Colfax Co.**, Raton Pass (Cole, 1954d), **Doña Ana Co.**, Aguirre Springs, Las Cruces, E. side Organ Mts., Dripping Springs, 45 k NE Las Cruces, (Jornada Long Term Ecological Site), **Grant Co.**, Leopold Vista, 60 k E Silver City, **Guadalupe Co.**, Santa Rosa, **Hidalgo Co.**, 2 mi. W Cloverdale, Guadalupe Canyon, **McKinley Co.**, near Gallup (Cole, 1954d), **Otero Co.**, Tularosa (Cole, 1954d), **Sierra Co.**, 11 mi. NW Cuchillo, **Socorro Co.**, 20 m N Bernardo (Cole, 1954d), 25 m E Bernardo (Cole, 1954d), Gran

Quivira, 21 k S Magdalena, Sevilleta National Wildlife Refuge, **Taos Co.**, without locality, **Torrance Co.**, near Mountainair, 15 mi W Mountainair (Cole, 1954d); MEXICO: Baja California, Baja California Sur, Chihuahua.

**Habitat.** Foothills of surrounding desert areas, including semidesert shrub communities, oak-juniper woodland (*Quercus turbinella*, *Rhus trilobata*, *Juniperus* sp.), with trees up to 4 meters tall, pinyon pine forests, riparian desert canyons with sycamore, cottonwoods and grass.

**Biology.** This species nests under stones in rocky loam soils, often on north-facing slopes and often in partial shade at the edges of a forest. Brood was found in nests from March to July. A dealate female was found in July. Foraging activity is nocturnal. One colony was nesting with *Trachymyrmex arizonensis*.

Cole, 1954d, 1966; Wheeler and Wheeler, 1973

### *Camponotus papago* Creighton

**Discussion.** This species can be easily recognized by the truncate anterior part of the head of the major, which is nearly perpendicular to the long axis of the head as seen from the side.

It could be confused with *C. ulcerosus*, but the head of the latter species is obliquely truncate. Additionally, *C. papago* nests in dead branches, *C. ulcerosus* nests under stones. The minors of both species are difficult to recognize, and to dis-

tinguish from those of other species. The minors of these two species can be separated as the metanotal suture is depressed in *C. papago*, but is not in *C. ulcerosus*.

**Distribution.** USA: southern and southeastern AZ; may occur in NM; MEXICO: Sonora.

**Habitat.** Oak and mesquite forests.

**Biology.** This species nests in dead limbs of oaks (*Quercus emoryi*, *Q. oblongifolia*), or mesquites, and are difficult to find. They are most common in the stubs of broken branches, with a diameter of 4 cms or more, and point vertically (apparently catch more rainwater). The nest has several entrances, which are blocked by the large, round, truncated portion of the heads of majors (see figure in Creighton, 1967). They move to allow the minors to exit and enter the nest. Creighton (1967) wrote one of the most interesting articles ever written on ants for a general audience, and is well worth reading. When the majors are disturbed, they exude a sticky, gray fluid from the region of the mouth (probably mandibular glands?), which spreads over the truncated portion of the head. It dries to a crust, which is difficult to remove. Mating flights occur throughout July, during the first half of the rainy season. Workers apparently forage at night, as they are not found on during the day on trees which contain nests.

Creighton, 1952c, 1967

## ***Camponotus pennsylvanicus* (De Geer)**

Fig. 341; Map 163

**Discussion.** The majors, minors, females, and males of this species are large, black ants without hairs on the cheeks or sides of the head, or posterior lateral corners, the scapes are without erect hairs, except at the apex, the mesosoma has numerous hairs on the dorsal surface, as does the petiole. The gaster has erect hairs scattered over the entire surface, the tibiae are without erect hairs, except for 2 rows along the flexor surface, in which most hairs are present along the apical half. Appressed pubescence is sparse on most surfaces, including the head, and mesosoma, although the hairs on dorsum are more numerous, but few or none overlap adjacent hairs, the side of the propodeum has a few appressed hairs. The hairs on the gaster are long (over 0.02 mm) and abundant, nearly all hairs overlap adjacent hairs, and are nearly as long as the erect hairs on the gaster.

This species is a member of a group of 3 species (with *C. herculeanus* and *C. modoc*), which are difficult to separate. Majors can be separated from those of *Camponotus modoc*, as the appressed hairs on the gaster are nearly as long or as long as the erect hairs, whereas these hairs on *Camponotus modoc* are generally shorter than the erect hairs (caution: there is considerable variation in the lengths of these hairs). The appressed hairs on the gaster overlap adjacent hairs, whereas they rarely do in *C. modoc*. *Camponotus penn-*

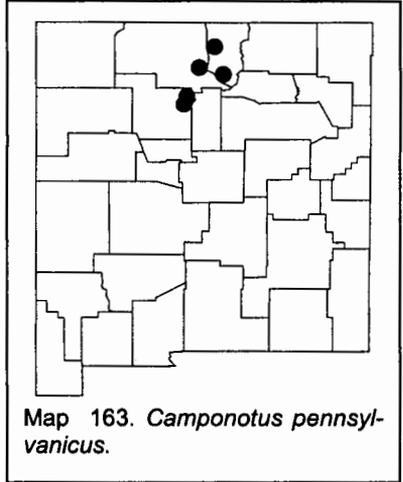
*sylvanicus* is nearly always concolorous black, whereas *Camponotus herculeanus* generally has a deep red mesosoma, or at least deep red legs. Along the western edge of the distribution (Wyoming south to northern New Mexico) specimens usually have red legs, which may be evidence of hybridization. The scapes of the major of *Camponotus pennsylvanicus* extend 1 - 2 funicular segments past the posterior lateral corner, whereas in *Camponotus herculeanus* they rarely reach the posterior lateral corner, or extend less than 1 funicular segment past the posterior lateral corner. The appressed hairs on the gaster are much denser in *Camponotus pennsylvanicus*.

The minors of the 3 species are very difficult to separate. The minors of *Camponotus pennsylvanicus* are usually concolorous black, whereas at least the legs of *Camponotus modoc* and *Camponotus herculeanus* are often dark red. The appressed hairs of *C. modoc* and *C. herculeanus* are usually shorter than they are in *C. pennsylvanicus*.

The females of the 3 species cannot be reliably separated, as the appressed hairs on the gasters of the females of *C. pennsylvanicus* are often short and similar to those of *C. modoc* and *C. herculeanus*. The females of *Camponotus pennsylvanicus* are concolorous black, whereas the legs of the other 2 species are occasionally dark red. The scapes extend about the same distance past the posterior lateral corners in all 3 species.

The males of the three species cannot be distinguished, and in

general cannot be separated from other species of *Camponotus*.



Map 163. *Camponotus pennsylvanicus*.

**Distribution.** CANADA: New Brunswick and Quebec; USA: Eastern North America as far west as TX; NM: Los Alamos Co., Los Alamos, Camp May, Taos Co., Ojo Caliente, 20 k S Taos, 6 k SW Tres Piedras. It is not widely distributed in New Mexico, but is locally common.

**Habitat.** Ranging from prairies to forested areas (ponderosa pine), including riparian habitats with cottonwoods.

**Biology.** This species, the black carpenter ant, and the first North American ant to be described, nests in living and dead trees, rotten logs or stumps in forested areas. This is an important, destructive pest that attacks fences, poles and buildings. This is probably the most destructive carpenter ant in North America (Wheeler and Wheeler 1963), although Creighton (1950) argued that its destructive capacities were somewhat exaggerated and that they only

tunnel in decayed wood. It often forages inside homes, making it an important house pest. Reproductives were found in nests from April to October. This species is found in the same logs and stumps as members of the genera *Lasius*, *Formica* (i. e. *F. podzolica*), and *Leptothorax*. Workers tend aphids, with the smaller workers collecting honeydew and transferring it to larger workers that carry it back to the nest. In addition, foragers feed on dead insects and plant juices.

McCook, 1877; Graham, 1918; Jones, 1929; Back, 1937; Van Pelt, 1958a; Wheeler and Wheeler, 1963; Sanders, 1964, 1972; Smith, 1965; DuBois and Danoff-Burg, 1994

### ***Camponotus sansabeanus* (Buckley)**

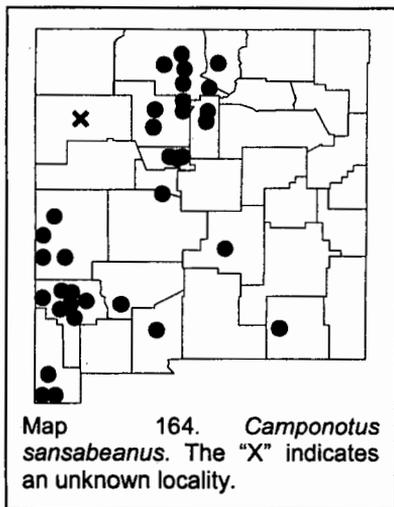
Figs. 333, 345; Map 164

**Discussion.** This is a very common species in northern New Mexico. Majors have wide heads, and the scape usually just reaches the posterior lateral corner of the head, or passes the posterior lateral corner by less than the first funicular segment. Erect hairs on the head are mostly restricted to the clypeus, but can be found on other parts of the head, and even the sides of the head and ventral surface of the head. The base of the scape is flattened and may even be lobe-like. The color ranges from pale yellow to black, most specimens are bicolored with the head darker than the remainder of the ant. Females are similar, except the scapes are relatively longer and

the head is usually noticeably widened near the level of the eye. The petiole of the female is slender in profile, with a sharp apex, the anterior face near the apex is slightly concave. The scape of the male is not flattened at the base. Specimens from southeastern Arizona (Cochise Co.) and western New Mexico (Grant Co.) often have erect hairs along the sides of the head.

This species could be confused with two other species: *C. dumetorum* and *C. semitestaceus*. Unfortunately the distributions of all three species overlap, further complicating identification. *Camponotus sansabeanus* can usually be separated from *C. semitestaceus* as the antennal scape extends < 1 funicular segment past the posterior lateral border, not > 1 as in *C. semitestaceus*. It can usually be separated from *C. dumetorum* as that the appressed pubescence on the gaster is usually sparse, not abundant as in *C. dumetorum*, and *C. dumetorum* does not occur in New Mexico. The minors of *C. sansabeanus* and *C. dumetorum* can often be distinguished from those of *C. semitestaceus* as the antennal scape extends about halfway past the posterior lateral corner, whereas in *C. semitestaceus* it usually extends more than half length past the corner. The females of the first two species can usually be separated from *C. semitestaceus* as the scapes extend past the posterior lateral corners by about 1 ½ funicular segments, whereas in *C. semitestaceus* the scape extends at least 2 segments past the posterior lateral corner. The males of the first two species are easily separated from

those of *C. semitestaceous* as the entire outline of the head this see the frontal view is covered with erect hairs, whereas the hairs are sparse in *C. semitestaceous*.



**Distribution.** USA: Southwestern United States CA, AZ, NV, UT, CO, TX east to MO, OK, LA and AR; NM: **Bernalillo Co.**, Albuquerque, NW Albuquerque, Tijeras, **Catron Co.**, Catwalk, 2 mi. N Frisco Hot Springs, 23 k N Glenwood, 8 k N Reserve, **Doña Co.**, 45 m NE Las Cruces, **Eddy Co.**, Hidden Cave, **Grant Co.**, Leopold Vista, Mimbres, Mule Creek, 100 k N Silver City, 60 k E Silver City, 10 mi. S Silver City, White Signal, **Hidalgo Co.**, Animas Mts., Clanton Draw, Guadalupe Canyon, **Lincoln Co.**, 5 mi. W Capitán, **Los Alamos Co.**, Los Alamos, Rio Grande near Los Alamos, **McKinley Co.**, without locality, **Rio Arriba Co.**, Abiquiu Dam, 37 k N Abiquiu, 7 k S Cebolla, 2 k N Dixon, **Sandoval Co.**, Bandelier National Monument, 26 k S Cuba, **Santa Fe**

**Co.**, Santa Fe, **Sierra Co.**, 31 k SW Hillsboro, **Socorro Co.**, Bear Mt., 20 m N Bernardo (Cole, 1954d), 17.6 k NW Magdalena, **Taos Co.**, 20 k NW Taos, **San Miguel Co.**, Pecos; MEXICO: Baja California, Chihuahua, Coahuila.

**Habitat.** Sagebrush, pinyon-juniper (most common in this habitat), oaks, ponderosa pine, Chihuahuan pine, rocky ridges near pines.

**Biology.** The nests are usually found under stones, but may be in (and under) rotten stumps and logs, or even under cow manure (especially founding gynes and young nests), in rocky, gravelly or loam soils. Brood and reproductives were found in nests in August and September. Dealate females were found in March, May and June and September. This species forages diurnally. Workers are timid and escape when the nest is disturbed. One colony was nesting together with *Forelius*.

Wheeler, 1917; Cole 1954d; Gregg, 1963; Wheeler and Wheeler, 1973

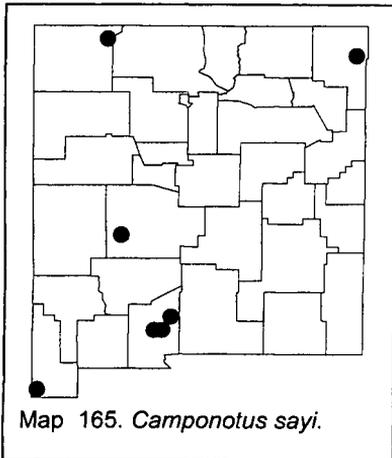
### *Camponotus sayi* Emery

Fig. 343; Map 165

**Discussion.** Major workers of this species have a well defined notch on the anterior border of the clypeus, usually have 2 erect hairs along the basal border of the clypeus, the cheeks and the malar area are without erect hairs, the pronotum is usually without erect hairs, but they have as many as 4, the dorsum of the mesosoma is very weakly convex, or even straight, the angle of the propo-

deum is relatively sharp as seen in profile, the petiole is narrow, with sharp apex, the head and mesosoma are usually red, the gaster is black.

The majors of this species are usually easy to identify, based on the shape of the mesosoma, with the dorsal surface being relatively flat and the propodeum relatively sharply angulate between the 2 faces. The usual lack of hairs on the pronotum also help in the identification. Minor workers are difficult to recognize, and can be confused with those of *C. hyatti*, as the mandible can be moderately shiny. The smaller workers can also be confused with those of *C. nearcticus*. As the distributions of these 3 species overlap, it is usually necessary to collect major workers to distinguish them. See the discussion of *C. nearcticus* for suggestions on how to separate this species from *C. nearcticus*.



Map 165. *Camponotus sayi*.

**Distribution.** USA: Eastern United States as far west as OR, south to CA; NM: **Doña Ana Co.**, 18 k E Las Cruces, 40 k E Las Cruces, Aguirre Springs, **Hidalgo Co.**,

Peloncillo Mts. (Coronado National Park), **San Juan Co.**, Archuleta, **Socorro Co.**, Magdalena Mts. (21k S Magdalena), **Union Co.**, Kiowa National Grasslands; MEXICO: Chihuahua, Sonora, Durango.

**Habitat.** Chihuahuan Desert (in New Mexico), arroyos with hackberry (*Celtis*), cottonwoods (*Populus*) in other areas habitats range from prairies to oak-hickory forests, scrubby juniper-pinyon-oak woodland or scrubby ponderosa pine on rocky slopes next to washes, steep, shaded stream banks of seasonal creek valleys with scattered sycamores, walnuts, junipers and large *Quercus grisea*.

**Biology.** This species occurs in arid ecosystems where it nests in mesquite (*Prosopis* spp.) and oaks (*Quercus* spp.), such as dead limbs (2 - 8 cm diameter) of *Quercus arizonica*, *Q. emoryi* and *Q. grisea*, about 2 meters above soil surface. Dealate females begin nests in such limbs. It is a minor house pest in some areas. Reproductives were found in nests in April.

Wheeler, 1910b; Dennis, 1938; Gregg, 1963; Smith, 1965; DuBois and Danoff-Burg, 1994

### *Camponotus schaefferi* Wheeler

Figs. 336, 351; Map 166

**Discussion.** This is an unusual member of the subgenus *Camponotus*. The teeth on the anterior border of the clypeus are well-developed (Fig. 336), the sides of the head of the major are nearly parallel, or even slightly wider anterior to the

eyes, the scapes have erect hairs (Fig. 351), but the remainder of the ant has few erect hairs, and the ante-



Fig. 351. Right scape of a major worker of *C. schaefferi*.

rior and posterior faces of the petiole are nearly parallel. The entire ant is yellowish-brown or reddish brown.

This species is easily separated from all of the other members of the subgenus *Camponotus*, by a combination of having erect hairs on the scapes, being concolorous yellowish-brown, and having the sides of the head of majors, minors and females nearly parallel. It could be confused with *C. laevigatus*, which also has numerous erect hairs on the scapes, and both species are shiny, but they are easily separated as *C. laevigatus* is black. Additionally, the teeth on the clypeal border are much more developed than they are in *C. laevigatus*. The shiny sculpture and color will separate it from all other New World species of the subgenus, except *C. texanus* (found in west Texas). It can be separated from this latter species by color: *C. texanus* is bicolored, with the head and gaster black, mesosoma red or reddish-brown.

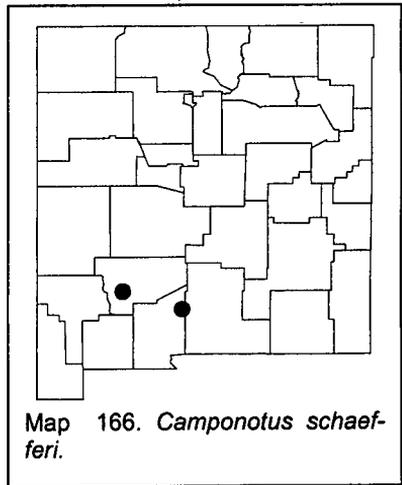
**Distribution.** USA: AZ, NM: Doña Ana Co., 40k E. Las Cruces (Aguirre Springs), Sierra Co., 20.7k E Hillsboro.

**Habitat.** Scrubby ponderosa pine, Arizona oak, oak pine-juniper

woods, oak foothills, from elevations of 1,520 - 2,440 m.

**Biology.** This carpenter ant nests in dead oak limbs and inside living trunks of half-dead Emory oaks. They are very agile and difficult to capture.

Wheeler, 1917



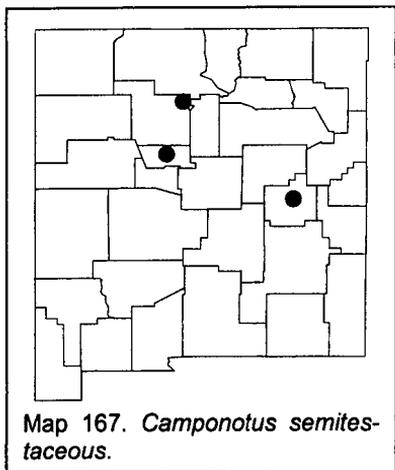
Map 166. *Camponotus schaefferi*.

### *Camponotus semitestaceus* Snelling

Fig. 349; Map 167

**Discussion.** This species is closely related to *C. dumetorum* and *C. sansabeanus*. The base of the scape is flattened and enlarged into a lobe (Fig. 349). It can usually be separated as the antennal scapes extend more than one funicular segment past the posterior lateral corner, usually about two segments. Further notes on this group of species, in addition to hints on the separation of the minors, females, and males, can be found in the discussion of *C. sansabeanus*.

**Distribution.** USA: Western United States as far east as OK; NM: **Bernalillo Co.**, Albuquerque, **De Baca Co.**, Sumner Lake, **Sandoval Co.**, Bandelier National Monument (Pippin and Pippin, 1984); MEXICO: Baja California.



Map 167. *Camponotus semites-taceous*.

**Habitat** Pinyon juniper forests.

**Biology.** Nests are found under stones or in the soil, surrounded by a small mound (few cms up to 30 cms in diameter). The colonies are large with many majors. Workers are active during the night or during cooler times of the day, and tend Homoptera. Nest density can be very high. Brood was found in a nest in May; reproductives were found in nests in September. The scarabaeid beetle *Cremastocheilus planatus* and the ant cricket *Myrmecophila oregonensis* occur in nests.

Wheeler, 1906b, 1910b, 1917; Essig, 1926; Cole, 1934a, 1966; Eckert and Mallis, 1937;

Mallis, 1941; Wheeler and Wheeler, 1973

### *Camponotus trepidulus* Creighton

**Discussion.** The propodeal angle of this species is low and completely rounded. The petiole is rectangular shaped in profile, the top of the node has a flattened face.

This species is not likely to be confused with any others, except *C. mina*, due to the shape of the propodeum and petiole. See the discussion of *C. mina* and the key to *Myrmobrachys* for hints on how to separate the two species.

**Distribution.** USA: AZ (Baboquivari Mts.); may occur in New Mexico; MEXICO: Baja California.

**Habitat.** Oak woodlands.

**Biology.** This species nests in dead limbs of oak (*Quercus oblongifolia*). Specimens from Nogales were collected from wood in tunnels of *Ailanthus*.

Creighton, 1965

### *Camponotus ulcerosus* Wheeler

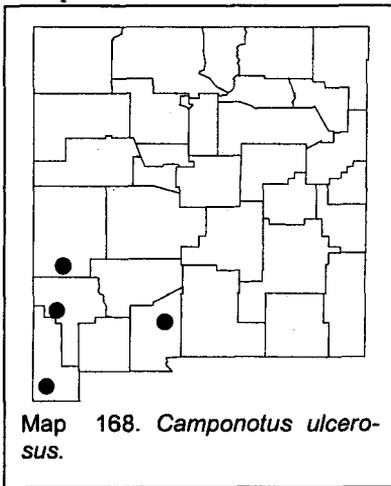
Figs. 330, 331; Map 168

**Discussion.** The majors are easily recognized as the head is obliquely truncate, very roughly sculptured and usually has deep, eroded areas on the cheeks. This will easily distinguish it from all other ground nesting *Camponotus* in New Mexico.

Unfortunately the minor worker is much more common and is the form most often collected. The

minor workers are more difficult to recognize, but are small, black, shiny specimens in which the head and mesosoma are densely and coarsely sculptured. The mesosoma is evenly arched and is covered with long (0.25 mm), white, slightly twisted, erect hairs (Fig. 331).

They are superficially very similar to the minor workers of *C. mina* (see *C. mina* discussion). They can also be confused with minors of *C. papago*, due to the form of the head. See the discussion of *C. papago* for hints on how to separate the two species.



Map 168. *Camponotus ulcerosus*.

**Distribution.** USA: AZ, TX, NM: NM: **Catron Co.**, Mogollon Mts., **Doña Ana Co.**, 45 k NE Las Cruces (Jornada Long Term Ecological Research Site), **Grant Co.**, 8.9 k NNE White Signal, **Hidalgo Co.**, 53 k SW Clayton Draw; MEXICO: Chihuahua.

**Habitat.** Chihuahuan Desert and surrounding foothills, including grassy areas, herbaceous meadows with scattered junipers, blue oaks.

oak-juniper woodland rocky soil, broad, mesquite dominated arroyos.

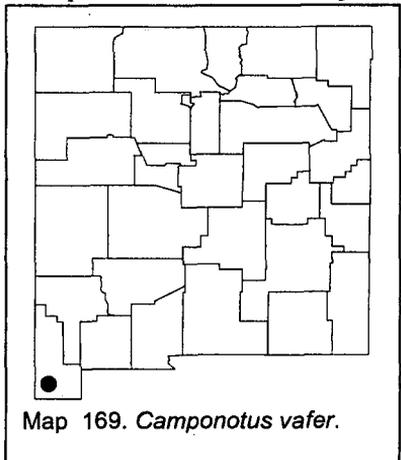
**Biology.** This species nests in arid habitats under large stones or boulders. The nest is surrounded by a carton shield, a paper-thin sheet of vegetable material, cemented together with salivary secretions, with at least one nest entrance. The soldier uses its head to block the nest entrance. Sexuials occur in nests in May. Minor workers are moderately common in rough, desert canyons, where they can be found foraging on large boulders. Majors capture workers of *Tetramorium spinosum* when they walk over their faces, as they blocks the nest entrance.

Wheeler, 1917; Creighton, 1951, 1953b, 1967; Samuelson, 1961

### *Camponotus vafer* Wheeler

Map 169

**Discussion.** The workers of this species are difficult to separate



Map 169. *Camponotus vafer*.

from those of *C. festinatus*. The

queens are larger than those of *C. festinatus*. See discussion of *C. festinatus* for a comparison of the two species.

**Distribution.** USA: AZ; NM: Hidalgo Co., Peloncillo Mts. (Coronado National Forest).

**Habitat.** Desert foothills.

**Biology.** This species nests under stones.

### ***Camponotus vicinus* Mayr**

Figs. 328, 350; Map 170

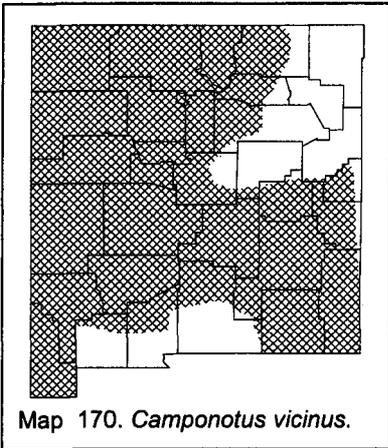
**Discussion.** The majors, minors, and females of this species have the area at the base of the scape flattened, which is rarely enlarged into a poorly formed lobe. The frontal carinae are widely separated. The cheek, malar area, and sides of head are nearly always are without erect hairs, but up to 3 for 4 hairs may be present on the cheeks (usually located near the base of mandibles), and an erect hair on the ventral surface of the head may be visible in full face view, appearing as an erect hair on the side of the head. The mesosoma has numerous erect hairs, as does the petiole and the gaster, the hairs on the gaster are positioned along the posterior edge of each tergum, as well as nearly always scattered across the surface. The middle and hind tibiae have 2 rows of erect, coarse hairs that extend nearly the entire length of the tibiae, but there are usually fewer than 10 present, and most are on the distal half. The head and mesosoma have a few appressed hairs. The appressed hairs on the gaster are variable, ranging from a few tiny (0.01 mm) hairs, to coarse,

long (up to 0.2 mm) hairs. The head is densely and evenly punctate, the mesosoma is coriaceous, and the gaster ranges from smooth and glossy to dull with coarse transverse striae. The color ranges from yellow brown to black, the most common color includes a black head and gaster with a red mesosoma and legs.

Majors of *C. vicinus* can be usually separated from the other closely related species of *Camponotus* by the near lack of erect hairs on the cheeks, malar area and sides of the head. The scape is nearly always flattened at the base, but is rarely widened. It could be confused with *C. acutirostris*, but the latter species has numerous erect hairs on the cheeks, and has erect hairs along the sides of the head, with some near the eyes, and the majors have a pointed clypeus (Fig. 348). It is also difficult to separate from *C. ocreatus*, but has sculpture that is coarser and not as strongly shining. In addition, there are at least 7 erect hairs on the pronotum, usually more than 10, whereas there are 10 or less on the pronotum of *C. ocreatus*.

**Distribution.** CANADA: southwestern region; USA: Western North America as far east as WY, CO, KS, OK, TX; NM: Common ant throughout the state, usually at higher elevations. It has been collected in **Bernalillo Co.**, Albuquerque, Rio Grande, **Catron Co.**, 4 k N Apache Creek, 13 k N Apache Creek, 33 k E Horse Springs, 12 k E Datil, 14 k E Datil, 15 k E Datil, 15.3 k NNE Datil, 34.9 k N Glenwood, Mogollon Mts., Ox Spring Canyon, Sawtooth Mts., near Snow Lake, 29.6 mi. N

Catron Co. Line, **Chaves Co.**, Mes-calero Sand Dunes W Caprock, **Colfax Co.**, 16 k E Eagle Nest, 41 k E Eagle Nest, Koehler, **Curry Co.**, Clovis, 4 mi. W Grady, **De Baca Co.**, 4 mi. N Taiban, **Doña Ana Co.**, Aguirre Springs, Las Cruces, **Eddy Co.**, 32°22.2'N 103°46.9' W, 26 mi. E Carlsbad, Hidden Cave, **Grant Co.**, Ft. Bayard, Silver City, 88 k E Silver City, Gila Mts. (Iron Creek), Mogollon Mts., **Hidalgo Co.**, Big



Map 170. *Camponotus vicinus*.

Hatchet Ranch (Thompson Canyon), Peloncillo Mts. (Coronado National Forest), Thompson Canyon (Big Hatchet Ranch), **Lea Co.**, 20 mi. WSW Hobbs, **Lincoln Co.**, Cibola National Forest, Oak Creek Camp, 4 mi. W Alto, Sacramento Mts., Eagle Creek - Sierra Blanca, **Los Alamos Co.**, East Banderier, Los Alamos, **McKinley Co.**, Gallup, 8 mi. S Gallup (Fagerlund, pers. comm.), **Mora Co.**, Coyote Creek State Park, **Otero Co.**, Guadalupe Mts. (41 k NW Sitting Bull Falls), Sacramento Mts. (Hayne's Canyon), White Mts., White Sands National Monument, **Rio Arriba Co.**, Abiquiu Dam, 37 k N Abiquiu, 4 k NW Ajo City, 7 k S

Cebolla, 4 k N Chama, 2 k N Dixon, 10 k SW Española, **Sandoval Co.**, 4 k W Cuba, 11 k E Cuba, 26 k S Cuba, Rio Rancho, **San Juan Co.**, Archuleta, 3 k E, 4 k E, 13 k E Aztec, Chaco Canyon, **San Miguel Co.**, 20 k NW Las Vegas, Romeroville, **Santa Fe Co.**, Glorieta Battlefield (SW Pecos), Santa Fe, **Socorro Co.**, Bosque del Apache, 12 k NW Datil, 5 k N Camp Luna, Grassy Lookout, Sevilleta, Magdalena Mts. (Water Canyon), 16 k S Magdalena, 21 k S Magdalena, 19 k S Magdalena, 3 mi. from Highway 107, **Torrance Co.**, 5 mi. W Capitán, 6.2 mi. E Clines Corner, 5 mi. NE Corona, 24 k S Mountainair, **Taos Co.**, Ojo Caliente, Taos, 20 k NW Taos, 6 k SW Tres Piedras, 14 k SE Tres Piedras, **Valencia Co.**, Belén; MEXICO: Baja California, Chihuahua, Coahuila, Nuevo Leon. Cole (1954d) lists many additional New Mexican localities.

**Habitat.** Chihuahuan Desert, areas of mesquite, sagebrush, meadows, deciduous forests, oak forests, riparian cottonwood forests, ponderosa pine-riparian, pinyon-juniper, ponderosa pine, Douglas fir, aspen forest, usually at higher elevations in relatively mesic sites (1930 - 2960 meters).

**Biology.** This is a very common species in New Mexico, which nests under stones and logs (rare) in open areas of fine sand to rocky soils. Brood and reproductives were found in nests from March to October, dealate females were captured from March to mid September. A flight occurred on 19-vii-1986 at 7:00 p.m. Nests are occasionally started by pleometrosis (multiple fe-

males start nests together). Much of the foraging occurs at night, although workers are also diurnal; workers tend Homoptera. Workers forage into vegetation, especially cholla (*Opuntia* sp.), and *Yucca* sp. Workers are attracted to baits, including liver, especially rotten liver. *Monomorium minimum*, *Myrmica striolagaster*, *Liometopum apiculatum*,

*Leptothorax crassipilis*, and *Solenopsis* live in nests. One nest inhabited an abandoned nest of *Pogonomyrmex occidentalis*. Gynes are prey of *Formica* and *Solenopsis*.

Jones, 1929; Mallis, 1941; Gregg, 1963; Wheeler and Wheeler 1963, 1973; Cole, 1966; DuBois and Danoff-Burg, 1994

## Genus *Formica*

(Keys: Creighton, 1950; Francoeur, 1973; Wheeler and Wheeler, 1977, 1986; Snelling and Buren, 1985; Mackay et al., 1988)

This is the largest genus in North America in terms of numbers of species. Ants of this genus are common in New Mexico, especially in montane forests. Identification to species is very difficult. One needs considerable experience with ants before tackling this genus, as without experience, identifications are usually incorrect.

Workers are quite variable in form, but the following characteristics will distinguish this genus and separate it from all others. Many species are polymorphic and bicolored, with a red head and mesosoma and a black gaster. Other species are concolorous black or dark brown, although some are concolorous yellow or light brown. The antenna has 12 segments with the first segment of the funiculus about as long as the two following segments (Fig. 352). The frontal carinae are short and almost parallel. The frontal area is clearly defined. The maxillary palp is long, obvious and composed of 6

segments. The mesosoma is depressed at the metanotal suture (Fig. 352). The petiole is convex anteriorly and flattened posteriorly. Although there is considerable variability within the genus, specific characteristics listed with the other genera will usually distinguish them from *Formica*.

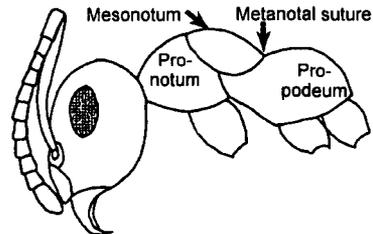


Fig. 352. Side view of a worker of *F. perpilosa*.

These ants nest in the soil, in thatched (Plate 2, Fig. 353) or earthen mounds, or in logs and stumps. Most species are predaceous, although they will also tend Homoptera. Some of our species are among the most aggressive ants. Although they cannot sting, they attack with a

vengeance, biting and spraying formic acid on their enemies, often in the wound made by the mandibles. Repeated exposure to the formic acid can peel the skin. They are common pests at picnics in the forest. Many species enslave other species, which makes them a fascinating group to observe.

This is a very large, difficult and common genus, especially in the northern part of the state. It is also in desperate need of revision. Most species determinations must be viewed with suspicion, as there are poorly characterized species in most species complexes and apparently several undescribed species. It is an especially interesting genus as species are involved in slave making, temporary social parasitism and various forms of nest founding ("normal", and budding, in which part of the original nest separates and forms a new nest.) and are involved in interest movement (Mackay and Mackay, 1983). These ants nest in a wide variety of sites, from logs and stumps to under stones, and in all community types in New Mexico. The species in the "rufa" species group usually build thatched dome-like nests (Plate 2, Fig. 353). Many species enslave other species. Cole (1954e, 1955b) discusses New Mexican species. Wheeler and Wheeler (1977, 1986) present good keys to the species and provide illustrations for the characters used in the following key. We have followed Wheeler and Wheeler (1986) and have included the *microgyna* group as part of the *rufa* group. They differ from the *rufa* group in that the hairs are usually spatulate and the queens

are small, approximately the size of the largest workers.

**Key to the workers of the *Formica* species groups**

(See Wheeler and Wheeler, 1977)

1. Anterior border of clypeus notched in middle (Fig. 354); integument dull to feebly shining; appressed pubescence dense, at least on gaster; bicolored, head and mesosoma reddish brown or reddish yellow, gaster brown or black; propodeum short and usually angulate in profile; facultative slave-makers ..... *sanguinea* group

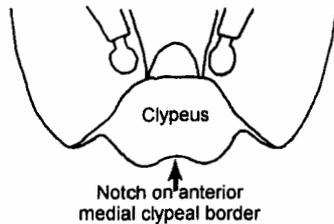


Fig. 354. Clypeus of a worker of *F. pergandei*, showing the notched anterior clypeal border.

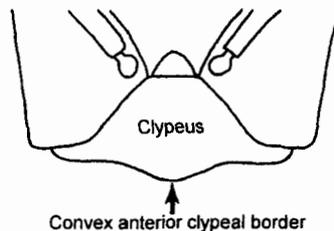


Fig. 355. Clypeus of a worker of *F. ciliata*, showing the convex anterior clypeal border (arrow).

- Anterior border of clypeus not notched (Fig. 355) or, if so, appressed pubescence is very sparse

and body shining; other characters vary ..... 2  
**2(1).** Slender (Fig. 356); surface shining; propodeum rounded (Fig. 356) in profile (i.e., dorsal and posterior faces not differentiated) ..... 3

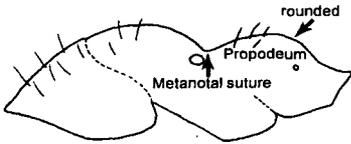


Fig. 356. Mesosoma of a worker of *F. limata*. The arrow indicates the rounded propodeum.

- Generally robust (Fig. 357); surface usually dull; propodeum usually angulate (Fig. 361) in profile (i.e., dorsal and posterior faces clearly differentiated) ..... 4

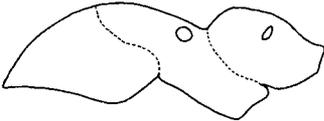


Fig. 357. Mesosoma of a worker of *F. ciliata*.

**3(2).** Scape slender, long ( $1\frac{1}{4}$  -  $1\frac{1}{3}$  length of head), scarcely curved at

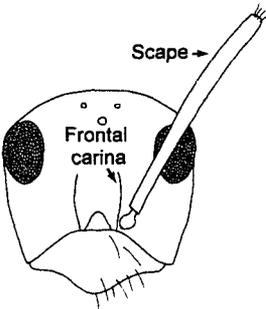


Fig. 358. Head of a worker of *F. pallidefulva*.

base (Fig. 358); median segments of funiculus more than  $1\frac{1}{2}$  times as long as broad; posterior face of petiolar apex convex; frontal carina curved inwards posteriorly (Fig. 358), larger ants (4 - 7 mm long) ..... ***pallidefulva* group**

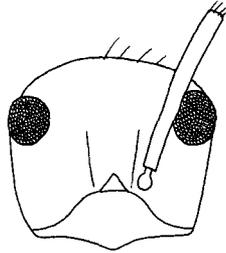


Fig. 359. Head of a worker of *F. limata*.

- Scape shorter (less than  $1\frac{1}{4}$  head length) (Fig. 359); frontal carinae subparallel, weakly diverging posteriorly (Fig. 359); smaller ants ( $2\frac{1}{2}$  - 6 mm long) ..... ***neogagates* group**

**4(2).** Larger workers with posterior border of head distinctly concave (Fig. 360); propodeum (in profile) with dorsal and posterior faces meeting at an angle (Fig. 361) .....

..... ***exsecta* group**

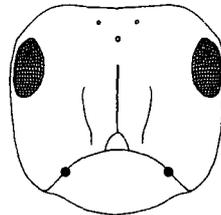


Fig. 360. Head of a worker of *F. opaciventris*.

- Larger workers with posterior lateral border at most slightly concave, usually flat or slightly convex

(Fig. 362); pronotum (in profile) evenly convex, not angulate ..... 5

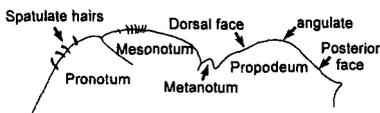


Fig. 361. Outline of the mesosoma of a worker of *F. opaciventris*.

5(4). Frontal area (Fig. 362) usually shining; bicolored: head and mesosoma reddish or yellowish red and notably lighter than gaster or, if infuscated, infuscation not completely masking reddish ground color in larger workers; gaster brown or black; surface mostly dull; strongly polymorphic ..... *rufa* group

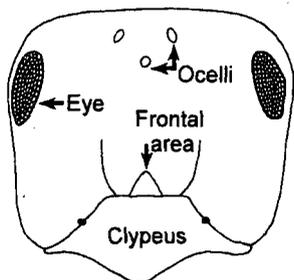


Fig. 362. Head of a worker of *F. obscuripes*.

- Frontal area dull, most surfaces dull, concolorous black or brown or bicolored; if bicolored, mesosoma lighter than gaster and upper portion of head; weakly polymorphic ..... *fusca* group

The following key may be useful, due to its simplicity. Unfortunately sorting specimens of *Formica* on the basis of their size does not always work, and there is overlap of size in the key. Once a species group has been determined, it is a

good idea to check it with the first key. Sorting specimens of *Formica* to the proper species complex is often the most difficult step, when you first begin with this group. Once you have experience, most specimens can be sorted by simply looking at them. If there is any doubt about the identity of the species group, it is wise to run the specimens of a series through more than one key, and compare them to the discussion of all of the species, to increase the probability of correct identification.

### Simplified key to the workers of the species groups of *Formica*

1. Predominantly small (2.5 - 6 mm), mostly monomorphic ants . 2
- Predominantly large (4 - 7 mm), mostly polymorphic ants ..... 3
- 2(1). Most body surfaces shiny, especially gaster.. *neogagates* group
- Most body surfaces dull ..... *fusca* group
- 3(1). Anterior margin of clypeus notched or concave in the middle (Fig. 354) ..... *sanguinea* group
- Anterior margin of clypeus convex or straight (Fig. 355) ..... 4
- 4(3). Posterior lateral margin of largest workers concave (Fig. 360); rarely collected in New Mexico ..... *exsecta* group
- Posterior lateral margin of largest worker straight, convex (Fig. 362) or only very weakly concave ..... 5
- 5(4). Relatively slender, partially smooth and shiny ants; usually yellow or concolorous light brown ... *pallidefulva* group

- Relatively robust, with most surfaces dull; usually bicolored (head and mesosoma red, gaster black) ...  
..... *rufa* group

**Key to the workers of the *Formica exsecta* group**

- 1. Pronotum and gaster each with at least 4, usually more than 12 erect hairs (Fig. 363) .....  
..... *opaciventris* Emery

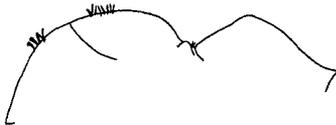


Fig. 363. Outline of the mesosoma of a worker of *F. opaciventris*.

- Pronotum (Fig. 364) without erect hairs (or fewer than 5), dorsum of first gastral tergum usually without erect hairs (except possibly few along posterior edge) .....  
..... *exsectoides* Forel



Fig. 364. Outline of the mesosoma of a worker of *F. exsectoides*.

**Key to the workers of the *Formica fusca* group**

- 1. Metasternum with a pair of distinctly pilose lobes (Fig. 365), arising one on either side of median sternal cavity (metasternal process); mesometasternal profile composed of a concavity followed by a pilose

triangle (Fig. 365) ..... 2

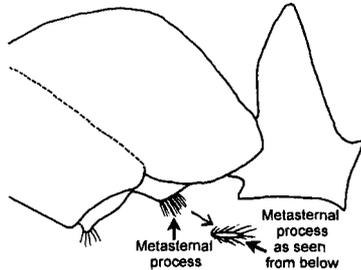


Fig. 365. Mesosoma and petiole of a worker of *F. occulta*, showing the pilose, well developed metasternal process. The second arrow shows the median sternal cavity as seen from below.

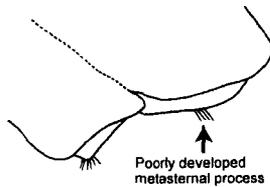


Fig. 366. Mesosoma of a worker of *F. fusca*, showing the poorly developed metasternal process.

- Metasternum without such lobes (Fig. 366); mesometasternal profile composed of concavity followed by a straight or convex line (Fig. 366) ..... 10
- 2(1). Concolorous black, dark brown or yellowish brown ..... 3
- Head and mesosoma red or yellow, gaster black or dark brown ..  
..... 8
- 3(2). Dark brown or black ..... 4
- Pale brown or yellowish brown ..... 7
- 4(3). Underside of head without erect hairs (Fig. 367) .....  
..... *occulta* Francoeur
- Underside of head with erect hairs (Fig. 368) ..... 5

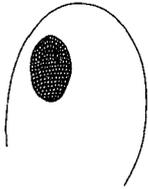


Fig. 367. Head of a worker of *F. occulta*, as seen from the side.

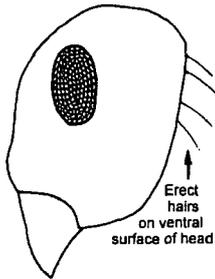


Fig. 368. Head of a worker of *F. montana*, as seen from the side.

5(4). Erect hairs present on cheek (Fig. 369) ..... 6

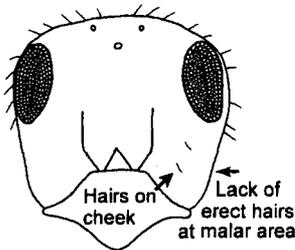


Fig. 369. Head of a worker of *F. montana*. The arrow indicates the lack of hairs on the side of the head anterior to the eye (malar area), the second arrow indicates the hairs on the cheek.

- Erect hairs absent from cheek (Fig. 370) ..... *altipetens* Wheeler  
 6(5). Head as seen in full face, with erect hairs present only from posterior lateral corner of head to

level of ventral border of eye; cheeks usually with 1 or 2 erect hairs (Fig. 369) ..... *montana* Wheeler

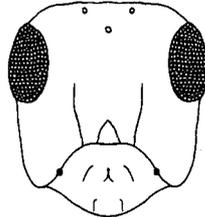


Fig. 370. Head of a worker of *F. altipetens*, showing the lack of erect hairs on the posterior lateral angles and cheek.

- Erect hairs present below level of ventral border of eye (Fig. 371); cheeks with more than 2 erect hairs (Fig. 371) .....  
 ..... *canadensis* Santschi

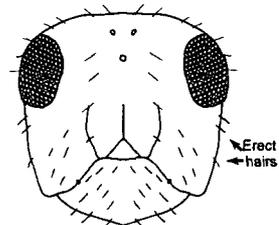


Fig. 371. Head of a worker of *F. canadensis*, showing the erect hairs on the side of the head anterior to the eye.

7(3). Ventral surface of head without erect hairs (Fig. 367) .....  
 ..... *neoclara* Emery

- Ventral surface of head with erect hairs (Fig. 368) .....  
 ..... *montana* Emery

8(2). Ventral surface of head without erect hairs (Fig. 367) .....  
 ..... *neoclara* Emery

- Ventral surface of head with erect hairs (Fig. 368) ..... 9

9(8). Posterior lateral angles of head (Fig. 369), and usually cheeks with erect hairs .... *montana* Emery  
 - Posterior lateral angles and cheeks without erect hairs (Fig. 370) ..... *altipetens* Wheeler  
 10(1). Concolorous (entire ant single color) ..... 11  
 - Head and body bicolored (minors and some majors may be so dark that the lighter color is reduced to patches on cheek and mesosoma) ..... 18  
 11(10). Dark brown or black; underside of head often with erect hairs (Fig. 368) ..... 12  
 - Pale brown or yellowish brown; underside of head never with erect hairs (Fig. 367) .....  
 ..... *argentea* Wheeler  
 12(11). Area between eye and mandibles with coarse, elongate punctures (Fig. 372), widely spaced on dorsal half ..... 13

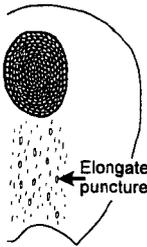


Fig. 372. Side of head of a worker of *F. neorufibarbis*, showing the elongate punctures between the eye and the base of the mandible.

- Area between eye and mandible without coarse, elongate punctures or, if present, they are concentrated on upper half, where they are closely spaced and interspersed with fine, circular punctures ..... 14

13(12). Erect hairs present on ventral surface of head, dorsal surface of mesosoma (Fig. 373), and dorsal margin of petiole (Fig. 373; all workers brownish-black or black .....  
 ..... *hewitti* Wheeler



Fig. 373. Dorsal surface of the mesosoma and petiole of a worker of *F. hewitti*, showing the presence of erect hairs.

- Erect hairs absent (Fig. 374) on above-mentioned structures (1 or 2 may be present); usually larger workers at least somewhat bicolored (at least the anterior part of head is reddish-black) .....  
 ..... *neorufibarbis* Emery



Fig. 374. Dorsal surface of the mesosoma and petiole and petiole of a worker of *F. neorufibarbis*, showing the near lack of erect hairs (note 2 hairs are present).

14(12). Erect hairs abundant on most surfaces, including ventral surface and posterior border of head, dorsum of mesosoma, dorsum of petiole, and 4 faces of all femora .....  
 ..... *lepida* Wheeler

- Erect hairs sparse, absent at least on propodeum, dorsum of petiole and at least 1 other above mentioned structures ..... 15

15(14).Hairs on first gastral tergite (exclusive of posterior row) sparse (Fig. 375) (average 4, rarely more than 10); metasternum more pilose, hairs surrounding metasternal cavity ..... 16



Fig. 375. Dorsal surface of the first gastral tergum of a worker of *F. fusca*.

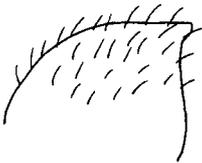


Fig. 376. Dorsal surface of the first gastral tergum of a worker of *F. argentea*.

- Hairs on first gastral tergite (exclusive of posterior row) abundant (Fig. 376) (average 20, rarely fewer than 10); metasternum less pilose, hairs not surrounding metasternal cavity, but usually restricted to region behind it ..... 17

16(15).Smaller ants (length of mesosoma 1.35 - 2.36); scapes often shorter than head length; anterior border of clypeus broadly convex, rarely angulate in middle; erect hairs on anterior part of clypeal carina usually shorter than height of frontal area; common ..... *fusca* Linnaeus

- Larger ants (length of mesosoma 1.75 - 2.85); scapes longer than head length; anterior margin of clypeus usually angulate; hairs adjacent to clypeal carina

longer than or equal to length of frontal area in most workers; rarely collected ..... *accreta* Francoeur  
17(15).Pubescence dense to very dense on cheeks and first four gastral tergites (Fig. 377, left), producing a silvery luster ..... *argentea* Wheeler

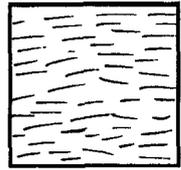
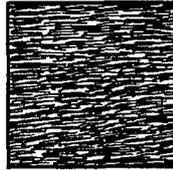


Fig. 377. Dorsal surface of the fourth gastral tergum of a worker of *F. argentea* (left) and of *F. podzolica* (right).

- Pubescence dilute to normal on fourth gastral tergite (Fig. 377, right) and on cheeks (at least on dorsal half), with a silky luster .....

..... *podzolica* Francoeur  
18(10).Gena between eye and mandible with coarse, widely spaced elongate punctures (Fig. 372); head and gaster dark brown, mesosoma yellowish or reddish brown; mesosoma sometimes infuscated, with lighter color reduced to mere patches; lower half of head sometimes paler; smallest workers may be entirely black; mesic habitats .....

..... *neorufibarbis* Emery

- Gena between eye and mandible without coarse elongate punctures or, if present, they are concentrated on upper half, where they are closely spaced and interspersed with fine circular punctures; color varies; often in arid habitats .....

19  
19(18).Dorsum of gaster with long, flexuous, erect hairs (Fig. 378), erect hairs on first gastral tergite abundant (24 - 43, exclusive of posterior row),

long (more than 1.2 times length of frontal area), 1 - 30 erect hairs on pronotum ..... *foreliana* Wheeler

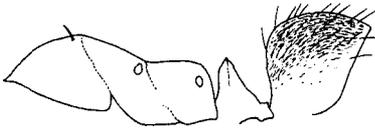


Fig. 378. Mesosoma, petiole and first tergum of the gaster of a paratype worker of *F. foreliana*.

- Dorsum of gaster with shorter, stiff, erect hairs (Fig. 379), less abundant on first gastral tergite (1 - 24, exclusive of posterior row), shorter (about equal in length to length of frontal area), 0 - 16 erect hairs on pronotum ..... 20

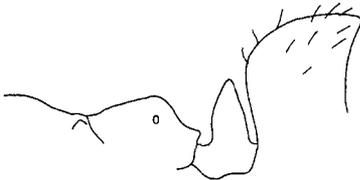


Fig. 379. Outline of the propodeum and gaster of a worker of *F. gnava*.

20(19). Propodeum high, angulate (Fig. 379) ..... *gnava* Buckley

- Propodeum long and low, rounded posteriorly (Fig. 380) ..... *xerophila* M. Smith

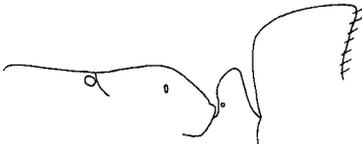


Fig. 380. Outline of the pronotum and gaster of a worker of *F. xerophila*.

**Key to the workers of the *Formica neogagates* group**

(Includes all North American species)

1. Anterior border of clypeus notched or concave in the middle (Fig. 381), or entire border is straight ..... 2

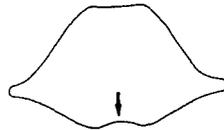


Fig. 381. Clypeus of a worker of *F. perpilosa*, showing the notched clypeus (arrow).



Fig. 382. Clypeus of a worker of *F. lasioides*, showing the convex, rounded anterior border of the clypeus.

- Entire anterior border of clypeus convex and rounded (Fig. 382) ..... 6

2(1). Gaster clear reddish-yellow, no darker than head and mesosoma; clypeus concave in the middle, but with little evidence of a notch; petiole very thick when viewed in profile; unknown from New Mexico (Man., MN, IA west to Alberta, MT, WY, CO) ..... *bradleyi* Wheeler

- Gaster darker than mesosoma and head; other characteristics are usually different ..... 3

3(2). Gaster strongly shining, with dilute pubescence which does not obscure the delicate, shagreened sculpture ..... 4

- Gaster opaque or feebly shining, the pubescence dense enough to partially obscure the finely coriaceous sculpture, gaster evenly covered with long, stout, silvery, erect hairs which are blunt at the tip; hairs on other parts of body only a little less abundant than those on gaster (MN west to Alberta south to NB, NM, UT, NV) . *obtusopilosa* Emery (See *sanguinea* species group.) 4(3). Dorsal face of propodeum with many long, erect hairs (Fig. 383), body hairs in general long and numerous (Fig. 383); underside of head with about 8 - 10 long, erect hairs (WY, CO, KS, OK, TX, NM, CA, state of Chihuahua, Mexico) .... *perpilosa* Wheeler

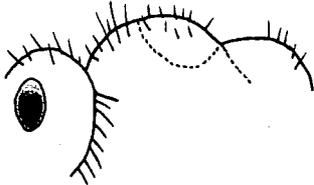


Fig. 383. Head and mesosoma of a worker of *F. perpilosa*, showing the numerous, erect hairs.

- Dorsal face of propodeum with few or no erect hairs, underside of head usually with 2 erect hairs, not reported from New Mexico ..... 5 5(4). Anterior border of clypeus straight, with a prominent central, longitudinal carina; head and mesosoma yellowish orange; a few erect hairs are usually present on propodeum (ID, UT, WA, OR, NV, CA) ..... *manni* Wheeler

- Anterior border of clypeus notched or concave in middle, central longitudinal carina on clypeus

poorly defined; head and mesosoma piceous brown; erect hairs usually absent on propodeum (OR) ..... *oregonensis* Cole 6(1). Antennal scape with several short, very delicate erect whitish hairs (Fig. 384), (NS, Que. west to BC, south to MA, MI, SD, CO, NM, AZ, CA) ..... *lasioides* Emery - Scape without erect hairs except for a small clump at the extreme tip ..... 7

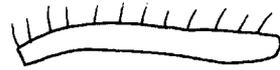


Fig. 384. Scape of a worker of *F. lasioides* with erect hairs, as seen from the side.

7(6). Mesosoma with numerous erect hairs (Fig. 385); surface of

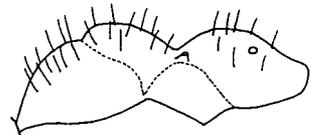


Fig. 385. Mesosoma of a worker of *F. neogagates*, showing the numerous erect hairs.

body moderately shining; NS, Que. west and north to AL, south to NC, IL, IA, NB, NM, AZ, CA ..... *neogagates* Viereck

- Mesosoma with 10 or fewer erect hairs (Fig. 386); surface of body strongly shining; MN, ND, CO, NM, UT, NV ..... *limata* Wheeler



Fig. 386. Mesosoma of a worker of *F. limata*, showing a reduced number of erect hairs.

**Key to the workers of the *Formica pallidefulva* group**

- 1. Clear golden yellow, gaster little darker than mesosoma, its surface feebly shining ..... *pallidefulva* Latreille
- Head and mesosoma yellowish brown to piceous brown, gaster notably darker, its surface moderately shining ... *nitidiventris* Emery

**Key to the workers of the *Formica rufa* group**

(Includes the *microgyna* species group, see Wheeler and Wheeler, 1986).

- 1. Scapes with numerous erect or suberect hairs on all surfaces (Fig. 387) ..... 2

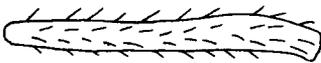


Fig. 387. Antennal scape of a worker of *F. oreas*, showing the numerous, erect hairs.

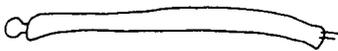


Fig. 388. Antennal scape of a worker of *F. laeviceps*, showing a lack of erect hairs.

- Scapes with very few or no erect hairs (Fig. 388) ..... 4
- 2(1). Hairs on mesosoma slender, short, tapering to sharp points (Fig. 389, left); erect hairs on propodeum and gaster short (less than 0.1 mm and equal in length), slender, with pointed tips; female larger than largest worker ..... 3

- Some hairs on mesosoma spatulate, or at least with blunt tips (Fig. 389, right), all short and subequal in length, hairs on propodeum and gaster coarse, thick and many greater than 0.12 mm in length, and with dull tips; female no larger than largest worker ..... *microgyna* Wheeler
- 3(2). Minor worker not extensively infuscated, head and mesosoma partially or completely red as in major worker ..... *oreas oreas* Wheeler

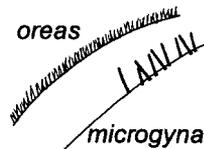


Fig. 389. Dorsal surface of the pronotum of workers of *F. oreas* and of *F. microgyna*.

- Minor worker extensively infuscated, head and mesosoma mostly deep brown, distinctly darker than major worker ..... *oreas comptula* Wheeler
- 4(1). Petiolar apex (seen from behind) with flat (Fig. 390, left) or broadly concave apex; sides of upper half of apex parallel, tapering only in lower half; female sometimes no larger than largest worker, strongly shining, color dull brown with some yellow markings . *dakotensis* Emery

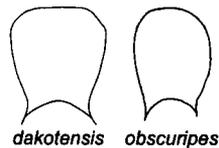


Fig. 390. Petioles of workers of *F. dakotensis* and *F. obscuripes*, as seen from behind.

- Petiolar apex (seen from behind) with apex convex (Fig. 390, right) or angularly produced upward in middle; sides of apex tapering inward from apex to base; female larger than largest worker ..... 5  
**5(4)**. Tentorial pit deep and pit-like (Fig. 391); edge of clypeus anterior to pit sweeping upward to median lobe; median lobe box-like (i.e. sides descending abruptly to fossae and making angles with its anterior face) ..... 6

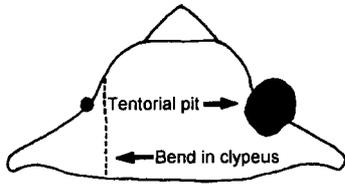


Fig. 391. Clypeus of a worker of *F. laeviceps* showing the deep, pitlike tentorial pit (depression indicated by dark stippling at point of arrow). The dashed line indicated by the other arrow represents a bend in the clypeus, which makes the middle part of the clypeus protrude into a box-like or rectangular surface.

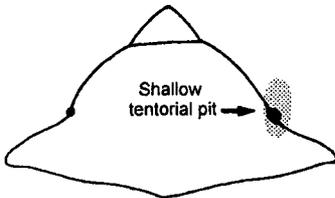


Fig. 392. Clypeus of a worker of *F. obscuripes*, showing the shallow tentorial pit (indicated by arrow and light stippling). Note that this clypeus is not strongly bent, and the surface only weakly convex, without a box-like surface.

- Tentorial pit shallow and scarcely pit-like (Fig. 392); edge of clypeus anterior to pit broadly united to base of lobe and not forming a distinct curve with it; median lobe not box-like (i.e., sides descending to fossae through even curves which begin at carina) ..... 8  
**6(5)**. Middle and hind tibiae with numerous erect hairs on all surfaces (Fig. 393) ..... 7



Fig. 393. Posterior tibia of a worker of *F. obscuriventris clivia*, showing numerous erect hairs on all surfaces.



Fig. 394. Middle tibia of a worker of *F. planipilis* as seen from the front, showing 2 erect hairs in addition to the rows of hairs on the flexor surface.

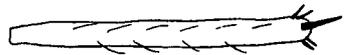


Fig. 395. Hind tibia of a worker of *F. laeviceps*, as seen from below, showing 2 rows of bristles on the flexor surface.

- Middle and hind tibiae without erect hairs except for double row on flexor surfaces (Fig. 395) .....  
 ..... *laeviceps* **Creighton 7(6)**. Minor workers extensively infuscated with brown, majors and intermediate sized workers with at least part of petiole infuscated .....  
 ... *obscuriventris clivia* **Creighton**

- Minor workers less deeply infuscated, dirty yellowish brown, petiole of majors clear red or yellow *obscuriventris obscuriventris* Mayr 8(5). Erect hairs on middle and hind tibiae usually abundant on all surfaces (Fig. 393), but at least there are 2 erect hairs in addition to those on flexor surfaces (Fig. 394) ..... 9

- Erect hairs on middle and hind tibiae, when present, confined to double row on flexor surface (Fig. 395), rarely 1 - 2 hairs elsewhere .11 9(8). Head of largest worker as broad as or broader than long, erect hairs on mesosoma unequal in length (Fig. 396); hairs on head only a little less abundant and not much longer than those on mesosoma ..... *obscuripes* Forel

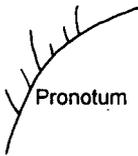


Fig. 396. Hairs on the dorsal surface of the pronotum of a worker of *F. obscuripes*, showing the hairs of unequal lengths.

- Head of largest worker longer than broad; erect hairs on mesosoma of about equal length (Fig. 397, 398); hairs on head notably longer and sparser than those on mesosoma .. 10 10(9). Smaller workers extensively infuscated, intermediate workers more or less infuscated; legs in all sizes of workers, brownish black ..... *planipilis* Creighton

- Head and mesosoma of all workers (except an occasional minor) clear red; legs scarcely or not at all darker than mesosoma ..... *coloradensis* Creighton

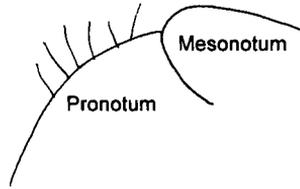


Fig. 397. Hairs on the dorsal surface of the pronotum of a worker of *F. planipilis*, showing the hairs of approximately equal length.

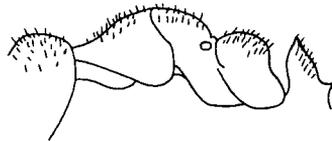


Fig. 398. Outline of the posterior part of the head, mesosoma and petiole of a worker of *F. coloradensis*.

11(8). Gaster densely clothed with short erect hairs, which (in profile) are so close together that they give appearance of a loose plush-like vestiture (Fig. 399) ..... 12

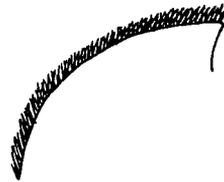


Fig. 399. Dorsal surface of the first tergum of the gaster of a worker of *F. ciliata*, showing the dense, erect hairs.

- Erect hairs on gaster much more widely spaced, and not forming an even vestiture (Fig. 400) ..... 14 12(11). Underside of head usually without erect hairs (1 or 2 may be present); female yellow, hairs very long, (Fig. 403) ..... *ciliata* Mayr

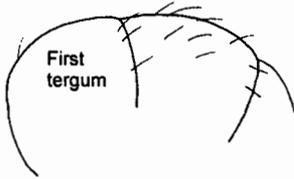


Fig. 400. Dorsal surface of the gaster of a worker of *F. criniventris*, showing the relatively sparse erect and semierect hairs.

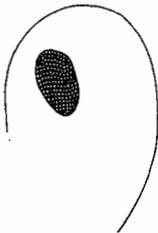


Fig. 401. Side view of the head of a worker of *F. ciliata*



Fig. 402. Side view of the head of a worker of *F. comata*.

- Underside of head (Fig. 402) with at least 12 erect hairs (count across entire surface); female brownish yellow, dirty brown, or bi-colored, mostly dull ..... 13
- 13(12).** Erect gastral hairs very short (Fig. 404), averaging 0.06 mm in length ..... *comata* Wheeler
- Erect gastral hairs longer, averaging 0.12 mm long ..... *mucescens* Wheeler

- 14(11).** Row of erect bristles on middle and hind tibiae extending at least 1/2 length of tibia (Fig. 393) ..... 15
- Middle and hind tibiae nearly lacking erect hairs, or with 3 - 4 erect hairs near spur ..... *criniventris* Wheeler

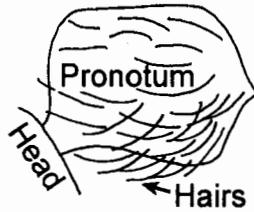


Fig. 403. The side of the pronotum of a female of *F. ciliata*, showing the long, yellow hairs.

- 15(14).** Clypeus, underside of head, and cheek strongly shining ..... *subnitens* Creighton
- Clypeus, underside of head, and gena dull ..... 16



Fig. 404. Outline of the dorsum of the gaster of a worker of *F. comata*.

- 16(15).** Underside of head, apex of petiole, and thoracic dorsum usually without erect hairs (Fig. 405), rarely 1 or 2 inconspicuous hairs present ..... *ravida* Creighton
- Pronotum, propodeum and apex of petiole with numerous erect or suberect hairs in at least a considerable part of nest series ..... 17

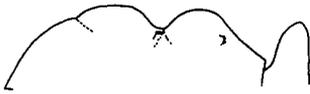


Fig. 405. Outline of the mesosoma and petiole of a worker of *F. ravidula*.

- 17(16). Erect hairs slender and pointed at tip (Fig. 397); female at least as large as largest worker ..... **18**
- Erect hairs blunt or spatulate (see Fig. 389, right); female no larger than largest worker ..... **19**
- 18(17). Erect hairs on posterior lateral angles in most of nest series; unknown from New Mexico (WA south to CA) ..... *integroides* Emery
- Posterior lateral angles without erect hair . *propinqua* Creighton
- 19(17). Erect hairs always present on apex of petiole (Fig. 406, left); pubescence on gastral dorsum dense and wholly concealing surface; sides of gaster feebly shining ..... **20**
- Erect hairs never present on apex of petiole (Fig. 406, right); pubescence of gastral dorsum rather dilute and not wholly concealing surface at rear edge of terga; sides of gaster strongly shining ..... **21**
- 20(19). Apex of petiole broadly rounded in side view (Fig. 407, left); body hairs blunt tipped (Fig. 406, left) to broadly spatulate at tips .....  
..... *densiventris* Viereck

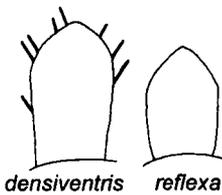


Fig. 406. Petioles of a workers of *F. densiventris* and *F. reflexa*, as seen from behind.

- Apex of petiole sharp in side view (Fig. 407, right); body hairs narrowly spatulate at tips .....  
..... *calviceps* Cole

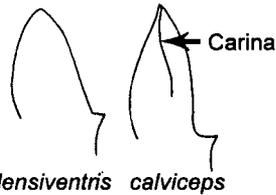


Fig. 407. Side view of the petioles of workers of *F. densiventris* and *F. calviceps*.

- 21(19). Head and mesosoma extensively infuscated .....  
..... *adamsi adamsi* Wheeler
- Head and mesosoma with little or not at all infuscated .....  
..... *adamsi alpina* Wheeler

**Key to the workers of the *Formica sanguinea* group**  
(See Snelling and Buren, 1985)

- 1. Underside of head and pronotum without erect hairs (Fig. 408), or pronotum with fewer than 6 very short (less than 0.06 mm long), stiff, blunt bristles (Fig. 408); apex of petiole without erect hairs (Fig. 410)  
..... **2**



Fig. 408. Ventral surface of the head of a worker of *F. aserva*, showing the lack of erect hairs.

- Underside of head with 1 or more erect hairs on each side (Fig. 409) and (or) pronotum with six or more hairs (Fig. 409), usually at least some are more than 0.10 mm long; apex of petiole with erect hairs ..... 3



Fig. 409. Ventral surface of the head of a worker of *F. rubicunda*, showing the erect hairs on the underside of the head and on the pronotum.

2(1). Apex of petiole sharp (Fig. 411), petiole broadly fan-shaped in posterior view (Fig. 410); longest hairs on disc of second tergum of gaster about 0.06 mm long; clypeal disc distinctly but finely striate along middle and often laterad (toward the side) along apical margin ..... *aserva* Forel

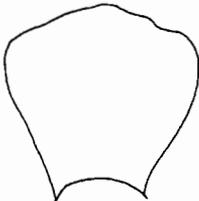


Fig. 410. Petiole of a worker of *F. aserva*, as seen from the back. Note that the dorsal margin is not always symmetric.

- Apex of petiole blunt (Fig. 412), petiole narrowly fan-shaped in posterior view; longest hairs on disc of second tergum about 0.10 mm

long; clypeal disc without very fine striae along middle; unknown from New Mexico (from Colorado Springs, Colorado) ..... *emeryi* Wheeler 3(1). Erect hairs of mesosomal and gastral dorsa short (0.06-0.14 mm long), stiff and bristle-like, usually more or less flattened and blunt-tipped, or abruptly tapering (Fig. 411) ..... 4  
- Erect hairs longer (0.10-0.25 mm long), often evenly tapering to tip (Fig. 412) ..... 5

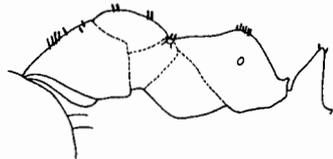


Fig. 411. Mesosoma and petiole of a worker of *F. rubicunda*.

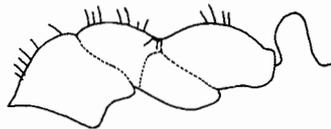


Fig. 412. Mesosoma and petiole of a worker of *F. obtusopilosa*.

4(3). Scape shorter than head length; propodeum subangulate in profile (Fig. 411) and apex of petiole sharp (Fig. 411) ..... *rubicunda* Emery  
- Scape longer than head length; propodeum broadly rounded between basal and posterior faces (Fig. 412); apex of petiole blunt in profile (Fig. 412) ..... *obtusopilosa* Emery 5(3). Pubescence of antennal scape fine and entirely appressed (Fig. 413) ..... 6



Fig. 413. Right antennal scape of a worker of *F. puberula*, as seen from the side, showing the numerous decumbent and suberect hairs.

- Pubescence of antennal scape coarse and at least partly decumbent to suberect ..... *puberula* Emery 6(5). Eyes large and protruding beyond sides of head in frontal view in all sizes (Fig. 414); female microgynous, about as large (or smaller) as largest worker .....  
 ..... *wheeleri* Creighton

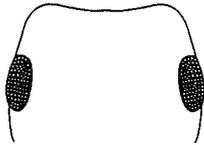


Fig. 414. Head of a worker of *F. wheeleri*.

- Eyes not protruding beyond sides of head, at least not in large workers (Fig. 415); females normal, much larger than largest workers .....  
 ..... *pergandei* Emery

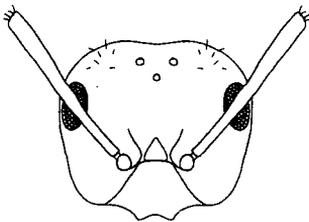


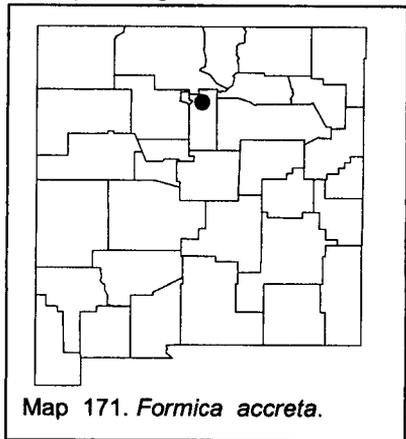
Fig. 415. Head of a worker of *F. pergandei*.

### List of *Formica* spp. of all species groups

#### *Formica accreta* Francoeur (*fusca* group)

Map 171

**Discussion.** This is a black species with the metasternal process poorly developed. The gena is without coarse punctures, although poorly defined, elongate punctures are located just anterior to the eyes. The scapes are usually longer than the head length. The anterior border of the clypeus is angulate, the eyes are large (maximum diameter 0.43 - 0.54 mm). The ventral surface of the head, posterior border, dorsum of the mesosoma and dorsum of the petiole are without erect hairs. The first gastral tergite has only 3 or 4 short (> 0.1 mm), blunt hairs. The dorsal surfaces of the head and mesosoma are weakly shining.



Map 171. *Formica accreta*.

This species is very difficult to separate from *F. fusca*. A combi-

nation of longer scapes, larger eyes and larger size will usually separate it from *F. fusca*. Wheeler and Wheeler (1986) considered it a synonym of *F. fusca*, Bolton (1995) removed it from synonymy. It is very rare in New Mexico, and this is the first record from the state.

**Distribution.** Western Canada south to California, east to Montana, south to NM: Santa Fe Co., Santa Fe.

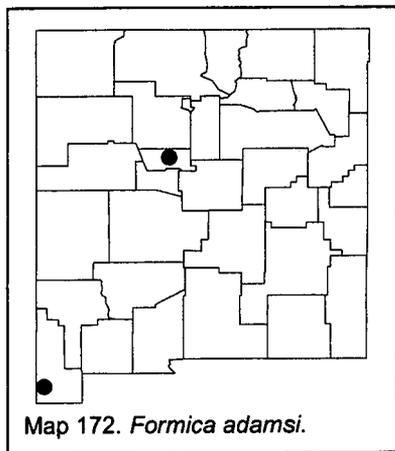
**Habitat.** Pinyon juniper woodlands

**Biology.** Unknown, may be associated with the plants *Potentilla* and *Amaranthus* (Francoeur, 1973).

***Formica adamsi* Wheeler  
(*microgyna* group)**

Map 172

**Discussion.** See discussion of *F. adamsi alpina*. This species was previously known as *Formica whymeri* Wheeler.



**Distribution.** USA: WY, AZ (Cochise Co., Chiricahua Mts.); NM:

Bernalillo Co., NE Albuquerque, Hidalgo Co., Peloncillo Mts. (Clanton Canyon).

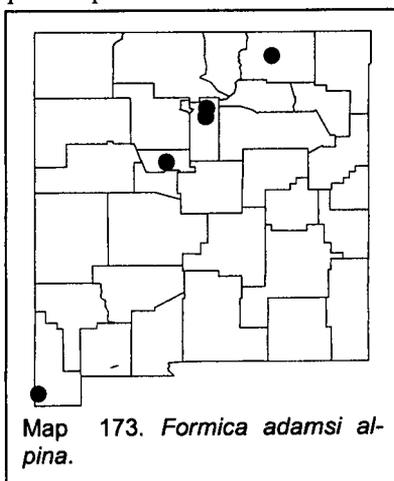
**Habitat.** Forests, including pinyon pine, oak, alligator bark juniper.

**Biology.** This species nests under stones in rocky areas.

***Formica adamsi alpina*  
Wheeler  
(*microgyna* group)**

Map 173

**Discussion.** Workers of this species have at least a few blunt tipped or spatulate hairs on the dorsum of the pronotum. The scapes, underside of the head, and petiole lack erect hairs. The gaster has only a few erect hairs, and the surfaces are sparsely covered with silver, appressed pubescence.



The head and mesosoma are red, the gaster black, which will usually separate it from *F. adamsi adamsi*. It is doubtful that this is a valid subspecies as it apparently dif-

fers from *F. adamsi* only in being lighter in color.

**Distribution.** CANADA: Nova Scotia, USA: ID, UT, CO; NM: **Bernalillo Co.**, Albuquerque, **Colfax Co.**, Ute Lake State Park (Cole, 1954e), **Hidalgo Co.**, Peloncillo Mts., **Santa Fe Co.**, Hyde Park, Tesuque Canyon (Cole, 1954e).

**Habitat.** Higher elevations, above 2200 meters, in mixed forests, meadows, spruce-fir forests up into dry tundra.

**Biology.** Nests are found under stones and logs (as well as in logs), usually banked with thatching, or simply in thatched nests. Reproductives were collected in nests from July to September. This species enslaves *Formica neorufibarbis*.

Cole, 1954e; Gregg, 1963

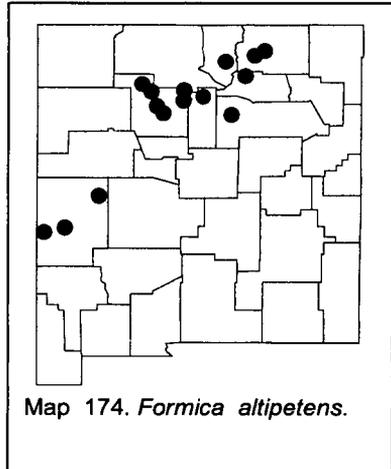
***Formica altipetens***  
**Wheeler**  
**(*fusca* group)**

Fig. 370; Map 174

**Discussion.** The metasternal process of the worker (and female) is well developed and surrounded by hairs. The eyes are large, the maximum diameter is about equal to the distance from the anterior border of the eye to the insertion of the mandible. There is usually a pair of erect hairs on the ventral surface of the head, a few hairs on the vertex, and several blunt-tipped hairs on the propodeum, the mesopleuron is usually without erect hairs, as are the cheeks and posterior lateral corners.

**Distribution.** USA: MT S to NM, W to CA; NM: **Catrón Co.**, 29 k NE Apache Creek, Aspen Basin

(Cole, 1954e), Ox Spring Canyon, **Colfax Co.**, Cimarron Canyon (Cole, 1954e), 8 mi. E Eagle Nest (Cole, 1954e), **Los Alamos Co.**, Los Alamos, **Mora Co.**, Coyote Creek State Park, **Sandoval Co.**, Bandelier National Monument (Pippin and Pippin, 1984), Barley Canyon (Jémez Mts.), 4 k W Cuba, 11 k E Cuba, Jémez Canyon Overlook (8000ft), **San Miguel Co.**, 20 k NW Las Vegas, **Santa Fe Co.**, Tesuque Canyon (Cole, 1954e), **Taos Co.**, 18 m E Taos (Cole, 1954e).



Map 174. *Formica altipetens*.

**Habitat.** Forested and open areas, ranging from meadows, pinyon-pine, ponderosa pines, Gambel oak forests to spruce forests.

**Biology.** This ant nests in the soil with entrances surrounded by a small mound, or under stones and logs, sometimes covered with detritus. Nest populations are large, and the ants are very aggressive when the nest is disturbed. Reproductives were found in nests in June and August, flights occurred during the first part of July (sexuals are attracted to

lights). It is enslaved by *Polyergus breviceps*.

Wheeler, 1913; Cole, 1954e; Gregg, 1963; Funk, 1975

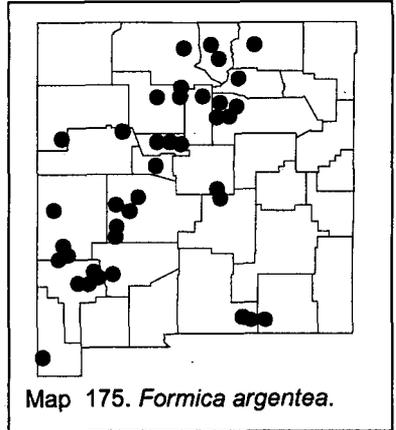
***Formica argentea* Wheeler  
(*fusca* group)**

Figs. 376, 377; Map 175

**Discussion.** The metasternal process of this species is poorly developed, but is often surrounded by abundant hair (exceptions common). The ventral surface of the head is without erect hairs. This species has a silvery sheen on the gaster, due to the abundance of pubescence, the remainder of the ant is usually brownish or even reddish or yellowish brown, with the gaster slightly darker, but may be concolorous black. Sometimes it is weakly bicolored.

This usually distinguishes it for the similar *F. fusca*, which is usually black without a silvery gaster. The wings of the males and females are usually clear, whereas those of *F. fusca* are usually darkened. *Formica fusca* usually has fewer than 10 erect hairs on the dorsum of the first gastral tergite, *F. argentea* usually has more than 10. This species is similar to *F. podzolica* and may be distinguished using characteristics listed in the discussion of *F. podzolica*. It could be confused with *F. gnava* and may occur in similar habitats. It can be separated as it is not as bicolored (the black gaster of *F. gnava* usually con-

trasts strongly with the red head and mesosoma), the mesosoma is less robust, and the propodeum is less angulate. Additionally, *F. gnava* usually has several blunt hairs on the pronotum, *F. argentea* has few or none. *Formica gnava* is dull, *F. argentea* has some of the surfaces



shiny.

**Distribution.** USA: Most of North America; NM: **Bernalillo Co.**, Manzanares, Sandia Mts. (Ciénega Canyon, Kiwanas Meadow), **Catron Co.**, Mogollon Mts. (trail 206), Reserve, near Snow Lake, **Cibola Co.**, Mt. Taylor (9000 ft), **Colfax Co.**, 16 k E Eagle Nest, **Grant Co.**, Iron Creek, 77 k E Silver City, 88 k E Silver City, Wright's Cabin, **Hidalgo Co.**, Coronado National Park (Clanton Draw), **Lincoln Co.**, 5 mi. E Red Cloud Campground, **Los Alamos Co.**, Los Alamos, Mortandad Canyon, 4 k N Los Alamos, 8 k N Los Alamos, **McKinley Co.**, 4 k E Ramah, **Mora Co.**, Coyote Creek State Park, **Otero Co.**, Guadalupe

Mts., 41 k NW Sitting Bull Falls, **Rio Arriba Co.**, 7 k S Cebolla, **Sandoval Co.**, Bandelier National Monument, 45 k SE Cuba, **San Miguel Co.**, Gallinas Canyon (Wheeler, 1913), Las Vegas (Wheeler, 1913), 20 k NW Las Vegas, Manzanares (Wheeler, 1913), Pecos (Wheeler, 1913), **Santa Fe Co.**, Hyde Park, **Sierra Co.**, Gila Mts. (Iron Creek), **Socorro Co.**, 5 k N Camp Luna, Durfee Canyon, near Grassy Look-out, Magdalena Mts. (Fagerlund, pers. comm.), San Mateo Mt. (10,000 ft), **Taos Co.**, Taos, 20 k NW Taos, **Torrance Co.**, 11 k SW Corona, **Valencia Co.**, Belén; MEXICO: Chihuahua.

**Habitat.** Disturbed urban sites, grasslands and sagebrush scrub, pinyon-juniper, oaks, pinyon-pine up to ponderosa pine-riparian and fir forests.

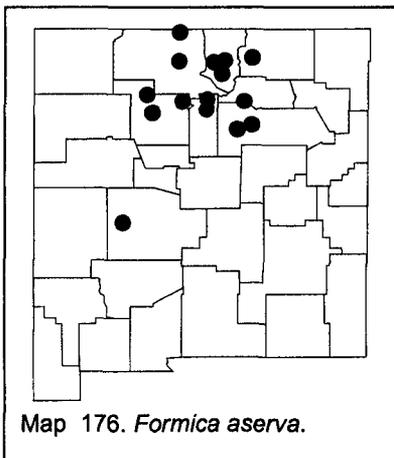
**Biology.** Nests are found under stones or logs, or under bark of pines. Brood was found in nests in July and August, sexuals in August. Multiple dealate females occur in nests (at least 3). Nests may have a small amount of thatching mixed with soil. They are generally relatively docile, and rapidly escape when the nest is disturbed. Flights occur in early July (sexuals are attracted to lights); a dealate female was collected in July. This species nests together with *Acanthomyops murphyi*, as well as with *Solenopsis molesta*, *Monomorium minimum*, *Lasius sitiens*, *L. pallitarsis*, and *Camponotus modoc*.

Gregg, 1963

### ***Formica aserva* Forel (*sanguinea* group)**

Figs. 408, 410; Map 176

**Discussion.** This is an easily recognized species, as the ventral surface of the head is without erect hairs, the pronotum has fewer than 6 short (less than 0.01 mm) stiff, blunt bristles, and the apex of the petiole is without erect hairs. The petiole is broad and fan-shaped as seen from the front (Fig. 410). The central area of the clypeus is striate. This species was previously referred to as *F. subnuda*.



Map 176. *Formica aserva*.

**Distribution.** CANADA: Newfoundland w to Yukon; USA: AK south to CA, east to NM, north to NY, NM: **Colfax Co.**, 13 mi. N Eagle Nest (Cole, 1954e), **Rio Arriba Co.**, 7 k S Cebolla, 4 k N Chama, **Sandoval Co.**, Bandelier National Monument, 11 k E Cuba, 45 k SE Cuba, **San Miguel Co.**, Beulah (Wheeler, 1913), Dailey Canyon (Beulah area) (Cole, 1954e), Las Vegas Range (Wheeler, 1913),

Sapello Canyon (Beulah area), **Santa Fe Co.**, 12 k NE Santa Fe, Tesuque Canyon (Cole, 1954e), **Socorro Co.**, Withington Lookout, **Taos Co.**, 20 k S Taos, 12 mi. E Taos (Cole, 1954e), 18 mi. E Taos (Cole, 1954e).

**Habitat.** This species occurs in a wide variety of habitats, ranging from prairies, through sagebrush scrub, juniper forests (*Juniperus monosperma*), aspen forests (*Populus tremuloides*) and mixed forests up to fir-aspen-spruce forests, subalpine fir (*Abies lasiocarpa*) and ponderosa pine. Nests even occur above the tree line.

**Biology.** This species nests in ponderosa pine logs and under stones, and may even construct thatched nests. Brood can be found in nests in early July until early August, reproductives were in nests in August, dealate females were found loose in July and August. This species enslaves *F. fusca*, *F. argentea* and *F. neorufibarbis*, and was found in a *F. argentea* nest together with *F. obtusopilosa*. One mixed nest included *F. argentea*, *F. aserva*, *F. obtusopilosa*, *F. lasioides* and *Myrmica*.

Wheeler, 1913; Finnegan, 1973 (as *F. subnuda*); Gregg, 1963 (as *F. subnuda*)

### ***Formica bradleyi* Wheeler (*neogagates* group)**

**Discussion.** This species is easily recognized as it is the only species of the *neogagates* group that is concolorous yellowish red. The entire ant, including the appendages, is covered with bristly, white hairs, except for the scape, which is with-

out erect hairs. The surfaces are shiny and the anterior border of the clypeus is concave, nearly notched. The male is unusual as it has a shiny head and mesosoma.

**Distribution.** CANADA: Alberta, Manitoba USA: MN, IO, MT, ND, WY, NB, CO; although this species has not been collected in New Mexico, it is widely distributed in Colorado, and would be expected to occur in the northern part of the state.

**Habitat.** Found only in very sandy soils at base of grass clumps (DuBois and Danoff-Burg, 1994).

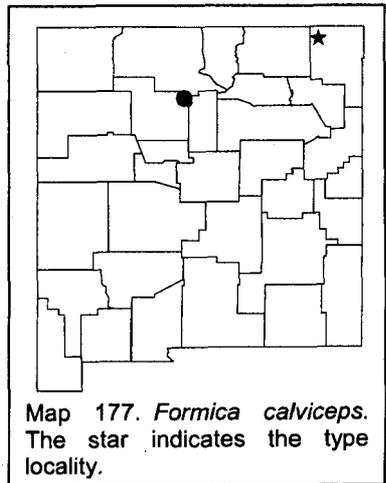
**Biology.** Reproductives were found in nests in June and July.

Gregg, 1963; Halverson et al., 1976

### ***Formica calviceps* Cole (*rufa* group)**

Fig. 407; Map 177

**Discussion.** The middle and hind tibiae of this species have a



double row of erect hairs on the flexor surfaces. Erect hairs are present on the mesonotum near the metanotal suture.

It differs from *F. fossiceps* by the presence of erect hairs on the mesosoma, and from *F. laeviceps* in that the hairs on the mesosoma are not abundant. It may be a synonym of *F. laeviceps*.

**Distribution.** USA: NM: **Union Co.**, Capulín Volcano National Monument (type locality, Cole, 1954e), **Los Alamos Co.**, Los Alamos (Map).

**Habitat.** Scrub oak, in dry, grassy areas.

**Biology.** This ant nests under stones, with the site surrounded by thatching.

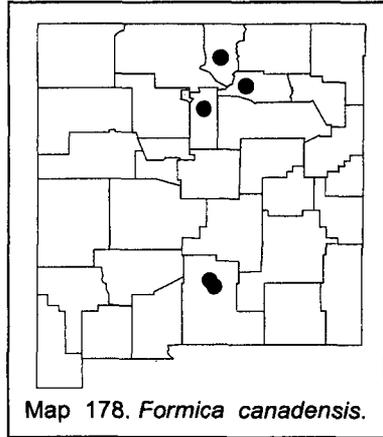
Cole, 1954e

***Formica canadensis***  
**Santschi**  
**(*fusca* group)**

Fig. 371; Map 178

**Discussion.** This species can be recognized by the short, bristly hairs covering most of the surfaces of the body. The sides of the head and cheeks usually have several erect hairs. The scape is without erect hairs (except at the apex) and the legs have few erect hairs. The tibiae have erect hairs only on the flexor surface. The metasternal process is well developed and covered with hairs.

This species is shiner than most of the other members of the



Map 178. *Formica canadensis*.

*fusca* group, and is usually medium brown with a black gaster.

**Distribution.** USA: Western North America; NM: **Mora Co.**, Coyote Creek State Park, **Otero Co.**, 5 mi. E Cloudcroft, Sacramento Mts., **Santa Fe Co.**, Santa Fe (Audubon Center), **Taos Co.**, 20 k NW Taos.

**Habitat.** Forested areas (ponderosa pine, Gamble oak) and surrounding open prairies, as well as areas of clover and milkweed.

**Biology.** Nests are found in the soil, usually with the nest entrance surrounded by mound of soil.

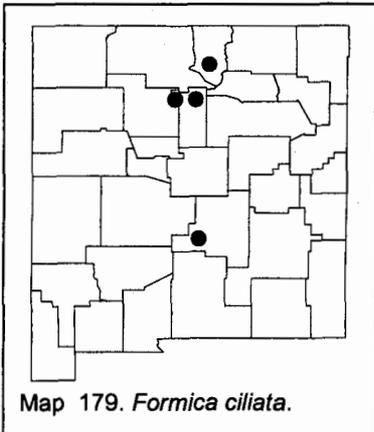
***Formica ciliata* Mayr**  
**(*rufa* group)**

Figs. 355, 357, 399, 401, 403;  
Map 179

**Discussion.** The workers of this species have few erect hairs, which are mostly restricted to the clypeus, pronotum, propodeum and gaster. The scapes are without erect hairs (except at the apex), each tibia has only a few (fewer than 10) erect

hairs on the flexor surfaces. The gaster is covered with short, erect hairs, in which the tips are closer than the length of the hairs. The females of this species are unusual as they are covered with long, curled, yellow hairs (Fig. 403), which suggests that it is a temporary social parasite (these types of hairs are typical of parasitic species).

*Formica criniventris* females have similar hairs, but the workers of this latter species lack the dense, erect hairs on the gaster and are thus easily separated.



**Distribution.** USA: MT, ND S to NM: Lincoln Co., Nogal, Los Alamos Co., Los Alamos, Santa Fe Co., Santa Fe, Taos Co., 20k NW Taos.

**Habitat.** Sagebrush, grasslands, disturbed areas (nuclear waste site), pinyon-juniper woodland, deciduous forests, up to ponderosa pine.

**Biology.** This species has nests thatched with pinyon pine needles and juniper needles, and also nests under logs and stones. The mound may completely lack thatch-

ing, and be covered with pebbles. The mound is small and is not much higher than the surrounding soil surface. They are usually found on south facing slopes. This species appears to be polydomous, with individual colonies located 4 - 5 meters apart, although in one instance, 2 adjacent nests were fighting. Brood was found in nests in August, reproductives occurred in nests in July and August, dealate females were collected loose in August.

Wheeler, 1909, 1910a; Gregg, 1963; Wheeler and Wheeler, 1963

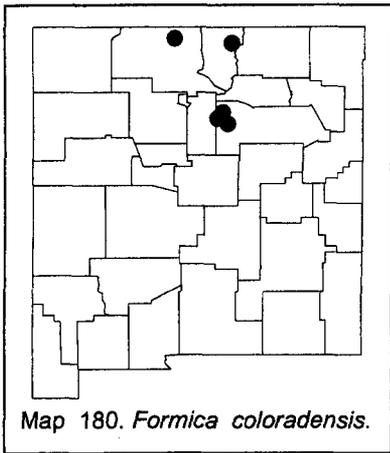
***Formica coloradensis***  
**Creighton**  
**(*rufa* group)**

Fig. 398; Map 180

**Discussion.** The presence of bristly, short, erect hairs scattered over all surfaces of the tibiae, separate this species from most of the others in the *rufa* group.

The lack of erect hairs on the scapes distinguishes it from *F. oreas*. Separation of this species from *F. obscuriventris* is more difficult, as both have scattered erect hairs on the tibiae. The clypeus of this latter species is box-like, protruding, with deep tentorial pits. *Formica coloradensis* has a less protruding clypeus, with shallow tentorial pits. Once these other species are excluded, we are left with a baffling group, which is nearly impossible to separate. The erect hairs on the mesosoma of the closely related *F. obscuripes* are unequal in length (Fig. 396), whereas those of *F. colo-*

*radensis* are short and equal in length (Fig. 398). Finally, we separate this species from *F. planipilis* on the basis of the color of the minor worker, the head and mesosoma of those of *F. coloradensis* being red, minor workers of *F. planipilis* are darker (especially the smaller specimens). The legs of all workers are red, whereas the legs of workers of *F. planipilis* are dark. It is obvious that much work remains to be done on the systematics of the *rufa* group, as well as the remainder of the genus *Formica*.



Map 180. *Formica coloradensis*.

**Distribution.** USA: ID, UT, CO; NM: Rio Arriba Co., 4 k N Chama, San Miguel Co., Beulah (Wheeler, 1913), Dailey Canyon (Cole, 1954e), Pecos (Wheeler, 1913), Taos Co., 3.4 mi. W Red River (Elephant Rock Campground).

**Habitat.** Higher elevation forests (1600 - 3500 meters), oak forests, occasionally in meadows or near aspen-spruce forests.

**Biology.** This ant nests under logs and stumps or stones, or simply in mounds with thatching. Reproduc-

tives were found in nests in July, dealate females were collected in July and August.

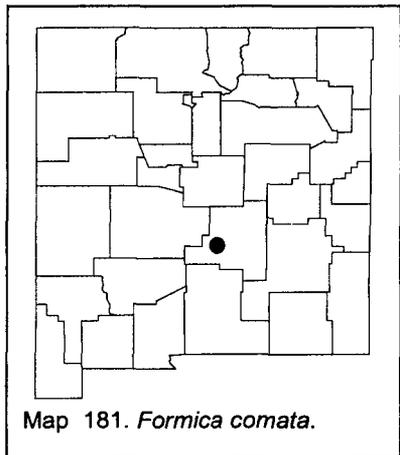
Wheeler, 1913; Creighton, 1940b; Cole, 1954e; Gregg, 1963

### *Formica comata* Wheeler (*rufa* group)

Figs. 402, 404; Map 181

**Discussion.** The workers of this species can be recognized by the numerous snort, erect hairs on the underside of the head (Fig. 402), and by the abundant, short, bristly hairs on the dorsum of the gaster (Fig. 404). The dorsum of the gaster is covered with a dense layer of fine, appressed, silver hairs.

It can be separated from the similar *F. ciliata* by the hairs on the ventral surface of the head, and from *F. mucescens* by the short length of the hairs on the dorsum of the first tergum of the gaster.



Map 181. *Formica comata*.

**Distribution.** USA; NM: Lincoln Co., Nogal.

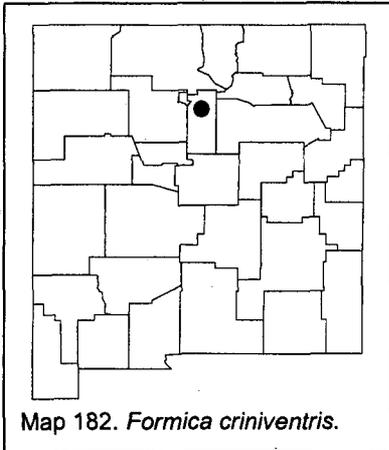
**Habitat.** Grasslands, Ponderosa pine forest, sagebrush.

**Biology.** These ants construct thatched nests. Sexu- als were found in nests in July.

***Formica criniventris***  
**Wheeler**  
**(*rufa* group)**

Fig. 400; Map 182

**Discussion.** This is an attractive, bicolored ant (head and mesosoma red, gaster black), in



which the mid and hind tibiae normally have only 1 or 2 erect or suberect hairs, located near the apices of the tibiae. The scapes are without erect hairs (except at the apex). The clypeal fossa is shallow and the surface of the clypeus is broadly convex. The suberect hairs on the gaster are widely scattered and sparse.

**Distribution.** USA: MT, ND, south to CO; NM: Santa Fe Co., Santa Fe (Audubon Center).

**Habitat.** Forested areas, open meadows.

**Biology.** These ants usually nest under stones and build thatched nests around the stone. It may enslave *F. argentea* or *F. neoclara*.

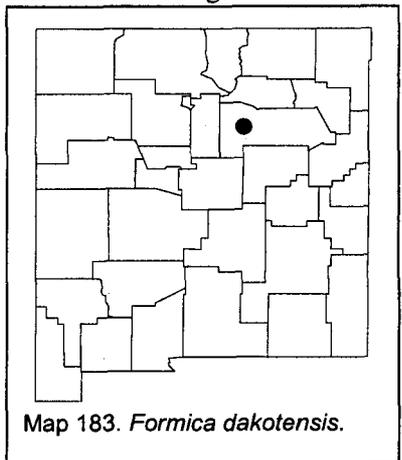
Wheeler, 1913

***Formica dakotensis* Emery**  
**(*rufa* group)**

Fig. 390; Map 183

**Discussion.** Workers, females (and even males) of this species are easily recognized as the node of the petiole is flat or has a slightly concave apex, as seen from the front or back (Fig. 390). The sides of the node are nearly straight and parallel.

The shape of the petiole separates this species from all other New World species of the *rufa* group. The palpi are remarkably short. The female is smooth and shining, and smaller than the largest workers.



**Distribution.** CANADA: Que.; USA: Much of North America; NM: San Miguel Co., Beulah (Wheeler, 1913, as *F. dakotensis* var. *montigena*).

**Habitat.** Grasslands up to ponderosa pine forests.

**Biology.** This ant nests in mounds, often thatched with detritus, or under stones. It enslaves *F. fusca*, *F. lepida*, *F. montana*, *F. nitidiventris*, *F. subsericea* and *F. pallidiflava*. Like most species of *Formica*, this species tends aphids.

Wheeler, 1904, 1910a; Abbott, 1926; Brown, 1957b; Gregg, 1963; Wheeler and Wheeler, 1963

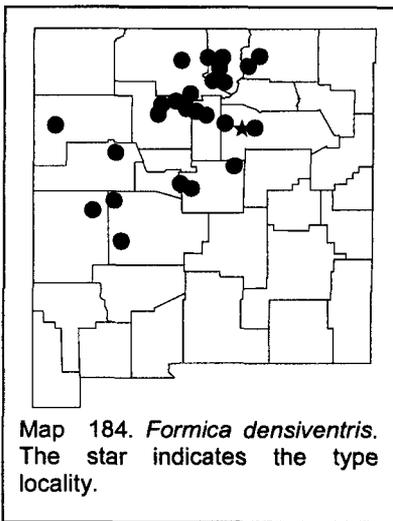
***Formica densiventris*  
Viereck  
(*microgyna* group)**

Figs. 406, 407; Map 184

**Discussion.** The nomenclature and status of this ant have been very complicated. The description by Viereck (1903) is brief and completely inadequate, and based on two poorly preserved specimens (Brown, 1947). This has created considerable confusion. A number of species and subspecies have been synonymized with *F. densiventris* (Creighton, 1950; Cole, 1955b). Wheeler (1903c) described a taxon, *F. rasilis* based on workers, females and males. Subsequently hybridization was observed between *F. rasilis* and *F. densiventris* (Creighton, 1950; Cole, 1955b; Gregg, 1963). Because of this, Gregg chose to consider *F. densiventris* as a subspecies of *F. rasilis*. We do not recognize a separate subspecies and due to precedence of date of publication (Viereck: Jan 1903; Wheeler: Nov 1903c) we consider the proper name

of the species to be *Formica densiventris* Viereck (Mackay et al. 1988).

**Distribution.** USA: Western United States; NM: **Catron Co.**, Ox Spring Canyon, **Cibola Co.**, Mt. Taylor, **Colfax Co.**, 16 k E Eagle Nest, 13 m N Eagle Nest, **Los Alamos Co.**, Los Alamos, 4 k W Los Alamos, 4 k N Los Alamos, 8 k N Los Alamos, **McKinley Co.**, 8 mi. S Gallup (Fagerlund, pers. comm.), **Rio Arriba Co.**, 7 k S Cebolla, **Sandoval Co.**, Bandelier National Monument, 11 k E Cuba, Jémez Mts., **San Miguel Co.**, near Las Vegas, Sapello Canyon near Beulah (type locality), Pecos (Wheeler,



Map 184. *Formica densiventris*. The star indicates the type locality.

1913), **Santa Fe Co.**, Sandia Mts., Tesuque Canyon, **Socorro Co.**, Beartrap Canyon, 43 k NE Datil, **Taos Co.**, 5 mi. SE Dixon, 20 k NW Taos, 6 k S Tres Piedras, 14 k SE Tres Piedras, **Torrance Co.**, 6 mi. E Cline's Corner, Manzano Mts., near Mountainair (Cole, 1954e).

**Habitat.** Prairies, including disturbed, weedy areas, to semiarid scrub up to pinyon-juniper, ponderosa pine-riparian, Douglas fir, and spruce-fir forests.

**Biology.** Nests are usually found under stones, but may be found in logs and stumps, and under bark. These structures may be partially covered with thatching. Nests may be composed entirely of thatching. Brood and reproductives were found in nests in June to August. A dealate female collected on 3 July 1986. Workers are very aggressive when the nest is disturbed. Foragers tend aphids. This is one of the most common *Formica* spp. in northern New Mexico. It enslaves other *Formica* spp., including *F. argentea*, *F. fusca*, and *F. subsericea*.

Wheeler, 1913; Mallis, 1941; Cole, 1942, 1954e; Gregg, 1963

### ***Formica exsectoides* Forel (*exsecta* group)**

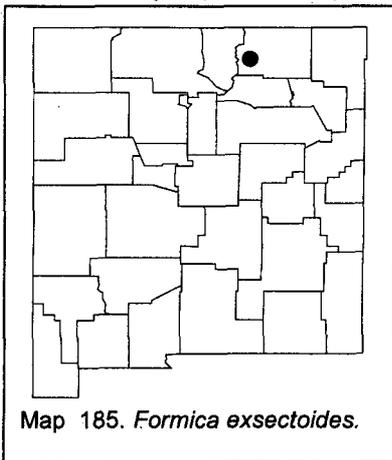
Fig. 364; Map 185

**Discussion.** Workers of this species are easily confused with members of the *rufa* group, being large, bicolored (red head and mesosoma, black gaster) ants with a dull surface. The larger workers can be separated at the vertex of the head is concave. The dorsum of the pronotum is usually without hairs, at least in the largest workers. The propodeum and petiole are often without erect hairs.

These characteristics separate this species from the other 2 species in the *exsecta* group, and from most

of the species of the *rufa* group and the *microgyna* group. The gaster has few erect hairs, which are mostly confined to the posterior edge of each segment.

**Distribution.** USA: Most of North America; NM: Colfax Co., Cimarron Canyon (Cole, 1954e).



Map 185. *Formica exsectoides*.

**Habitat.** Mountain meadows through juniper woodlands and grasslands, up to ponderosa pine forests.

**Biology.** This species nests in large mound (made of soil) nests, and enslaves *F. fusca* and *F. subsericea*. Cole (1954e) reported it nesting under a stone. This species is not common in New Mexico. Colonies can be large, including over 1,600 individual nests. It is extremely aggressive when the nest is disturbed.

Wheeler, 1913; Andrews, 1926, 1929; Haviland, 1947; Cole, 1954e; Gregg, 1963; Christensen and Quick, 1970

***Formica foreliana* Wheeler  
(*fusca* group)**

Fig. 378

**Discussion.** Workers of this species can be recognized by the abundant (24 - 43 on first tergum, exclusive of row along posterior edge of tergum) long, flexuous, erect hairs on the gaster. It is bicolored, with the head and mesosoma mostly red, the gaster is black.

**Distribution.** USA, AZ; NM: We have no records for the state, but it occurs in southeastern Arizona (Cochise Co.) and would be expected to be found in southwestern New Mexico.

**Habitat.** Areas between 1370 and 1760 meters elevation (Francoeur, 1973).

**Biology.** Unknown.  
Wheeler, 1913

***Formica fusca* Linnaeus  
(*fusca* group)**

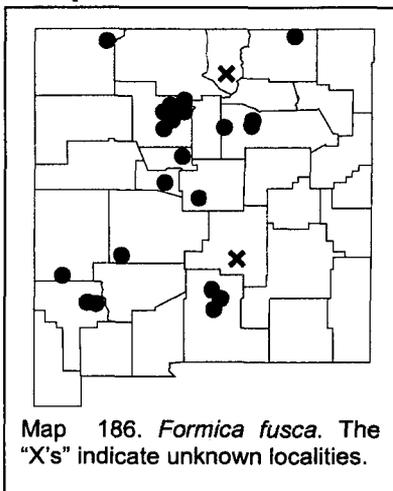
Figs. 366, 375; Map 186

**Discussion.** This species is similar to *F. occulta*, but differs in that the metasternal lobe is absent or very poorly developed and it usually has erect hairs around the metasternal cavity. It is concolorous black with abundant appressed pilosity. The underside of the head has no erect hairs, and the first tergite of the gaster (excluding the posterior edge) has only about 4 course, erect hairs.

*Formica podzolica* and *F. argentea* are very similar, but have more than ten erect hairs on the first tergite (again excluding erect hairs

on the posterior edge). Also the metasternal cavity has hairs only around the posterior edge or they may be absent. Most other similar species usually have hair surrounding the metasternal cavity.

*Formica marcida* is a synonym. Francoeur (1977:208) lists *F. fusca* var. *subaenescens* Emery as a valid species.



Map 186. *Formica fusca*. The "X's" indicate unknown localities.

**Distribution.** USA: Most of North America; NM: **Bernalillo Co.**, Sandia Mts., **Catron Co.**, Mogollon Mts. (trail 206), **Colfax Co.**, Barela Mesa (Wheeler, 1913, as *F. subaenescens*), **Grant Co.**, 77 k E Silver City, Wright's Cabin, **Los Alamos Co.**, Los Alamos, Mortadad Canyon, Camp May, **Lincoln Co.**, without locality, **Otero Co.**, Cloudcroft (Wheeler, 1913, as *F. subaenescens*), Sacramento Mts. (Bailey Canyon), 13 k NW Timberon, **Sandoval Co.**, Bandelier National Monument, 45 k SE Cuba, 100 k E Cuba, **Jémez Mts.**, 12 mi. NE Jémez Springs, **San Juan Co.**, Manzanares (Wheeler, 1913, as *F. subaenescens*), **San Miguel Co.**,

Beulah, Old Pecos Pueblo (Wheeler, 1913, as *F. subaenescens*), Top of Las Vegas Range (Wheeler, 1913, as *F. subaenescens*), Socorro Co., 33°48'32.8"N 107°26'10.7"W, Taos Co., without locality, Torrance Co., 24 k S Mountainair, Valencia Co., 57 k SW Grants.

**Habitat.** Widely distributed in mesic habitats, including forests and open areas, ponderosa pine-riparian, pinyon juniper, aspen forests, Douglas fir forests, absent only in semiarid and arid habitats and above timberline.

**Biology.** This ant nests in soil or under stones and in logs (primarily very rotten and soft). They occasionally have an earthen mound. Brood was found in nests from May to August, reproductives were found in nests from July to September, dealate females were found in August and September. This species nests together with *Myrmica lobifrons* and with *Monomorium minimum* and *M. cyaneum*.

Cole, 1954e; Gregg, 1963; Wheeler and Wheeler, 1963

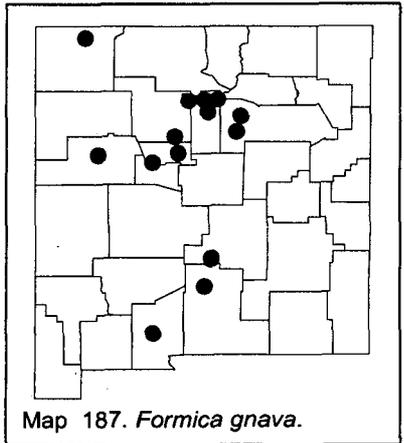
### *Formica gnava* Buckley (*fusca* group)

Fig. 379; Map 187

**Discussion.** This is a second species of *Formica* which is often found in arid ecosystems (the other species is *F. perpilosa*). This species differs from *F. perpilosa* in that it is not as hairy and does not have a notched clypeus. It is also not common in arid sites, being found primarily in desert-oak transitions and in semi-arid sites.

It can be separated from *F. argentea* (which occasionally occurs in arid habitats) as it is bicolored and the surface is dull (*F. argentea* is usually concolorous yellow-brown or black, and at least some of the surfaces, especially parts of the head, are shiny).

**Distribution.** USA: Southwestern United States; NM: Bernalillo Co., Albuquerque (Wheeler, 1913), Cibola Co., Mesa Negra (Wheeler, 1913), Doña Ana Co., Mesilla Park, Lincoln Co., Sierra Blanca, Otero Co., Alamogordo, Sandoval Co., Coronado State Park, San Miguel Co., Las Vegas (Wheeler, 1913), Villanueva State Park, Santa Fe Co., San Ildefonso (Wheeler, 1913), Santa Fe, Tesuque, San Juan Co., Aztec, Valencia Co., Los Valles (Wheeler, 1913); MEXICO: Chihuahua.



Map 187. *Formica gnava*.

**Habitat.** Semi-deserts and shady canyons up to oak forests and pinyon pine forests and rarely to fir forests.

**Biology.** This ant nests under stones and in the soil without mounds. It feeds from extrafloral

nectaries of the cholla (*Opuntia* spp), and forages into cotton wood trees. These ants can be very aggressive when the nest is disturbed, spraying formic acid at the intruder.

Wheeler, 1913, 1917; Cole, 1934a; Mallis, 1941; Gregg, 1963

***Formica hewitti* Wheeler  
(*fusca* group)**

Fig. 373; Map 188

**Discussion.** This is a dark brown species with lighter brown appendages. The metasternal process is poorly developed or absent. The cheek has elongate punctures (difficult to see, try looking obliquely at the surface with the light source coming from the side). The appressed pubescence on the gaster is sparse, and the gaster is little sculptured, resulting in the surface being smooth and shining. There are several erect hairs on the ventral surface of the head, vertex, mesosoma, apex of petiole and gaster. The propodeum is often without erect hairs.

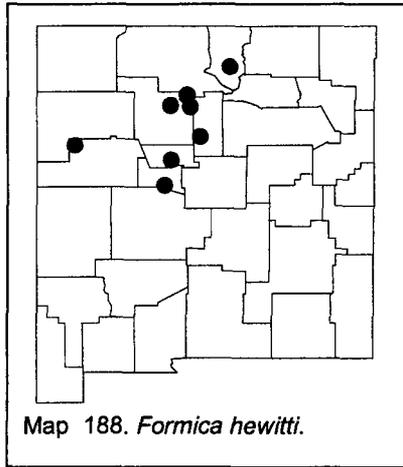
**Distribution.** USA: Most of the United States; NM: **Bernalillo Co.**, Bosque Forest, **Cibola Co.**, Zuni Mts. (southeast of Gallup), **Los Alamos Co.**, Los Alamos, Mortandad Canyon, Camp May, **Sandoval Co.**, Bandelier National Monument, 45 k SE Cuba, **Santa Fe Co.**, Sangre de Cristo Mts., **Taos Co.**, 20 k S Taos; MEXICO: Chihuahua.

**Habitat.** Meadows through ponderosa pine-riparian up to aspen forests.

**Biology.** This species is found in pebble and soil mounds (up to 20 cm high, 50 cm in diameter),

often with some thatching; occasionally nests are simply under a stone or in a log or stump. Brood was found in nests in July and August. This is a common species in northern New Mexico. This species nests with *Camponotus modoc*.

Gregg, 1963



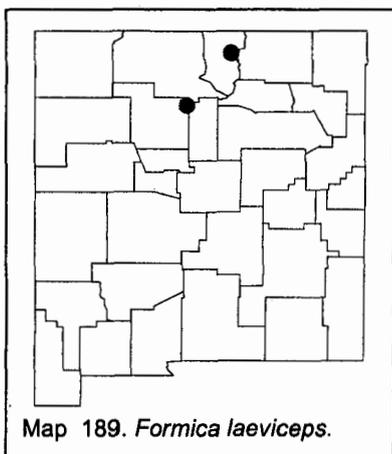
Map 188. *Formica hewitti*.

***Formica laeviceps*  
Creighton  
(*rufa* group)**

Figs. 388, 391, 395; Map 189

**Discussion.** Workers can be recognized as lacking erect hairs on the scape (except at apex) and with few erect hairs on the mid and hind tibiae, except for a double row of bristles, each with up to 10 hairs, which extend the entire length of the tibia. The tentorial pits are very deep and pit-like, making the middle part of the clypeus rise up as a rectangle (Fig. 391). The species name suggests that the head is smooth, but it is predominantly rough and only

slightly smoother than the average member of the *rufa* group.



**Distribution.** USA: CO; NM: Los Alamos Co., east Banderlier (possibly species near *laeviceps*), Taos Co., Taos (Yerba trailhead).

**Habitat.** Semiarid sites, grasslands, pinyon-juniper forests, up into mixed conifer habitats (Fagerlund, pers. comm.).

**Biology.** This ant nests under stones, and occurs in areas with sandy soils and interspersed stones. Foragers were collected on *Yucca* sp. stalks, tending aphids, on a sunny, east-facing slope.

### *Formica lasioides* Emery (*neogagates* group)

Figs. 382, 384, 416; Map 190

**Discussion.** This is a very common, small *Formica* which is widely distributed in New Mexico, especially at higher elevations. It is easily recognized as the pronotum has 10 or more erect hairs and the scape has numerous, short, delicate,

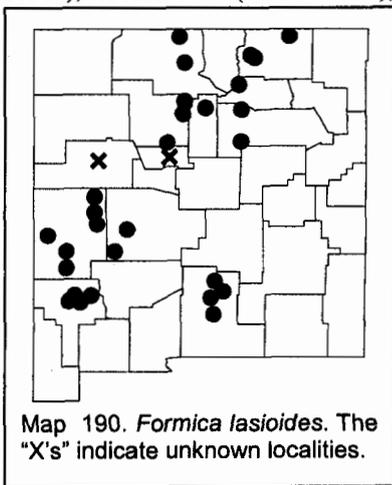
white hairs. Most other body parts are covered with bristly hairs. The entire surface is smooth and polished.

It is unlikely to be confused with any other species of *Formica*, as it is the only small, shiny New Mexican species with erect hairs on the antennae.



Fig. 416. Clypeus of a worker of *F. lasioides*.

**Distribution.** USA: Most of North America; NM: Bernalillo Co., without locality, Catron Co., 9 k N Apache Creek, 15 k NW Datil, 14 k W Datil, Mogollon Mts. (trail 206), near Snow Lake, Ox Springs Canyon, Cibola Co., without locality, Colfax Co., Cimarron Canyon (Cole 1954e), 2 mi. S Raton Pass (Cole 1954e), Ute Park (Cole 1954e),



Grant Co., 5 mi. N Pinos Altos, Wright's Cabin, 77 k E Silver City, 88 k E Silver City, Los Alamos Co., Los Alamos, Mortandad Canyon, Mora Co., Coyote Creek State Park, Otero Co., Cloudcroft (Wheeler, 1913), 14 mi. S Mescalero (Cole 1954e), Sacramento Mts. (Bailey Canyon), 9 k SW Timberon, Rio Arriba Co., 7 k S Cebolla, 4 k N Chama, Sandoval Co., Bandelier National Monument, Rio Rancho, San Miguel Co., Beulah (Wheeler, 1913), Gallinas Canyon (Wheeler, 1913), Sapello Canyon near Beulah (Cole 1954e), Santa Fe Co., 12 k NE Santa Fe, Socorro Co., Grassy Lookout, Withington Lookout.

**Habitat.** Primarily pine forest, ponderosa pine-riparian, fir forests, spruce and aspen forests, pinyon pine, oak forest, although it occurs in other habitats, including semiarid grasslands.

**Biology.** This is a common species, which nests in the soil, usually under stones or logs. Brood was collected in nests in July and August. Two dealate females were collected on the soil surface on 6 Aug. 1986. It nests together (possibly enslaved by) with *F. occulta*. One colony was nesting together with *Lasius pallitarsis*, several nests contained colonies of *Leptothorax crassipilis*. One mixed nest included *F. argentea*, *F. aserva*, *F. obtusopilosa*, *F. rubicunda*, *F. lasioides* and *Myrmica*. These ants are docile, and escape when the nest is excavated.

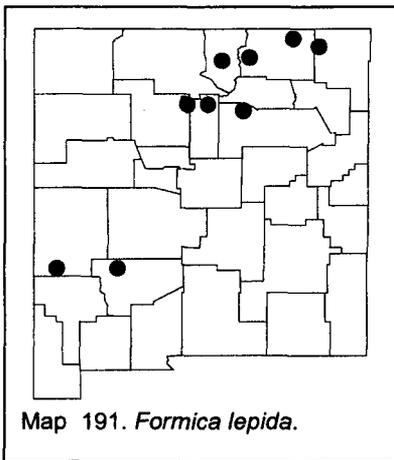
Cole, 1942, 1966; Wheeler and Wheeler, 1944, 1963; Gregg, 1963; Kincaid, 1963

### *Formica lepida* Wheeler (*fusca* group)

Map 191

**Discussion.** Workers may be recognized by the lack of a process on the metasternum, being concolorous yellow to blackish-brown, by lacking elongate punctures on the genae, and in having erect hairs present on the ventral surface of the head, posterior border, promesonotum, propodeum and dorsal margin of the petiole. The four faces of the femora have erect hairs, and the petiole is thick as seen in profile, with a rounded apex.

*Formica lepida* can be separated from *F. canadensis* by the lack of a process on the metasternum, and the hairs are more tapering than those of *F. canadensis*, the sides are convergent along the length. The hairs on *F. canadensis* are mostly coarse, with the sides parallel along their lengths.



Map 191. *Formica lepida*.

**Distribution.** USA: CA (northern coastal region); NM: Ca-

tron Co., Mogollon Mts., Colfax Co., Cimarron Canyon (Cole, 1954e), 2 mi. S Raton Pass (Cole, 1954e), Sandoval Co., Bandelier National Monument, San Miguel Co., Sapello Canyon (Cole, 1954e), Santa Fe Co., Tesuque Canyon (Cole, 1954e), Sierra Co., Little Willow Creek Canyon, Taos Co., 5 mi. E Taos (Cole, 1954e), Union Co., Capulin Volcano National Monument (Cole, 1954e).

**Habitat.** Moist meadows and shaded slopes (juniper, pine, fir and aspen forests).

**Biology.** This species nests under stones.

Cole, 1954e; Francoeur, 1973

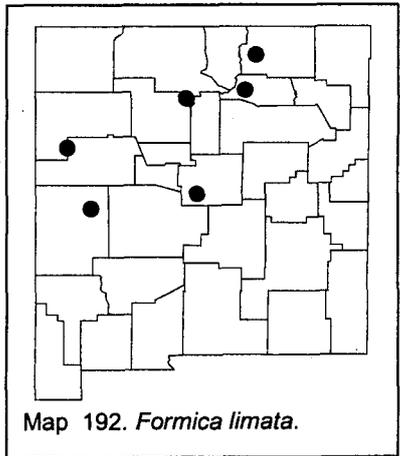
### ***Formica limata* Wheeler (*neogagates* group)**

Figs. 356, 359, 386; Map 192

**Discussion.** This species can be recognized as the pronotum has fewer than 10 erect hairs (often none), and all surfaces are smooth and glossy. The scape is without erect hairs (except at the apex).

It is unlikely that this species would be confused with any others, except *F. neogagates*. It differs in having fewer erect hairs on the pronotum (rarely more than 10), whereas *F. neogagates* normally has more than 20 erect hairs on the pronotum. This species is more smooth and polished, many surfaces of *F. neogagates* are tessellated, and although shiny, are somewhat roughened. Sometimes a specimen cannot be separated in to one or the other of these two species. It is difficult to separate this species from *F. ore-*

*gonensis* as both species generally have few hairs on the pronotum and both are usually more shiny than *F. neogagates*. They can be separated on the basis of distribution, *F. oregonensis* is found only in Oregon, *F. limata* has not been reported from Oregon, and is known only from the mid west, as far east as Utah and New Mexico.



Map 192. *Formica limata*.

**Distribution.** USA: ND, MT south to NM, west to CA; NM: Catron Co., 14 k W Datil, Colfax Co., Cimarron Canyon (Cole, 1955c), Eddy Co., Hidden Cave, Los Alamos Co., Los Alamos, 2 k NE Los Alamos, Mortandad Canyon, McKinley Co., 4 k E Ramah, Mora Co., 10 k SE Mora, San Miguel Co., Las Vegas (Wheeler, 1913), Torraine Co., 24 k S Mountainair.

**Habitat.** Meadows and grasslands through sagebrush, pinyon-juniper, ponderosa pine-riparian, grassy areas up to the tree line.

**Biology.** This species nests under stones and logs, usually in exposed areas. Nests are occasionally small mounds in the soil. Nest popu-

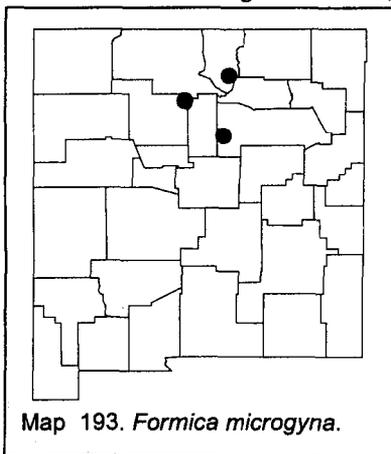
lations are small, and these ants are timid. Brood was found in nests in August. One nest was found within a cave, 80 ft from the entrance. Workers are attracted to baits (grape jelly, tuna).

Wheeler and Wheeler, 1944, 1963; Gregg, 1946, 1963; Cole, 1966

***Formica microgyna***  
**Wheeler**  
**(*microgyna* group)**

Fig. 389; Map 193

**Discussion.** The workers of this species are robust, large bodied, bicolored (head and mesosoma red, gaster black) ants, with numerous blunt, erect hairs on various body parts, especially the pronotum. The tibiae have erect hairs on all surfaces, including a double row on the flexor surfaces. The gaster is dull,



Map 193. *Formica microgyna*.

except for a band at the end of each tergum, the surface is dull and covered with dense, appressed pubescence. The erect hairs are white, silver or pale yellow in color, and are abundant, especially on the pron-

tum, mesonotum, propodeum and gaster. Those on the gaster vary in length. Most of the hairs on the mesosoma are blunt tipped, or even weakly spatulate.

**Distribution.** USA: WY S to NM, W to UT; NM: **Los Alamos Co.**, Camp May, **San Miguel Co.**, Pecos (Wheeler, 1913), **Taos Co.**, 2 k W Tres Ritos.

**Habitat.** Meadows and open forests, pine and aspen forests.

**Biology.** Nests are found under stones and logs, occasionally with thatching. Reproductives were found in nests in August. This species enslaves *F. argentea*, *F. fusca*, *F. lasioides* and *F. neogagates*.

Wheeler, 1913, 1917; Gregg, 1963; Cole, 1966

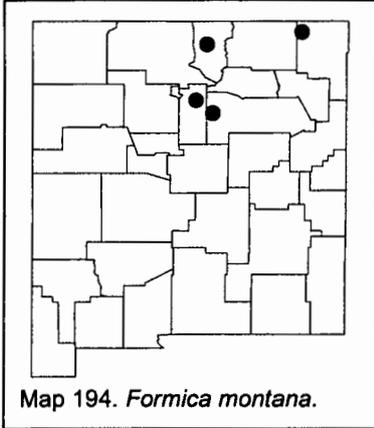
***Formica montana*** Wheeler  
**(*fusca* group)**

Figs. 368, 369; Map 194

**Discussion.** This is a light brown, hairy species. The metasternal process is well developed and surrounded with erect hairs. There are numerous erect hairs on the ventral surface of the head, the pronotum, propodeum, petiole and gaster. Many (or most) of the hairs are blunt-tipped. There are few hairs along the side of the head, usually extending anteriorly only to the anterior edge of the eye. The cheek is usually without erect hairs.

**Distribution.** USA: OH west to ND, south to NM; NM: **Santa Fe Co.**, Santa Fe, **San Miguel Co.**, Pecos, **Taos Co.**, Taos, **Union Co.**, Capulin Mountain National Monument (Cole, 1954e).

**Habitat.** Prairies and meadows, up to pinyon-juniper and oak-pine forests.



Map 194. *Formica montana*.

**Biology.** This ant nests in mounds of soil, occasionally with thatching. Reproductives were found in nests from May to July.

Wheeler, 1910a, 1917; Amstutz, 1943; Gregg, 1948, 1963; Cole, 1954e; Wheeler and Wheeler, 1963 (as *F. altipetens*); DuBois and Danoff-Burg, 1994

***Formica mucescens*  
Wheeler  
(*rufa* group)**

**Discussion.** This species can be recognized as there are few hairs on the tibiae, where they are restricted to two rows on the flexor surface. The gaster is covered with short, bristly hairs, in which the distance between the tips is less than the lengths of the hairs.

It is similar to *F. ciliata*, but differs in that the cheek has several erect hairs (usually more than 12 on each), and the female is brown, and without the curved hairs found on the

female of *F. ciliata*. It can be separated from *F. comata* (which occurs from Montana south to Colorado) as the erect hairs on the gaster are longer (0.12 mm vs. 0.06 mm in length in *F. comata*).

**Distribution.** USA: CO and UT; NM: not known to occur in the state, but as it is found near the border in Colorado, it would be expected in New Mexico.

**Habitat.** Found in open prairies up to ponderosa pine forests.

**Biology.** This species nests under stones banked with detritus or in thatched nests.

Gregg, 1963

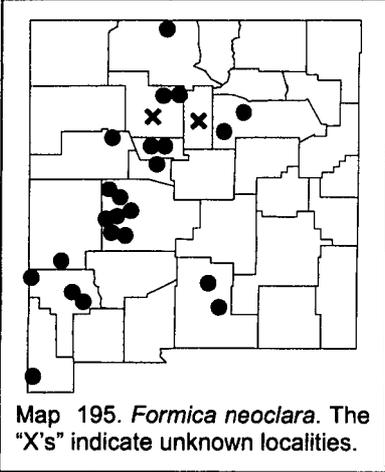
***Formica neoclara* Emery  
(*fusca* group)**

Map 195

**Discussion.** This is one of the few light-colored *Formica* spp. in New Mexico. It is usually a light yellowish brown with a gaster that is only slightly darker. Occasionally workers are red with a black gaster, or even nearly black, with yellowish-brown areas. The pilose lobes on the metasternum are not always well developed, but there are always at least a few golden erect hairs on the posterior edge.

It could be confused with *F. argentea*, but the latter species has few or no golden erect hairs on the metasternal lobes. Additionally, *F. argentea* usually has a few blunt hairs on the pronotum, *F. neoclara* rarely has any pronotal hairs.

**Distribution.** USA: Western United States; NM: **Bernalillo Co.**, Albuquerque, Rio Grande, **Cañón**



Co., Mogollon Mts., **Cibola Co.**, Mt. Taylor (9000 ft), **Grant Co.**, 6 k E Mule Creek, 60 k E Silver City, 9 k E White Signal, **Hidalgo Co.**, Gray Ranch, **Los Alamos Co.**, Los Alamos, **Otero Co.**, 4 mi. N Cloudcroft, 13 k N Timberon, 14 k N Timberon, **Rio Arriba Co.**, 4 k N Chama, **Sandoval Co.**, Jémez Springs, without locality, **San Miguel Co.**, Pecos (Wheeler, 1913), Las Vegas (Wheeler, 1913), **Santa Fe Co.**, without locality, **Socorro Co.**, 5 k N Camp Luna, 11 k NW Magdalena (Bear Mt.), 18 k NW Magdalena (Bear Mt.), 17 k S Magdalena, 19 k S Magdalena, 21 k S Magdalena, 23 k S Magdalena, Withington Mt., Intersection roads 330 X 107, **Valencia Co.**, Belén; MEXICO: Chihuahua.

**Habitat.** Residential areas, grasslands (including arid grasslands) and open deciduous woods, oak forests, pinyon juniper into pine and fir forests.

**Biology.** This species nests in the soil, usually with a mound. Sometimes nests are located at the base of a plant or under stones or logs, or in stumps, often in sandy soils. Nests can be large, with a circumference over 9 meters in diameter, with over 125 entrances. Brood was collected in June to August. Reproductives were found in nests in July and August, dealate females were collected in late June and July. This species may be polygynous, 3 dealate females were found in a single nest. Foragers are often found on cholla (*Opuntia imbricata* var. *arborescens*). Workers may be aggressive when a nest is disturbed, although they usually escape. This species is enslaved by *Polyergus breviceps* and nests with *Camponotus modoc*.

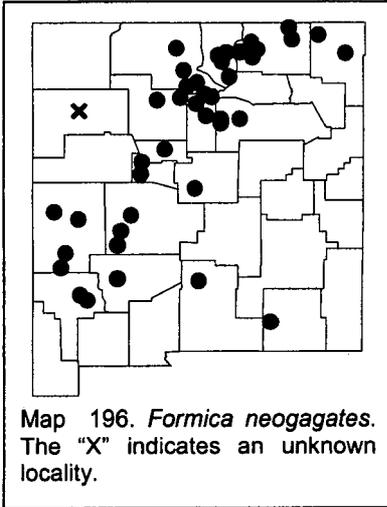
Wheeler, 1910a; La Berge, 1952; Gregg, 1963 (as *F. pruinosa*); Wheeler and Wheeler, 1963

### *Formica neogagates* Viereck (*neogagates* group)

Fig. 385; Map 196

**Discussion.** *Formica neogagates* usually has abundant erect hairs on the pronotum, as well as the remainder of the body. The antennae are without erect hairs (except at the apex). The surfaces are shiny, but more sculptured than most members of the *neogagates* species group. It can be separated from most of the other members by having more than 10 erect hairs on the pronotum (usually more than 20), and having rougher sculpture.

These latter two characters usually separate it from *F. neogagates*. It is very similar to *F. oregonensis*, but can be separated on the basis of distribution (*F. oregonensis* is known only from Oregon, *F. neogagates* occurs throughout North America, but has not been reported from Oregon).



**Distribution.** CANADA:

Que.; USA: Most of North America; NM: **Bernalillo Co.**, Albuquerque (Wheeler, 1913), **Catron Co.**, 37 k N Apache Creek, 14 m W Horse Springs, Mogollon Mt., near Snow Lake, **Colfax Co.**, Cimarron Canyon (Cole, 1954e), 16 k E Eagle Nest, 41 k E Eagle Nest, 8 mi. W Eagle Nest (Cole, 1954e), 2 mi. S Raton Pass (Cole, 1954), 16 m E Raton (Cole, 1954e), Ute Pass (Cole, 1954e), **Grant Co.**, 77 k E Silver City, 88 k E Silver City, **Los Alamos Co.**, Los Alamos, **McKinley Co.**, without locality, **Otero Co.**, Alamogordo (Wheeler, 1913), 41 k NW Sitting

Bull Falls, **Rio Arriba Co.**, 7 k S Cebolla, San Juan Pueblo, **Sandoval Co.**, 11 k E Cuba, **San Miguel Co.**, Las Vegas (Wheeler, 1913), Pecos (Wheeler, 1913), Sapello Canyon, (Beulah area), (Cole, 1954e), **Santa Fe Co.**, Glorieta (Wheeler, 1913), Santa Fe, Tesuque Canyon near Santa Fe, **Sierra Co.**, Black Range, **Socorro Co.**, 16 k S Magdalena, Withington Lookout, Intersection roads 330 X 107, **Taos Co.**, 20 k NW Taos, 12 mi. E Taos (Cole, 1954), 18 mi. S Taos (Cole, 1954e), 2 k W Tres Ritos, **Torrance Co.**, 24 k S Mountainair, **Union Co.**, Capulín Mountain National Monument, 3 mi. N Greenville, **Valencia Co.**, 22 k E Grants, Los Valles (Wheeler, 1913).

**Habitat.** Grasslands and highly disturbed urban environments through pinyon-juniper forests up to aspen forests. It is occasionally found in semiarid habitats.

**Biology.** This species nests in the soil, often under stones or logs. Colonies are small and these ants are timid. *Formica densiventris*, *F. wheeleri* and *F. pergandei* enslave it. It nests together with *Lasius alienus* and *Myrmica lobifrons*. Reproductives were found in a nest in June, dealate females were found in June and July. Nests have multiple, dealate females.

Wheeler, 1905a; Wesson and Wesson, 1940; Buren, 1944; Wheeler and Wheeler, 1944, 1963; Gregg, 1963; Cole, 1966; DuBois and Danoff-Burg, 1994

***Formica neurufibarbis***  
**Emery**  
**(*fusca* group)**

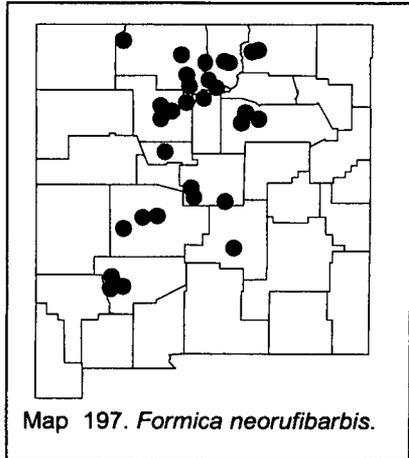
Figs. 372, 374; Map 197

**Discussion.** This species has few erect hairs, the gaster is polished and strongly shining, the surface is little hidden by sparse pubescence. The metasternal process is poorly developed, but is usually surrounded by erect hairs (as in Fig. 366). The area between the anterior edge of the eye and the mandible has elongate punctures, which are often difficult to see unless the surface is held obliquely and the light is directed from the side.

The shiny gaster usually suggests the *neurufibarbis* species complex, the other characters, especially the lack of hairs on the ventral surface of the head and dorsum of the petiole, together with the elongate punctures on the gena, confirm the identification.

**Distribution.** USA: Most of United States; NM: **Bernalillo Co.**, Embudo Canyon, **Colfax Co.**, 2 mi. W Cimarron, 15 mi. E Eagle Nest, **Lincoln Co.**, 5 mi. W Capitán, **Los Alamos Co.**, Los Alamos, Rio Grande, Camp May, **Rio Arriba Co.**, Abiquiu Dam, 37 k N Abiquiu, 2 k N Dixon, 57 k SW Duke, 10 k SW Española, 4 k NW Navajo City, NE Truchas Peak (Wheeler, 1913), **Sandoval Co.**, Bandelier National Monument, 45 k SE Cuba, Jémez Mts., 1 mi. S Jémez, Placitas, without locality, **San Miguel Co.**, Las Vegas range (Wheeler, 1913), Sappello Canyon (near Las Vegas), Villanueva State Park, **Santa Fe Co.**,

Tesuque Canyon, **Sierra Co.**, 4 k W Hillsborough, 21 k SW Hillsborough, 6 k W Kingston, **Socorro Co.**, Intersection Roads 330 X 107, Water Canyon, 16 mi. E Socorro, **Taos Co.**, Ojo Caliente, 12 mi. E Taos, 18 mi. E Taos, **Torrance Co.**, 5 mi. NE Corona, 13 k NW Mountainair, 24 k S Mountainair (Cole, 1954e); MEXICO: Chihuahua.



**Habitat.** Sagebrush, grasslands, pinyon-juniper, up to spruce and aspen, fir, riparian cottonwood forests and ponderosa pine forests.

**Biology.** This is a common, widely distributed species. Nests may be found under stones or logs and in rotten logs and stumps in areas of rocky sand or loam. Brood was found in nests in July and August, reproductives were in nests in August. The diurnal foragers are found in chollas (*Opuntia* sp.). This species is enslaved by other species of *Formica* (*F. adamsi alpina*) and by *Polyergus breviceps*.

Wheeler, 1913 (as *F. fusca* var. *gelida*); Cole, 1954e; Gregg

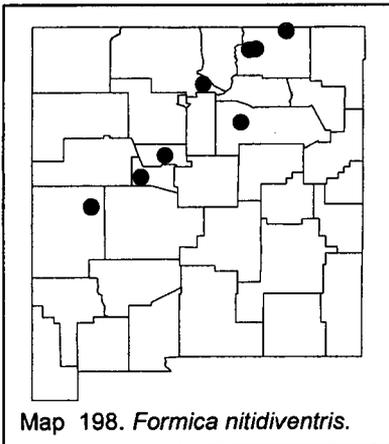
1963; DuBois and Danoff-Burg,  
1994

***Formica nitidiventris***  
**Emery**  
**(*pallidefulva* group)**

Map 198

**Discussion.** This is a shiny, elongate ant similar to other members of the *pallidefulva* species complex. The apex of the petiole is moderately sharp; there are few hairs on the dorsum of the mesosoma.

This taxon has a darker gaster than the typical *F. pallidefulva*, a character that seems to be very consistent. DuBois and Danoff-Burg (1994) concluded that this taxon is probably a valid species as it and *F. pallidefulva* occur together in the same habitats.



**Distribution.** USA: Northern and eastern United States as far west as CO and NM: **Bernalillo Co.**, NW Albuquerque, **Catron Co.**, 2 mi. E Datil (Cole, 1954e), **Colfax Co.**, Cimarron Canyon (Cole, 1954e), 41 k E Eagle Nest, 2 mi. S Raton Pass

(Cole, 1954e), **Rio Arriba Co.**, Truchas (Cole, 1954e), **San Miguel Co.**, Las Vegas (Wheeler, 1913), **Valencia Co.**, Los Valles (Wheeler, 1913, as *F. pallidefulva schaufussi* var. *incerta*).

**Habitat.** Occurs in numerous habitats, ranging from urban environments through grasslands up to pinyon-juniper woodlands and ponderosa pine forests.

**Biology.** This species usually nests under stones or logs, but may occur in open areas in the soil; reproductives were found in nests from June to October.

Wheeler, 1904, 1917; Rau, 1934; Wesson and Wesson, 1940; Talbot, 1946, 1948; Schread and Chapman, 1948; Gregg, 1963; DuBois and Danoff-Burg, 1994

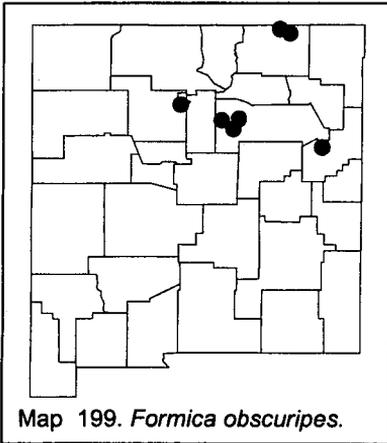
***Formica obscuripes* Forel**  
**(*rufa* group)**

Figs. 66, 362, 390, 392, 396; Map  
199

**Discussion.** This species is difficult to separate from *F. obscuriventris*. Characters to separate it from *F. obscuriventris* are in the discussion of that species. It is generally less hairy than *F. obscuriventris*, specifically having fewer than 30 erect hairs on the posterior border of the head (usually fewer than 20), whereas *F. obscuriventris* usually has more than 30.

**Distribution.** USA: Much of North America; NM: **Colfax Co.**, Barela Mesa (Wheeler, 1913), Raton Pass (Cole, 1954e), **Los Alamos Co.**, Los Alamos, Mortandad Canyon, **Quay Co.**, Tucumcari, **San Mi-**

guel Co., Beulah (Wheeler, 1913), Dailey Canyon (Cole, 1954e), Pecos (Wheeler, 1913).



Map 199. *Formica obscuripes*.

**Habitat.** Prairies, sagebrush, mixed deciduous forest up to pinyon-juniper, ponderosa pine-riparian.

**Biology.** This species is not common in New Mexico. It nests in thatched mounds or under logs or stones (usually partially covered with thatch). Workers tend aphids. It is polygynous (multiple queens in the nest). This species does not have typical mating flights; instead small numbers leave the nest throughout the season. Dealate females were collected in late June and early July.

Wheeler, 1913 (*F. rufa aggerans*); Jones, 1929; Cole, 1932; Weber, 1935; Gregg, 1963

***Formica obscuriventris obscuriventris* Mayr  
(*rufa* group)**

**Discussion.** This species is difficult to identify as characteriza-

tion depends on the structure of the clypeus (see couplet 5 of the *rufa* group key). The tentorial fossa is deep, with the surrounding area depressed into a pit-like funnel. In addition, the middle of the clypeus is separated from the sides and is shaped somewhat like a rectangular box. If you pass couplet 6, it will key to *F. obscuripes*, but will differ to some degree in being more hairy. The vertex of the head usually has more than 30 erect hairs, when the top of the head is seen in profile from behind.

*Formica obscuripes* usually has fewer than 20 hairs on the vertex, and the clypeal fossa will not be deep and funnel shaped. The middle of the clypeus passes gradually into the sides, not forming a rectangular box.

**Distribution.** USA: All through North America; NM: This subspecies is found in southwestern Colorado and may occur in New Mexico. Mayr (1886) includes NM, as does Wheeler (1913:449), without listing localities.

**Habitat.** Mixed canyon forest, and open woods into pinyon-oak-cedar woodland.

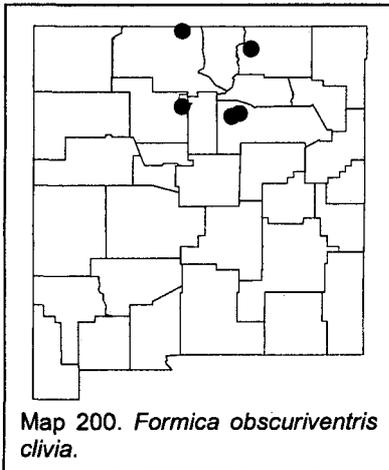
**Biology.** This species nests under logs or stones, usually partially covered with thatch. Females were found in nests in April, it may be polygynous, as several dealate females may be found in nest. It enslaves *F. subsericea*.

Wheeler, 1913; Gregg, 1963

***Formica obscuriventris*  
*clivia* Creighton  
(*rufa* group)**

Fig. 393; Map 200

**Discussion.** This subspecies can be separated from the typical *F. obscuriventris* in that the minors are darker, and at least part of the petiole of the majors is somewhat darkened, as compared to workers of *F. obscuriventris*, in which the minors are yellow-brown in color and the petiole of the majors is clear yellow or red. Obviously the differences in color are of little significance, and this subspecies is probably a synonym.



**Distribution.** USA: Central North America south to NM: **Colfax Co.**, 13 mi. N Eagle Nest (Cole, 1954e), **Rio Arriba Co.**, 4 k N Chama, **Sandoval Co.**, Bandelier National Monument (Cole, 1954e), **San Miguel Co.**, Dailey Canyon (Cole, 1954e), Sapello Canyon (Cole, 1954e).

**Habitat.** Meadows up to oak woodlands, ponderosa pine-riparian and spruce aspen forests.

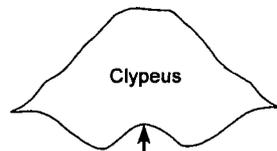
**Biology.** This ant constructs thatched domes of pine needles, typical of the *F. rufa* species group, in loam soils. Nests may also be found under stones or logs banked with thatch. Brood was found in nests in June and August, reproductives can be found in nests in August to September; dealate females were also found in August and September. They are very aggressive and attack when the nest is disturbed. Foragers tend aphids on various plants.

Gregg, 1963

***Formica obtusopilosa*  
Emery  
(*sanguinea* group)**

Figs. 412, 417; Map 201

**Discussion.** This species can be recognized as the gaster is evenly covered with short (up to 0.14 mm), stout, silver, erect hairs, which are blunt at the tip, and the hairs on other surfaces are less abundant. The mesosoma has only a few erect hairs (occasionally none), which are finer



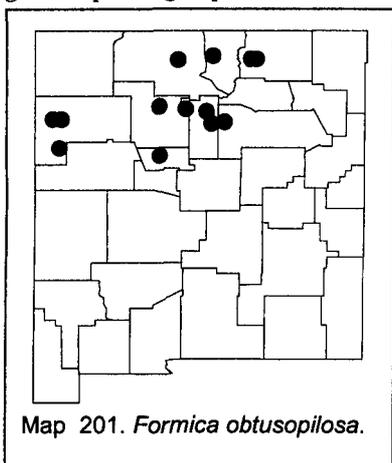
Deeply notched clypeus

Fig. 417. Clypeus of a worker of *F. obtusopilosa*, showing the deeply notched clypeus.

than those on the gaster, and which are at most half as long. There is at

least a pair of erect hairs on the underside of the head. The notch of the clypeus is well developed (Fig. 417). The scape is longer than the head length; the propodeum is broadly rounded between the faces and the apex of the petiole is blunt in profile.

*Formica obtusopilosa* is also included in the key to the *neogagates* group as smaller workers may occasionally be confused with members of that group. The species does not belong to the *neogagates* species group and is a member of the *sanguinea* species group.



Map 201. *Formica obtusopilosa*.

**Distribution.** USA: Canada south through MN, NB to NM: **Bernalillo Co.**, Placitas, **Colfax Co.**, 10 mi. NE Cimarron (Cole, 1954e), Ute Park (Cole, 1954e), **Los Alamos Co.**, Los Alamos, Camp May, **McKinley Co.**, Church Rock, 40 mi. E Gallup, 4 k E Ramah, **Rio Arriba Co.**, 7 k S Cebolla, **Sandoval Co.**, 11 k E Cuba, **San Miguel Co.**, Old Pecos Pueblo (Wheeler, 1913), **Taos Co.**, 14 k SE Tres Piedras, **Santa Fe Co.**, Glorieta [Canyon?] (Wheeler, 1913), Santa Fe (Audubon Center).

**Habitat.** Sagebrush scrub through meadows, irrigated plains and pinyon-juniper forests up to aspen forests. Cole (1954) found a nest in dry semi-desert.

**Biology.** Nests are found under stones or in earthen mounds, similar to those of *Myrmecocystus*, in fine sandy or loam soils. These ants are very aggressive. Brood was found in nests in June and August, dealate females were found in July. Colonies are probably small, possibly a few hundred workers. One colony also contained workers of *F. aserva*, *F. argentea*, *F. lasioides* and *Myrmica*.

Wheeler, 1913 (including *F. munda*); Cole, 1954e

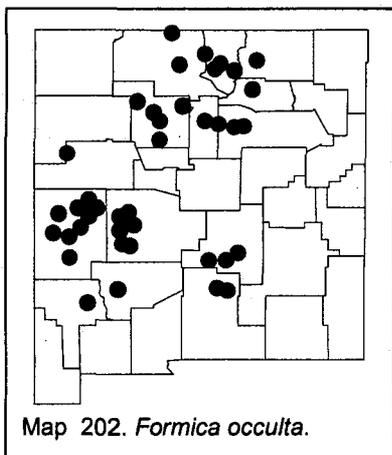
### ***Formica occulta* Francoeur (*fusca* group)**

Figs. 365, 367; Map 202

**Discussion.** This is a very common species in New Mexico. It is black or nearly black, with abundant appressed pilosity. The pilose lobes on the metasternum are always developed and surrounded with abundant, erect hairs (Fig. 365).

Callows (immature, lightly pigmented workers) could be easily confused with workers of *F. neoclara*. It is important to collect a good series to determine if at least some of the workers are dark. Some specimens can be confused with *F. fusca*, when the metasternal lobes are less well developed than normal. Again it is important to collect a good series (10 or more) so several workers can be examined.

**Distribution.** USA: OR, WY, UT, CO, AZ; NM: **Catron Co.**, 9 k N Apache Creek, 37 k NE Apache Creek, 5 k N Camp Luna, 14 k NW Datil, 15 k NW Datil, Ox Spring Canyon, Sawtooth Mts., near Snow Lake, **Colfax Co.**, 16 k E Eagle Nest, **Grant Co.**, 88 k E Silver City, **Lincoln Co.**, 2 mi. W Alto, Bonito Lake, Oak Grove Camp, **Los Alamos Co.**, Los Alamos, 8 k N Los Alamos, 4 k W Los Alamos, Chupaderos Canyon, Camp May, **McKinley Co.**, 4 k E Ramah, **Mora Co.**, Coyote Creek State Park, **Otero Co.**, Bailey Canyon, Cloudcroft, **Rio Arriba Co.**, 7 k S Cebolla, 4 k N Chama, **Sandoval Co.**, 4 k W Cuba, 45 k S Cuba, 12 mi. NE Jémez



Map 202. *Formica occulta*.

Spring, Jémez Canyon, **San Miguel Co.**, Las Vegas, 20 k NW Las Vegas, Pecos, **Santa Fe Co.**, Santa Fe, **Sierra Co.**, Black Range, **Socorro Co.**, Beartrap Canyon (43 k SE Datil), 5 k N Camp Luna, Grassy Lookout, San Mateo Mts. (10,000'), Water Canyon, Withington Lookout, **Taos Co.**, 6 k SW Tres Piedras, 14 k SE Tres Piedras, 2 k W Tres Ritos,

20 k NW Taos; MEXICO: Chihuahua.

**Habitat.** Pinyon-juniper, sagebrush communities, oak forests, ponderosa pine-riparian; aspen, fir, spruce, and residential areas.

**Biology.** Nests are usually found under stones, but may be located under logs, or simply in the soil, in fine sand, loam soils, to rocky loam. Brood was found in nests from June to August, sexuals in late June to July. Dealate females were collected in late June and early July. A mating flight occurred the night of 12-vii-1986, sexuals were attracted to a blacklight trap. Dealate females were found in August, two new females were found nesting together (two separate times, one with brood present). All nests had only a single gyne. They are very fast, and rescue brood when the nest is disturbed. Workers from larger nests are moderately aggressive. One colony was nesting together with *Lasius sitiens*, a second nest was together with *Myrmica hamulata*, another with *Formica lasioides*, a fourth with *Solenopsis salina*. One nest also contained *Acanthomyops latipes*, *Lasius sitiens* and *Myrmica hamulata*. It is a host of the cricket *Myrmecophila* sp., and is parasitized by *Polyergus breviceps*.

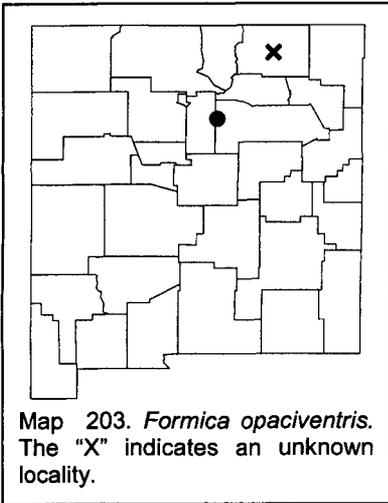
***Formica opaciventris*  
Emery  
(exsecta group)**

Figs. 360, 361, 363; Map 203

**Discussion.** Workers can be recognized as the posterior border is concave as seen in full-face view

(Fig. 360), and the propodeum is somewhat angulate as seen in profile (Fig. 361). The pronotum has several spatulate hairs and the mesonotum has a few short, bristly hairs. The dorsum of the gaster has many scattered, short, bristly hairs and has sparse, silver, appressed pubescence. This species would be considered a member of the *microgyna* group if the posterior border was not concave.

This species can easily be separated from *F. exsectoides* by the numerous erect hairs on the pronotum and gaster (compare Figs. 361 & 364).



**Distribution.** USA: MT and ND south to NM; NM: Colfax Co., without locality, San Miguel Co., Dailey Canyon (Beulah area) (Cole, 1954e).

**Habitat.** Sagebrush scrub, meadows up to the edge of forests.

**Biology.** This species lives in soil mounds or mounds with some thatching.

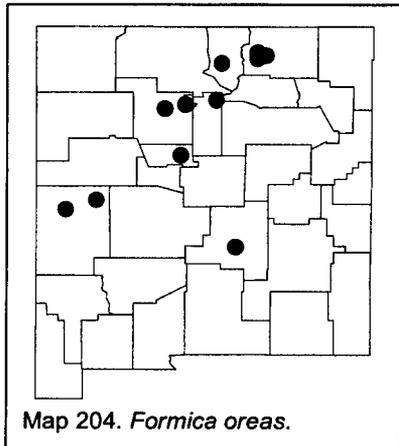
Cole, 1954e; Scherba 1961, 1963, 1964a, 1964b; Gregg, 1963; Wheeler and Wheeler, 1963

***Formica oreas oreas***  
**Wheeler**  
**(*rufa* group)**

Figs. 387, 389; Map 204

**Discussion.** This species can be separated from most others as the scape is more or less evenly covered with erect hairs, whereas other species have erect hairs only at the tip, with possibly a few others scattered on the scape. It can be separated from others with many erect hairs on the scapes as it has short dense hairs covering the gaster and the gaster is brownish black instead of black.

Specimens with few or no hairs will key to *F. obscuripes*, thus it is important to carefully examine all surfaces of scapes of several workers from a series. The subsp-



cies *F. oreas comptula* is recognized, as the minor workers are darker. It is doubtful that this insignificant difference in color is of any importance.

**Distribution.** USA: MT, ID S to NM: **Bernalillo Co.**, Embudo (Wheeler, 1913), **Catron Co.**, 37 k N Apache Spring, Sawtooth Mts., **Colfax Co.**, (Cole, 1954e) Cimarron Canyon, Eagle Nest, Ute Pass, **Lincoln Co.**, 5 mi. W Capitán, **Sandoval Co.**, Bandelier National Monument (Cole, 1954e), 1 mi. S Jémez Springs, **Taos Co.**, 12 mi. E Taos (Cole, 1954e).

**Habitat.** Open woods or meadows up to pine and aspen forests.

**Biology.** This ant nests under stones or logs, usually covered with detritus or thatching, in areas of fine sand to rocky loam. Occasionally this species constructs mounds solely of thatching. Brood was found in nests in March and August, reproductives occurred in nests June to August. Workers are very aggressive when the nest is disturbed.

Wheeler, 1913; Cole, 1942; Gregg, 1963

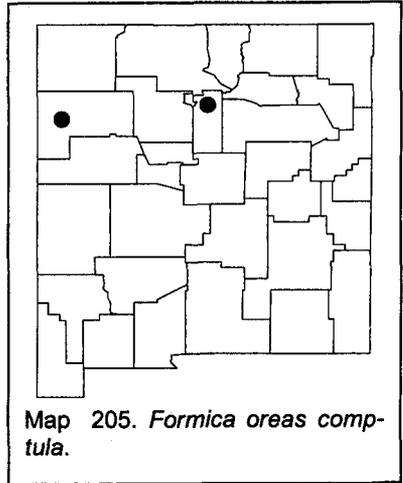
***Formica oreas comptula***  
Wheeler  
(*rufa* group)

Map 205

**Discussion.** This is another subspecies, which is based on relatively insignificant color differences. The minor workers of this subspecies are partially dark, whereas minor workers of the typical *F. oreas* are generally bicolored (head and mesosoma red, gaster black). It will probably be shown to be a synonym of the typical *F. oreas*.

**Distribution.** USA: Western North America; NM: **McKinley Co.**,

8 mi. S Gallup (Fagerlund, pers. comm.), **Santa Fe Co.**, 12 k NE Santa Fe.



Map 205. *Formica oreas comptula*.

**Habitat.** Woodlands and grasslands.

**Biology.** Nest are found under stones or logs covered with thatching.

Cole 1934b; Wheeler and Wheeler 1963

***Formica pallidefulva***  
Latreille  
(*pallidefulva* group)

Figs. 358, 418; Map 206

**Discussion.** This species is large, elongate, and most surfaces

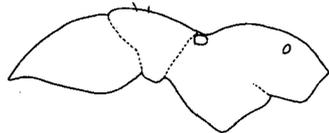
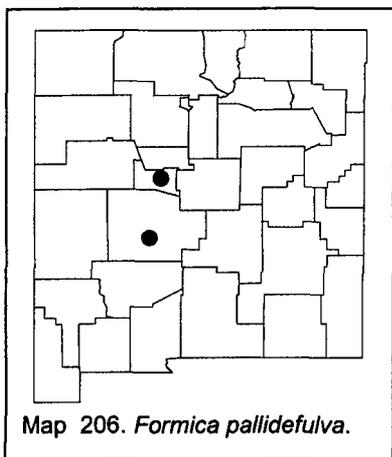


Fig. 418. Mesosoma of a worker of *F. pallidefulva*.

are shiny. It is usually light brown in color, but may be nearly orange or

even yellow, especially when seen in the field.

The gaster is about the same color as the mesosoma, which differentiates it from *F. nitidiventris*. There are few (or none) erect hairs on the dorsum of the mesosoma (Fig. 418). See discussion of *F. nitidiventris* for more details.



**Distribution.** USA: Eastern United States as far west as CO (central); NM: Socorro Co., Bosque del Apache, Valencia Co., Belén.

**Habitat.** Brushy areas, deciduous forests up to birch forests, colonies may also be found in open prairie.

**Biology.** This species nests under stones in areas of sandy or pebbly soils. Nests may be small mounds 5 - 10 cms in diameter. Reproductives were found in nests from May to September.

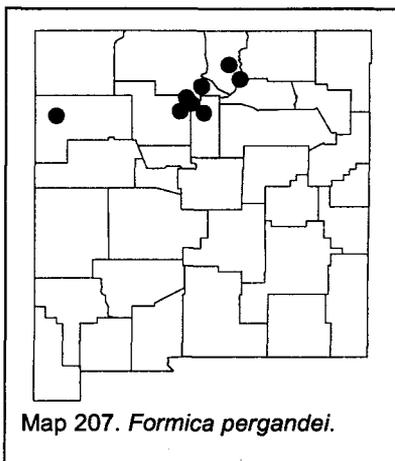
Wheeler, 1913; Dennis, 1938; Cole, 1940; Schneirla, 1944; Gregg, 1963; DuBois and Danoff-Burg, 1994

### *Formica pergandei* Emery (*sanguinea* group)

Figs. 354, 415; Map 207

**Discussion.** The metanotal impression of this species is deep, the head is usually broader than long, the eyes of the majors fail to reach the sides of the head, and there are usually 1 - 4 hairs on the underside of the head. The hairs on the gaster are abundant, but are approximately as abundant (and of the same length) as the hairs on the pronotum. The length of the scape is less than or equal to the length of the head.

**Distribution.** CANADA: Quebec; USA: Eastern North America W to ND S to NM: Los Alamos Co., Los Alamos, Camp May, McKinley Co., 8 mi S Gallup (Fagerlund, pers. comm.), Rio Arriba Co., Truchas, Sandoval Co., Bandelier National Monument,



Santa Fe Co., Santa Fe, Taos Co., 20 k S Taos, 2 k W Tres Ritos.

**Habitat.** Aspen forests, disturbed areas.

**Biology.** This species nests in the soil, and enslaves other *Formica* spp. (*F. fusca* and *F. pallidefulva*). Reproductives were found in a nest in August.

Wheeler, 1901; Gregg, 1946, 1963; Wheeler and Wheeler, 1963; Hung, 1973; Finnegan, 1973 (as *F. subluccida*)

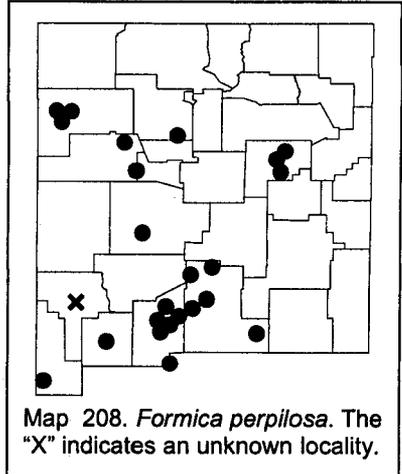
***Formica perpilosa* Wheeler  
(*neogagates* group)**

Figs. 352, 381, 383; Map 208

**Discussion.** This is one of the few species of *Formica*, which occurs in the Chihuahuan Desert, especially in sandy soils. It is also common in lawns in urban environments. It can be distinguished from others in such habitats as the clypeus is usually concave or notched and it is abundantly hairy, black (gaster) and red (head and mesosoma) ant. Most surfaces are moderately shining, including the gaster. It is difficult to place this species in a species complex, and it is presently considered to be a member of the *neogagates* group, but it doesn't seem to be closely related to the others in the complex. It was previously considered to be a member of the *sanguinea* group, based on the notched clypeus. The clypeus is not as notched as it is in the other members of the *sanguinea* group. It is possible that it is a shiny species of the *fusca* complex.

**Distribution.** USA: WY S to TX, W to CA; NM: Cíbola Co., Paraje (Wheeler, 1913), Doña Ana Co., 2 mi. SW Haldeman Air Force Base, La Mesa, 5 mi. N Las Cruces,

10 mi. NE Las Cruces, 45 k NE Las Cruces (Jornada Long Term Ecological Research Site), Grant Co.,



without locality, Guadalupe Co., Park Lake (Santa Rosa), Pecos River at Highway 91 (N of Puerto de Luna), Perch Lake (1.5 mi. SE Santa Rosa), Hidalgo Co., Guadalupe Canyon, Luna Co., Deming, McKinley Co., Gallup, Church Rock, Zuni Mts. (southeast of Gallup), Otero Co., Alamogordo (Wheeler, 1913), Lake Lucero, 41 k NW Sitting Bull Falls (Bate's Park 32°26'08"N 105°04'37"W), 8 mi. NE Tularosa, White Sands National Monument, Sandoval Co., Coronado State Park, Socorro Co., Bosque del Apache, Valencia Co., Los Valles (Wheeler, 1913); MEXICO: Chihuahua, Coahuila.

**Habitat.** Chihuahuan Desert (mesquite woodlands, playas), especially common in loose sand, up to foothill meadows and low elevation forests (pinyon-juniper) (below 1850 meters), riparian (cottonwoods, sycamore forests). It is abundant in urban environments.

**Biology.** Nests are found in the soil, with the entrance surrounded by a small mound. It also nests at the base of desert plants, especially grass clumps, in areas of fine sand to loam. It occasionally nests under stones or pieces of wood. Reproductives were found in nests in July, flights occurred in July, dealate females were found during July. Workers forage on the flowers of *Yucca elata*. This species apparently does not enslave other species of *Formica*. It is the host of the cricket *Myrmecophila* sp. It may be an important predator of the boll weevil. This species shows division of labor, and the workers undertake 38 different behavioral acts.

Wheeler, 1913, 1917; Cole, 1934a; Mallis, 1941; LaBerge, 1952; Gregg, 1963; Brandão, 1978; DuBois and Danoff-Burg, 1994

***Formica planipilis*  
Creighton  
(*rufa* group)**

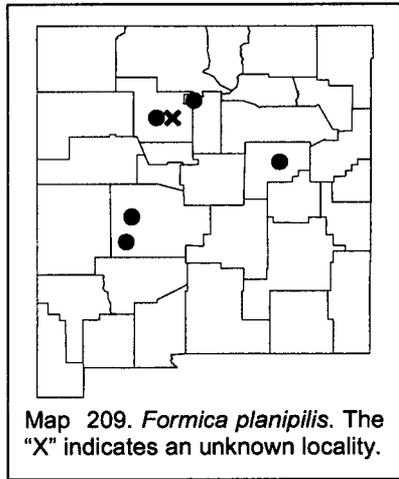
Figs. 394, 397; Map 209

**Discussion.** The tentorial pit of this species is shallow. The middle and hind tibiae have a double row of bristles on the flexor surface, but each is with few hairs (fewer than 10 hairs in each row). There are a few scattered hairs on the other surfaces of the tibiae. The head of the major is longer than broad; the erect hairs on the mesosoma are short and of about equal length. The hairs on the head are longer and sparser than those on the mesosoma.

This species differs from the closely related *F. coloradensis* in

that the smaller workers are partially brown, and the legs of workers of all sizes are brownish black. The minor workers of *F. coloradensis* are clear red with a black gaster. The legs of all sizes of workers of *F. coloradensis* are not much darker than the mesosoma.

**Distribution.** USA: ND, UT, CO, KS, UT, NV; NM: **Guadalupe Co.**, Park Lake (Santa Rosa), **Los Alamos Co.**, Los Alamos, **Sandoval Co.**, Jémez Mts., without locality, **Socorro Co.**, Grassy Lookout, San Mateo Mts.



**Habitat.** Grasslands, open forests, ponderosa pine forests, often found in riparian areas, popular-spruce forests, up to about 3000 meters elevation.

**Biology.** These ants nest in the soil, usually with some thatching of pine needles, but may also be found nesting in rotten logs and stumps in rocky and gravelly soils. Brood and reproductives were found in nests from late June to mid August. Workers forage up into the canopy of pine trees.

Gregg, 1963; Wheeler and Wheeler, 1963; Cole, 1966; DuBois and Danoff-Burg, 1994

***Formica podzolica***  
**Francoeur**  
**(*fusca* group)**

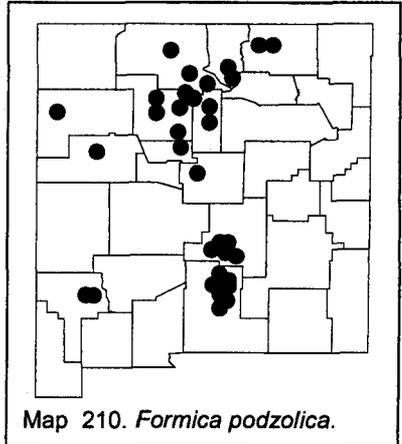
Fig. 377; Map 210

**Discussion.** This species is closely related to a number of others, including *F. occulta*. It differs in that the area around the metasternal cavity is essentially flat, and has only a few hairs surrounding the cavity. It differs from *F. fusca* in that erect hairs are absent on the area surrounding the metasternal cavity, or are present only on the posterior edge. It also has 10 or more coarse, erect hairs on the first gastral tergite (excluding the hairs on the posterior edge).

It is extremely difficult to distinguish this species from *F. argentea*. It is usually darker, black, whereas *F. argentea* is usually dark brownish yellow. The underside of the head of *F. podzolica* has scattered silver, appressed pubescence whereas the pubescence in the similar area of *F. argentea* is more dense and silky, producing more of a luster when seen with the gena in profile.

**Distribution.** USA: Most of North America; NM: **Bernalillo Co.**, Sandia Mts., **Cibola Co.**, Baca Ranch, **Colfax Co.**, 16 k E Eagle Nest, 41 k E Eagle Nest, **Grant Co.**, 77 k E Silver City, 88 k E Silver City, **Lincoln Co.**, 2 mi. SE Alto, 2 mi. W Alto, Bonito Lake, Sierra Blanca, **Los Alamos Co.**, Los Alamos, Camp May, **McKinley Co.**, 8

mi. S Gallup (Fagerlund, pers. comm.), **Otero Co.**, Bailey Canyon, Cloudcroft, Cox Canyon, Haynes' Canyon, James Canyon, Sacramento Mts. (Osha Trail), 13 k N Timberon, **Rio Arriba Co.**, Abiquiu Dam, 7 k S Cebolla, Truchas, **Sandoval Co.**, Bandelier National Monument, 11 k E Cuba, 45 k SE Cuba, Jémez Canyon, Placitas, **Santa Fe Co.**, Santa Fe, 12 k NE Santa Fe, **Taos Co.**, 20 k S Taos, 2 k W Tres Ritos, **Torrance Co.**, Tajiique; MEXICO: Chihuahua.



Map 210. *Formica podzolica*.

**Habitat.** Urban areas, meadows, pinyon-juniper, up to ponderosa pine-riparian, fir, aspen, sand spruce forests.

**Biology.** Nests are found under stones or logs, or in soil with small mounds (up to 50 cm diameter), sometimes with a covering of pebbles or thatching, in rocky loam soils. Brood was present in July and August, sexuals in August, and dealate females were collected in July and August (with first brood). This species is the host of *Polyergus breviceps*. These ants nest together with *Lasius*, with the brood of the 2

genera mixed. One mixed nest included *F. argentea*, *F. aserva*, *F. obtusopilosa*, *F. lasioides* and *Myrmica*, another contained *Camponotus pennsylvanicus*, two nests were together with *Myrmica*. It is enslaved by *Formica aserva*.

Gregg, 1963

***Formica propinqua*  
Creighton  
(*rufa* group)**

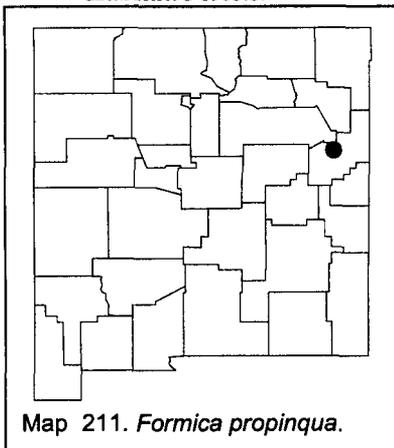
Map 211

**Discussion.** Workers can be recognized by the distribution of erect hairs. The posterior lateral corners and scapes have none (except at apex of scape), the dorsal and ventral surfaces of the head have several (at least 12 on ventral surface of head), the dorsum of the mesosoma has several short, fine erect hairs (most < 0.1 mm in length), the petiole has several similar hairs, and the dorsum of the gaster has several erect hairs which are slightly longer and slightly coarser than those on the pronotum. Most surfaces, including the clypeus, underside of the head and the gena, are dull or only weakly shining. The mid and hind tibiae have a few erect bristles (about 5 on each of the 2 parallel rows), but they extend the entire length of the tibiae.

The dull surfaces separate it from *F. subnitens*, and the lack of posterior lateral hairs separates it from *F. coloradensis*, and from *F. integroides* (which is only found on the West Coast). This species was previously referred to as *F. integroides propinqua*.

**Distribution.** USA, NM: Quay Co., Tucumcari. This is the first record from the state.

**Habitat.** Forests.



Map 211. *Formica propinqua*.

**Biology.** This species nests next to logs and stumps, in thatched nests.

Gregg, 1963

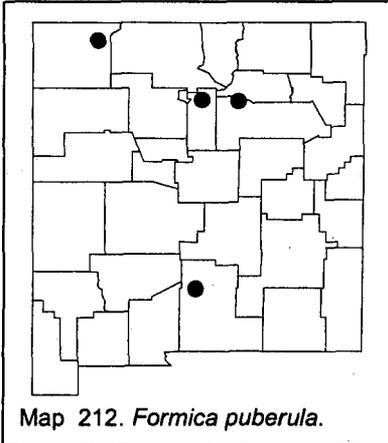
***Formica puberula* Emery  
(*sanguinea* group)**

Fig. 413; Map 212

**Discussion.** The scape of this species has appressed to suberect, relatively coarse hairs, giving it a slight bristly appearance. The underside of the head has at least a pair of hairs. The erect hairs on the gaster are about 0.1 mm long, and are of about the same form and density as those on the pronotum. Most hairs have sharp tips.

**Distribution.** USA: Western North America east to TX; NM: Otero Co., Alamogordo (Wheeler, 1913), Cole (1954e) found 2 nests at Santa Fe Co., Tesuque Canyon, at 2600 m elevation (Cole, 1954e), San

Juan Co., Manzanares (Wheeler, 1913), San Miguel Co., Gallinas Canyon (Wheeler, 1913).



Map 212. *Formica puberula*.

**Habitat.** Sagebrush scrub and grasslands through mixed forests into ponderosa pine and aspen forests. This species also occurs in urban habitats.

**Biology.** This species nests under stones and logs. It enslaves *F. altipetens*, *F. bradleyi*, *F. densiventris*, *F. fusca*, *F. hewitti*, *F. lasioides*, *F. lepida*, *F. montana*, *F. neoclara*, *F. neorufibarbis*, *F. nitidiventris* and *F. subpolita*.

Wheeler, 1910a; Wheeler and Wheeler, 1963; Gregg, 1963; Snelling, 1969

### ***Formica ravid* Creighton (*rufa* group)**

Fig. 405

**Discussion.** The tentorial pits of this species are shallow. The erect bristles on the tibiae are restricted to two rows on the flexor surface, which extend nearly the entire length of the tibiae. The erect hairs on the

gaster are scattered, and do not form an even vestiture when viewed in profile, although the gaster is covered with dense, gray, appressed pubescence. The petiole is narrow in profile with a moderately sharp apex. This species was previously referred to as *F. haemorrhoidalis*.

**Distribution.** USA: Western North America; NM: although this species commonly occurs in western and southwestern Colorado, we have no records from New Mexico. It would be expected to be found in northwestern New Mexico.

**Habitat.** Prairies up to pine forests.

**Biology.** Nests are usually in the form of thatched mounds on the sides of logs and stumps. Incipient nests may be found under stones or logs, but usually some thatching is present. These ants are extremely aggressive. Workers fold the gaster under the body and squirt a stream of formic acid several centimeters. This acid is strong enough to cause blistered skin, after repeated contact with these ants.

Gregg, 1963

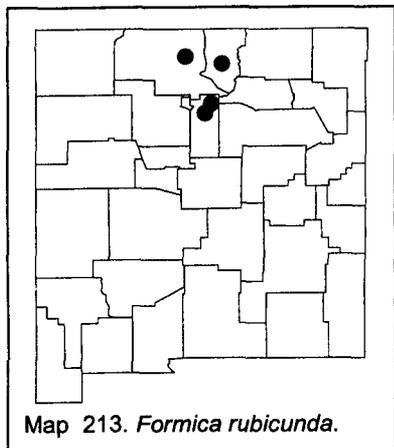
### ***Formica rubicunda* Emery (*sanguinea* group)**

Figs. 409, 411; Map 213

**Discussion.** The apex of the petiole, as seen in profile, is sharp. The dorsum of the first tergum of the gaster has abundant hairs, slightly over 0.1 mm in length. The hairs are coarse and thick, but most are abruptly tapered to sharp tips. These hairs are slightly longer and more abundant than those on the pron-

tum, which tend to be more blunt tipped. The underside of the head usually has four hairs.

**Distribution.** USA: Much of North America; NM: Rio Arriba Co., 7 k S Cebolla, Santa Fe Co., 12 mi. S Santa Fe, Tesuque Canyon (Cole, 1954e), Taos Co., 12 mi. E Taos.



Map 213. *Formica rubicunda*.

**Habitat.** Prairies and open woodlands up to pinyon-juniper and ponderosa pine and aspen forests.

**Biology.** This species nests under stones and logs and may occasionally construct thatched nests or earthen mounds. *Formica rubicunda* enslaves *F. altipetens*, *F. bradleyi*, *F. fossiceps*, *F. fusca*, *F. lasioides*, *F. lepida*, *F. montana*, *F. neoclara*, *F. neogagates*, *F. neorufibarbis*, *F. obscuriventris clivia*, *F. nitidiventris*, and *F. schaufussi*. One mixed nest included *F. argentea*, *F. aserva*, *F. obtusopilosa*, *F. lasioides* and *Myrmica*.

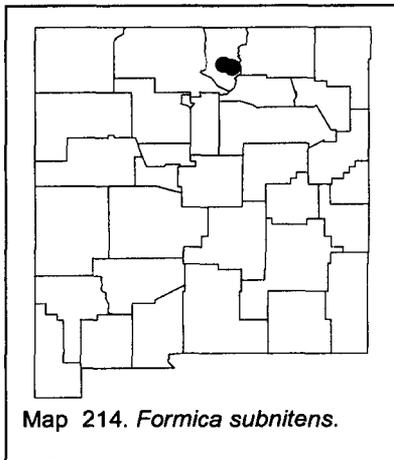
Wheeler, 1910a, 1913; Talbot, 1934; King and Sallee, 1959; Gregg, 1963; Wheeler and Wheeler, 1963

### *Formica subnitens* Creighton (*rufa* group)

Map 214

**Discussion.** The middle and hind tibiae of this species have erect hairs in two rows (usually fewer than ten hairs in both rows combined), but do not have erect hairs scattered over the remainder of the surface. The erect hairs extend over nearly the entire length of the tibia. The gaster has few erect hairs on the first tergum (fewer than 10, excluding those along posterior edge of tergum).

This latter characteristic separates it from the closely related *F. ravida* which has more than 10 hairs on the same surface. The clypeus, cheeks and malar area are often shiny.



Map 214. *Formica subnitens*.

**Distribution.** USA: Western United States; NM: Taos Co., 5 mi. E Taos (Cole, 1954e), 12 mi. E Taos (Cole, 1954e).

**Habitat.** Grasslands to pin-yon cedar forests, willows, and cedars.

**Biology.** This species nests in thatched mounds, occasionally under stones or logs, usually with some surrounding thatch. They are occasionally found in earthen domes (Cole, 1954e).

Cole, 1954e; Ayre, 1957, 1958a, 1958b, 1959; Gregg, 1963; Wheeler and Wheeler, 1963

***Formica wheeleri*  
Creighton  
(*sanguinea* group)**

Figs. 414, 419; Map 215

**Discussion.** The petiole of this species has a blunt apex (Fig. 419), and is wide as seen from the

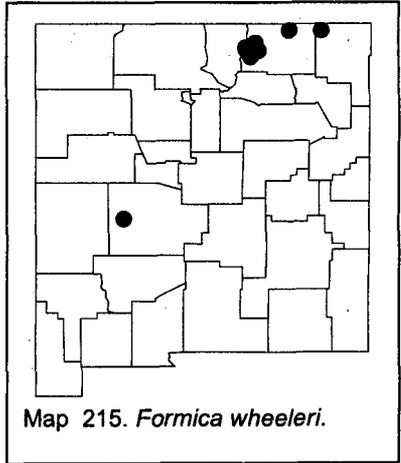


Fig. 419. Petiole of a cotype worker of *F. wheeleri*, as seen from the side (left) and seen from the front (right).

front. The head is often darker than the mesosoma. The underside of the head usually has a pair of erect hairs. The hairs on the gaster are about 0.1 mm long, and are moderately fine, mostly sharp-tipped. Those on the pronotum are shorter, thicker and at least a few are blunt-tipped. The eyes are large, extending past the sides of the head in most workers (Fig. 414).

**Distribution.** USA: ND S to NM W to AZ; NM: Colfax Co.,

(Cole, 1954e) Cimarron Canyon (Cole, 1954e), Dailey Canyon (Cole, 1954e), 13 mi. N Eagle Nest (Cole, 1954e), 11 mi. E Eagle Nest (Cole, 1954e), 2 mi. S Raton Pass (Cole, 1954e), Sapello Canyon (Cole, 1954e), Socorro Co., Grassy Lookout, Union Co., Capulin Mountain National Monument (Cole, 1954e).



Map 215. *Formica wheeleri*.

**Habitat.** Sagebrush scrub, grasslands up to ponderosa pine and aspen-spruce forests.

**Biology.** This species usually nests under stones, but may construct earthen mounds or even thatched domes in rocky loam soils. Reproductives were found in nests in July, dealate females also in July. The males are apparently very large (Cole, 1955c). This species enslaves *F. altipetens*, *F. bradleyi*, *F. fusca*, *F. lasioides*, *F. lepida*, *F. neogagates*, and *F. neorufibarbis*.

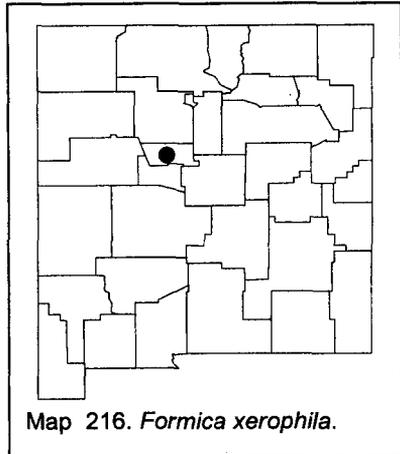
Cole, 1942, 1954e; Wilson, 1955; Gregg, 1963; Wheeler and Wheeler, 1963; Halverson et al., 1976

***Formica xerophila*****M. Smith****(*fusca* group)**

Fig. 380; Map 216

**Discussion.** This species can be easily recognized by the thick petiole with a blunt apex, as seen in profile (Fig. 380). Additionally it is pale brown with a slightly darker gaster. The propodeum is low, about the same level as the lowest point (posterior edge) of the mesonotum. The region between the two faces is broadly rounded. The metasternal process is poorly developed; there are few erect hairs, which are restricted to the clypeus, dorsum of the head and dorsum of the gaster.

**Distribution.** USA: WA, CA, UT, AZ; NM: Bernalillo Co.,

Map 216. *Formica xerophila*.

Bosque forest (first record from New Mexico).

**Habitat.** This species occurs in arid and semi arid sites, in transition zones to pines.

**Biology.** Nests are found in the soil.

Francoeur, 1973

**Genus *Lasius***

(Key: Wilson, 1955)

Workers in this genus can be recognized by the shape of the mesosoma, in which the propodeum is separated from the remainder of the mesosoma (Fig. 420). The antennal fossa either touches the posterior edge of the clypeus or nearly touches it. The eyes may be large (length nearly  $\frac{1}{3}$  the length of the head) to very tiny, consisting of a few ommatidia. The antennal scape extends past the posterior edge of the head by only a slight amount. The maxillary palp is always seen and consists of 6 segments.

This genus is easily confused with *Acanthomyops*, but differs as

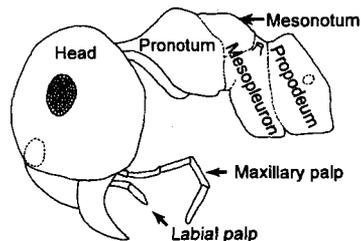


Fig. 420. The head and mesosoma of a worker of *L. pallitarsus*, showing the labial and maxillary palps.

*Acanthomyops* has a three segmented maxillary palp, which is difficult to see. Identification to species is difficult, hopefully the key will be useful.

This is a common genus in the state. They normally nest under stones in mesic woodlands and meadows, although nests are found simply in the soil or in and under wood. One species (*L. xerophilus*) is found in arid sites. Workers feed on secretions from Homoptera and feed on small arthropods. Some species are pests as they tend plant lice on the roots of plants, especially corn. They are so common in cornfields that they are called cornfield ants. They may also be house pests.

**Key to the workers of *Lasius***  
(See Wilson, 1955)

1. Eye relatively large (Fig. 421), maximum worker eye length 0.20 times head width or more, at least 10 ommatidia at the maximum diameter of eye (usually more than 12); maxillary palp long, extending nearly to foramen magnum; usually dark colored ..... 2

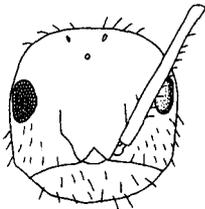


Fig. 421. Head of a worker of *L. neoniger*, showing a relatively large eye.

- Eye relatively small (Fig. 422), maximum worker eye length

0.17 times head width or less; fewer than 12 ommatidia at maximum diameter; maxillary palp shorter, extending about 1/2 distance to foramen magnum (Fig. 422); often light yellow or pale brown ..... 8

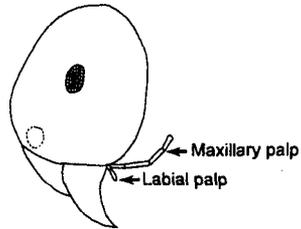


Fig. 422. Head of the worker of *L. umbratus*, as seen from the side, showing a relatively small eye.

2(1). Scape without erect hairs (1 or 2 may be present, also hairs are present at apex, which are parallel to axis of scape) ..... 3  
 - Scape with more than 5 erect and suberect hairs (Fig. 421) ..... 5  
 3(2). Maximum eye length usually less than 0.25 times the head width, usually with 11 ommatidia (10 - 12) in maximum eye diameter; color always yellowish-brown; scapes always lacking standing hairs ..... *sitiens* Wilson  
 - Maximum eye length exceeding 0.25 times head width, even if only slightly, usually 12-14 ommatidia in maximum diameter of eye; color usually dark brown; scapes may have 1 or 2 erect or suberect hairs ..... 4  
 4(3). In one or both mandibles of nest series, either penultimate basal tooth is markedly reduced in size relative to two flanking teeth (Fig. 423), or gap between penultimate and terminal basal teeth tends to be larger in area than terminal basal

tooth and variable in shape .....  
 ..... *crypticus* Wilson

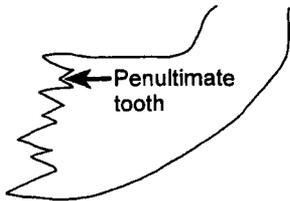


Fig. 423. Left mandible of a worker of *L. neoniger*, showing the reduced penultimate basal tooth.

- In all workers of nest series, penultimate and terminal basal teeth are subequal in size (Fig. 424), gap between them has about same area as terminal tooth and is constant in shape ..... *alienus* (Foerster)

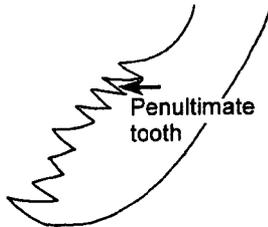


Fig. 424. Left mandible of a worker of *L. alienus*, showing the normal sized penultimate tooth (arrow).

5(2). Extensor surface of anterior tibia with at least 6 erect hairs (usually more than 10, see Fig. 428) .. 6

- Extensor surface of anterior tibia with fewer than 6 erect hairs (often 1 or none) .....  
 ..... *neoniger* Emery

6(5). Antennal scape with fewer than 30 erect and suberect hairs; in given nest series all larger workers and most smaller workers with one or more offset teeth at the basal angle of the mandible (Fig. 425) .....  
 ..... *pallitarsis* (Provancher)

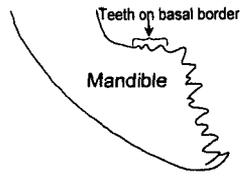


Fig. 425. Right mandible of a worker of *L. pallitarsis*, showing the teeth on the basal border.

- Antennal scape with more than 30 erect and suberect hairs; workers of all sizes with posterior basal tooth aligned with adjacent teeth of masticatory border (as in Fig. 423) ..... 7

7(6). Medium to dark brown; penultimate and terminal basal teeth of worker subequal in size (as in Fig. 424), gap between them has about the same area as terminal tooth and is constant in shape; occurring in mesic sites ..... *niger* (Linnaeus)

- Yellow or yellowish brown; penultimate basal tooth of worker markedly reduced in size relative to 2 flanking teeth (as in Fig. 423), or gap between penultimate and terminal basal teeth larger in area than terminal basal tooth, variable in shape; occurring in arid and semiarid habitats .....  
 .. *xerophilus* Mackay and Mackay 8(1). Apex of petiole as seen in frontal view strongly convex (Fig. 426, left) and non-emarginate .....  
 ..... *humilis* Wheeler



Fig. 426. Petioles of workers of *L. humilis* and *L. fallax*, as seen from behind.

- Apex of petiole at most feebly convex and often emarginate (Fig. 426, right) ..... 9
- 9(8). Eyes with fewer than 35 ommatidia (Fig. 427, left) ..... 10
- Eyes with more than 35 ommatidia (Fig. 427, right) ..... 12

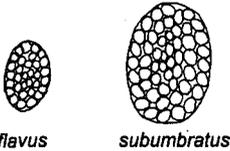


Fig. 427. Eyes of workers of *L. flavus* and *L. subumbratus*.

- 10(9). Outer surfaces of each tibia with numerous standing hairs (Fig. 428) prominent above the ground pubescence ..... ***fallax* Wilson**

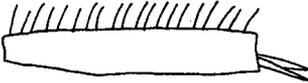


Fig. 428. Hind tibia of a worker of *L. fallax*.

- Outer surfaces of each tibia with at most 1 or 2 standing hairs ..... 11
- 11(10). Terminal segment (# 6 in Fig. 429) of maxillary palp longer than penultimate segment (# 5), at least in a majority of nest series .....  
..... ***nearcticus* Wheeler**



Fig. 429. Last 3 segments of the maxillary palp of *L. nearcticus*.



Fig. 430. Maxillary palp of a worker of *L. flavus*.

- Terminal segment (# 6 in Fig. 430) of maxillary palp at most as long as penultimate segment (# 5) ..... ***flavus* (Fabricius) 12(9)**. Longest hairs of posterior half of first gastral tergite, exclusive of extreme posterior strip, not exceeding in length 0.50 times maximum width of hind tibia at its mid-length (Fig. 431); eye with more than 65 ommatidia; brownish yellow .....  
..... ***umbratus* (Nylander**

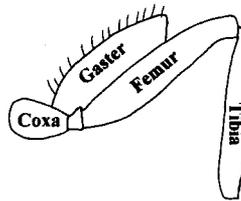


Fig. 431. Gaster, coxa, posterior femur and tibia of a worker of *L. umbratus*.

- Longest hairs of posterior half of first gastral tergite, exclusive of extreme posterior strip, at least 0.60 times as long as maximum width of hind tibia at its mid-length (Fig. 432); eye with fewer than 65 ommatidia; yellow .....  
..... ***subumbratus* Viereck**



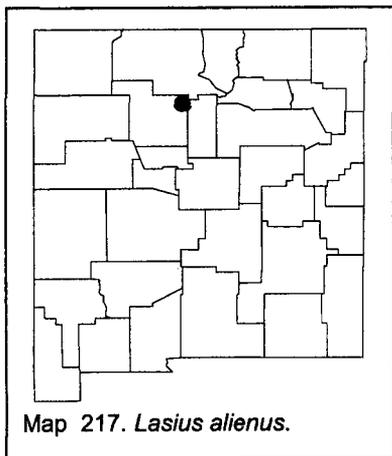
Fig. 432. Posterior leg and first gastral tergite of a worker of *L. subumbratus*.

***Lasius alienus* (Foerster)**

Fig. 424; Map 217

**Discussion.** This is a small, dark brown or black species with relatively large eyes (12-14 ommatidia in maximum diameter). The scape has few (less than 5) or no erect hairs (except at apex). The penultimate tooth is about the same size as the adjacent teeth (other 2 basal teeth). It is not common in New Mexico, and has been reported from a single site (Mackay et al., 1988).

**Distribution.** USA: Most of North America; NM: **Los Alamos Co.**, Los Alamos, Mortandad Canyon; MEXICO: Chihuahua.



**Habitat.** Common in many habitats ranging from grasslands to well shaded woodlands, pinyon-pine (especially riparian habitats), ponderosa pine.

**Biology.** Nests are found under stones or logs or in stumps, or simply in the soil. Workers feed on living and dead insects and tend

Homoptera, especially aphids. This species can be a pest in houses. Brood occurred in nests from May to August; reproductives were found in nests from June to September.

Wilson, 1955; Kannoowski, 1959; Gregg, 1963; Wheeler and Wheeler, 1963, 1973; Burns, 1964; Smith, 1965; DuBois and Danoff-Burg, 1994

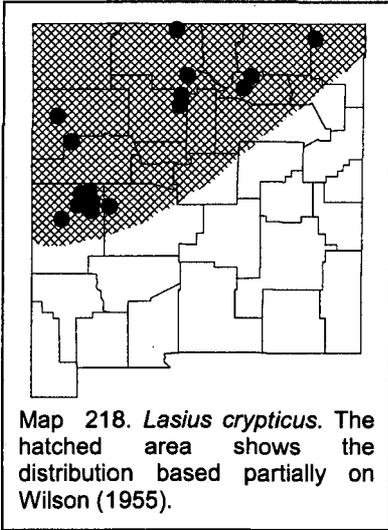
***Lasius crypticus* Wilson**

Map 218

**Discussion.** This species is easily recognized as all of the hairs on the scapes are appressed (except at apex). The eye is relatively large with 12 - 14 ommatidia in maximum diameter. The penultimate basal tooth is greatly reduced in size as compared to the adjacent basal teeth, and is often absent. This results in a wide gap between the other two basal teeth. It is advisable to look at a large series, as the small tooth differs greatly in size within a nest series, and sometimes between the two mandibles of a single individual. It is often difficult to separate this species from *L. alienus*, unless a large series is available.

**Distribution.** USA: Western North America; NM: **Catron Co.**, 32 k NE Apache Creek, Beartrap Canyon (43 k NE Datil), 12 k W Datil, 14 k W Datil, Ox Spring Canyon, Sawtooth Mts., **Cibola Co.**, Zuni Mts. (southeast of Gallup), **Los Alamos Co.**, Chupaderos Canyon, 4 k N Los Alamos, 4 k W Los Alamos, **McKinley Co.**, Red Rock State Park, **Mora Co.**, Coyote Creek State Park, 10 k SE Mora, **Rio Arriba Co.**, 37 k

N Abiquiu, 4 k N Chama, **Sandoval Co.**, Bandelier National Monument, **Socorro Co.**, 43 k SE Datil, **Union Co.**, Capulin National Monument.



Map 218. *Lasius crypticus*. The hatched area shows the distribution based partially on Wilson (1955).

**Habitat.** Sagebrush, grasslands, pinyon-juniper, oaks woodlands, meadows, ponderosa pine-riparian, Douglas fir.

**Biology.** This species nests under stones in sandy soils to rocky loam soils. One nest was in a log. Brood was found in nests from March to August. A dealate female was collected on 5-viii-1994, under a stone. We collected foragers feeding on a dead beetle. *Monomorium minimum* lives in the nest.

Wheeler and Wheeler, 1963

### ***Lasius fallax* Wilson**

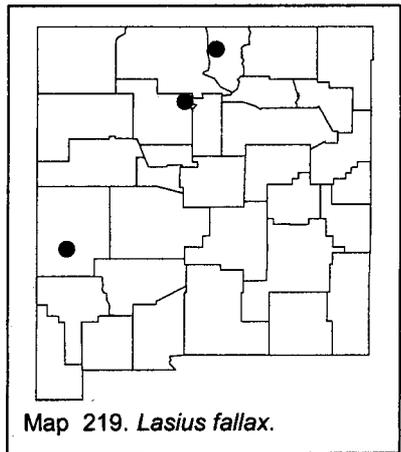
Figs. 426, 428; Map 219

**Discussion.** This ant is pale yellow or light brown and has a very small eye (fewer than 35 ommatidia, usually about 20). The apex of the

petiole is weakly convex, flat or even slightly concave (Fig. 426). Tibiae have erect or semierect hairs on all surfaces. The scape has numerous appressed hairs, as well as several erect and suberect hairs.

**Distribution.** USA: Western United States; NM: **Catron Co.**, Catwalk, **Los Alamos Co.**, Los Alamos, Camp May, **Taos Co.**, 6 k SW Tres Piedras.

**Habitat.** Forested areas (pinyon-juniper, ponderosa pine), especially riparian habitats.



Map 219. *Lasius fallax*.

**Biology.** This species nests under stones in rocky sands or loam soils.

Wilson, 1955

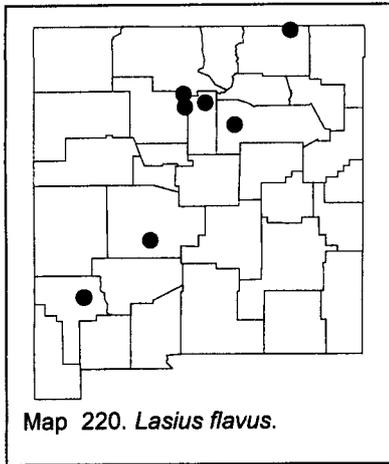
### ***Lasius flavus* (Fabricius)**

Figs. 427, 430; Map 220

**Discussion.** This is a yellow or pale brown species, with a small eye (fewer than 35 ommatidia). The apex of the petiole is either straight or slightly concave. The hairs on the scapes and tibiae are decumbent or appressed (possibly 1 or 2 suberect

hairs). The last segment of the maxillary palp is about as long (or shorter) than the penultimate segment.

These ants are often impossible to separate from *L. nearcticus*.



Map 220. *Lasius flavus*.

**Distribution.** USA: Entire country; NM: **Colfax Co.**, between Raton Pass and Raton (Wilson, 1955), **Grant Co.**, 77 k E Silver City, **Los Alamos Co.**, 4 k N Los Alamos, Chupaderos Canyon, **Sandoval Co.**, Bandelier National Monument, **Santa Fe Co.**, Hyde Park (Sangre de Cristo Mts.), **San Miguel Co.**, San Geronimo (Wilson, 1955).

**Habitat.** Grasslands and mixed deciduous forest to ponderosa pine-riparian.

**Biology.** This species nests under stones, and reproductives were found in the nest in mid August. It tends aphids, especially on the roots of grasses.

Wheeler, 1905a; Wesson and Wesson, 1940; Cole, 1942; Wheeler and Wheeler, 1944, 1963, 1973; Wilson, 1955; Waloff, 1957; Gregg, 1963 (as *L. brevicornis*); Marik-

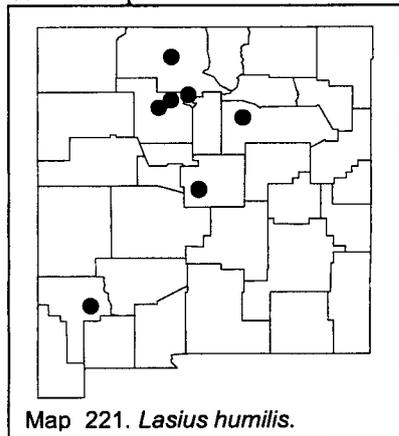
ovsky, 1965; DuBois and Danoff-Burg, 1994

### *Lasius humilis* Wheeler

Fig. 426; Map 221

**Discussion.** This ant is easily recognized as the apex of the petiole is convex and broadly rounded. It is a yellow ant with a small eye (ommatidia are difficult to count, as they are poorly defined, the diameter is about 0.07 mm).

It could be confused with other yellow species with small eyes, such as *L. fallax*, *L. nearcticus* and *L. flavus*. It can be separated from the first species by the shape of the apex of the petiole (usually concave to slightly convex in *L. fallax*), and the eyes are smaller than those of the other two species.



Map 221. *Lasius humilis*.

**Distribution.** USA: NV, CO; NM: **Cibola Co.**, without locality, **Colfax Co.**, 4 mi. W Eagle Nest, **Grant Co.**, 77 E Silver City, **Los Alamos Co.**, Los Alamos, Rio Grande, **Rio Arriba Co.**, 7 k S Cebolla, **Sandoval Co.**, 26 k S Cuba, 100 E Cuba, Jémez Mts., **San Mi-**

**guel Co.**, without locality, **Santa Fe Co.**, Tesuque Canyon (Hyde Park near Santa Fe) (Wilson, 1955), **Taos Co.**, 5 mi. SE Dixon, **Torrance Co.**, 24 k S Mountainair.

**Habitat.** Sagebrush, pinyon-juniper, mountain meadows, pine aspen woods, ponderosa pine forests.

**Biology.** This species nests under stones. Reproductives were found in nests in early July, flights occur at night in mid July (blacklight traps), and a loose gynes were collected in pitfall traps from early July to mid August.

Gregg, 1963

### ***Lasius nearcticus* Wheeler**

Fig. 429

**Discussion.** This species is yellow or pale brown, and has small eyes (fewer than 35 ommatidia, usually about 20, diameter about 0.09 mm). The apex of the petiole is concave, the terminal segment of the maxillary palp is usually longer than the penultimate segment.

The workers of this species are nearly impossible to separate from *L. flavus*. The females and males are of little use in distinguishing the 2 species.

**Distribution.** USA: North America, including CO; NM: we have no records, but would expect it to occur in the northern part of the state.

**Habitat.** Found in dense, damp woodlands, especially pines, but also cedar and pinyon woodlands.

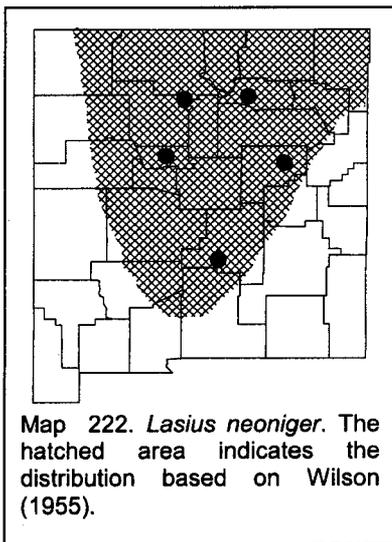
**Biology.** This ant nests under logs and stones; it is predominantly subterranean.

Wesson and Wesson, 1940; Headley, 1943; Hicks, 1947; Wilson 1955; Gregg, 1963

### ***Lasius neoniger* Emery**

Figs. 421, 423; Map 222

**Discussion.** Workers of this species are usually dark brown in color, and have relatively large eyes (at least 12 ommatidia in greatest diameter). The scape has several erect hairs, but the extensor surface of the anterior tibia has fewer than 6 erect hairs. The penultimate basal tooth is smaller than the 2 adjacent teeth, and may even be absent, leaving a gap between the other basal teeth.



Map 222. *Lasius neoniger*. The hatched area indicates the distribution based on Wilson (1955).

**Distribution.** USA: most of country; NM: **Bernalillo Co.**, Albuquerque, **Guadalupe Co.**, Park Lake, **Lincoln Co.**, Sacramento Mts. (2 mi.

W Alto), **Los Alamos Co.**, Mortadad Canyon, **Mora Co.**, 10 k SE Mora.

**Habitat.** Found along roadsides or in disturbed urban environments, grasslands, up to ponderosa pine-riparian. This species is usually found in mesic habitats.

**Biology.** This species is uncommon in the state, and nests under stones or in the soil. Brood was found in nests in early July, reproductives in early July to October. It feeds on secretions of Homoptera.

Tanquary, 1913; Talbot, 1945, 1946, 1953; Schread and Chapman, 1948; Wilson, 1955; Ayre, 1962; Wheeler and Wheeler, 1963; Gregg, 1963; Smith, 1965; DuBois and Danoff-Burg, 1994

### ***Lasius niger* (Linnaeus)**

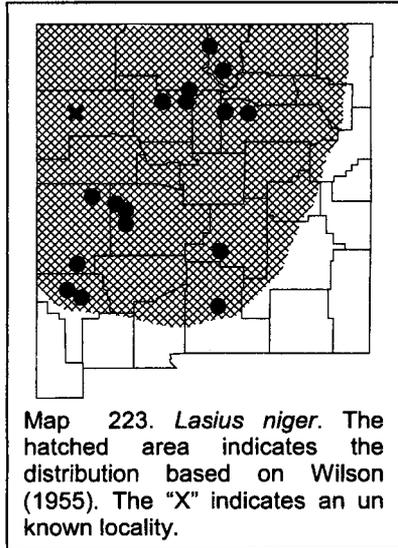
Map 223

**Discussion.** These are medium to dark brown ants with large eyes, which have abundant erect and suberect hairs on the scapes (more than 30) and the extensor surface of the anterior tibia (more than 6). The three basal teeth are about equal in size (the teeth adjacent to the penultimate tooth may be smaller in size).

It could be confused with *L. xerophilus*, but differs in being darker in color, having three equal sized basal teeth, and in occurring in more mesic sites.

**Distribution.** EUROPE; USA: Western United States; NM: **Catron Co.**, 15 k NW Datil, Mogollon Mts., **Grant Co.**, 5 mi. N Pinos Altos, 77 k E Silver City, **Lincoln Co.**, Bonito Lake, **Los Alamos Co.**,

Chupaderos Canyon, Los Alamos, 4k W Los Alamos, 8 k N Los Alamos, **McKinley Co.**, without locality, **Otero Co.**, 9 k NE Timberon, 9 k SW Timberon, Jim Lewis Spring, **Sandoval Co.**, Bandelier National Monument, 12 m NE Jémez Springs, **San Miguel Co.**, 20 k NW Las Vegas, Terrero, **Socorro Co.**, Beartrap Canyon, 43 k SE Datil, Grassy Lookout, **Taos Co.**, 20 k S Taos, 6 k S Tres Piedras.



Map 223. *Lasius niger*. The hatched area indicates the distribution based on Wilson (1955). The "X" indicates an unknown locality.

**Habitat.** Ponderosa pine-riparian, oak forests, deciduous forest, fir forests, mixed forests, residential areas.

**Biology.** This species nests under stones or logs, or in earthen mounds, in rocky loam soils. Reproductives were found in a nest in late August. Workers are primarily nocturnal and feed on insect fragments, nectar and honeydew. It actually moves aphids in and out of its nest and places them on plants, depending on the environmental conditions.

Workers guard the aphids when they are on plants. This species also collects seeds, although it is unknown if the seeds are consumed. It occasionally enters houses.

Wilson, 1955; Wheeler and Wheeler, 1973

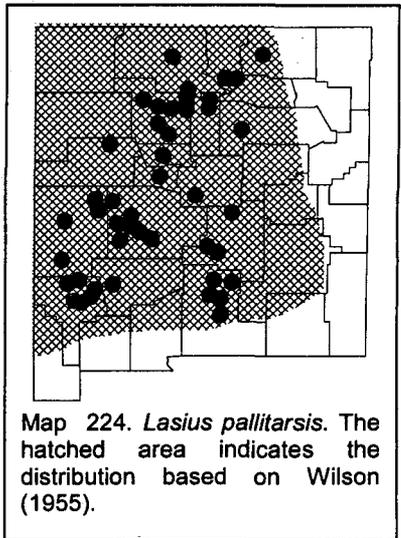
***Lasius pallitarsis***  
**(Provancher)**

Figs. 70, 420, 425; Map 224

**Discussion.** This is the most common species in New Mexico. The teeth on the basal border of the mandibles (Fig. 425) distinguish this species from all others in the genus *Lasius*. Unfortunately the mandibles must be removed from most specimens to see this character, which partially destroys the specimen. It is usually easiest to remove the head, trap it in a soft bottomed box with one insect pin, and pry the mandibles open with a second pin, or separate them from the head. Later the pieces are glued to the point in a position which allows them to be easily examined. It is also possible to crush the head of one or more specimens of a series with a pair of forceps, so that the mandibles are splayed outwards, before the specimen is mounted. Rarely will you be lucky enough to have a specimen with the mandibles open. Unfortunately any medium brown specimen with large eyes may be *L. pallitarsis*. This species was referred to as *L. sitkaensis* in the past.

**Distribution.** USA: Most of states; NM: **Bernalillo Co.**, Albuquerque, **Catron Co.**, 25 k NE Apache Creek, Beartrap Canyon, 15

k NW Datil, Ox Spring Canyon, near Snow Lake, **Cibola Co.**, Mt. Taylor, **Colfax Co.**, 4 mi. W Eagle Nest, **Grant Co.**, Gila Mts. (Iron Creek, Wright's Cabin), Mimbres, TWC-Mimbres Preserve, Mogollon Mts. (Trail 206), 77 k E Silver City, 88 k E Silver City, **Lincoln Co.**, Bonito Lake, Cibola National Forest, Sierra Blanca, **Los Alamos Co.**, Camp May, Los Alamos, 8 k N Los Alamos, Mortandad Canyon, **Otero Co.**, Camp Sleepy Grass, 4 mi. N Cloudcroft, Sacramento Mts. (Bailey Canyon), 9 k N Timberon (Agua Chiquita), 13 k N Timberon (Agua Chiquita), 14 k N Timberon (Spring Canyon), 9 k NE Timberon (Jim Lewis Spring), **Rio Arriba Co.**, 7 k



Map 224. *Lasius pallitarsis*. The hatched area indicates the distribution based on Wilson (1955).

S Cebolla, **Sandoval Co.**, Bandelier National Monument, Coronado State Park, 4 k W Cuba, 45 k SE Cuba, 100 k E Cuba, Jémez Mts., 12 mi. NE Jémez Springs, **San Miguel Co.**, Villanueva State Park, **Santa Fe Co.**, Hyde Park (Sangre de Cristo

Mts.), 12 k NE Santa Fe, **Sierra Co.**, Black Range, **Socorro Co.**, Bosque del Apache, 43 k SE Datil, Grassy Lookout, Magdalena Mts. (Water Canyon), San Mateo Mts., Withington Lookout, **Taos Co.**, 20 k S Taos, 2 k W Tres Ritos, **Torrance Co.**, 24 k S Mountainair, **Valencia Co.**, Belén; MEXICO: Chihuahua.

**Habitat.** Grasslands to tundra, pinyon-juniper, especially common in ponderosa pine, ponderosa pine-riparian, pine aspen, fir forests, and Douglas fir, up to 2700 meters elevation.

**Biology.** Nests are located under stones or under logs, under cow manure, in sandy or rocky loam soils. One colony was inside and under the bark of a rotten log, another in a stump and under the bark. Brood was present in nests from May to September, reproductives were found in nests from late July to late August. Flights occurred at night on 12-vii-1986 (black light trap) and between 8:00 and 9:00 and again between 18:00 and 19:00 on 6-viii-1982 at a single site (12 mi. NE Jémez Springs). This species is the host of *Lasius subumbratus*, of *Solenopsis validiuscula* and of the syrphid fly genus *Microdon*. One colony was nesting together with *Crematogaster punctulata*, one each with *Formica lasioides*, and *F. argentea*, another with *Tapinoma sessile*, two with *Myrmica hamulata*, and three colonies were with *Myrmica fracticornis*. It is a host of the cricket, *Myrmecophila* sp. This is also a house infesting species. It is a very common ant in New Mexico, especially abundant near Bonito Lake in southern New Mexico.

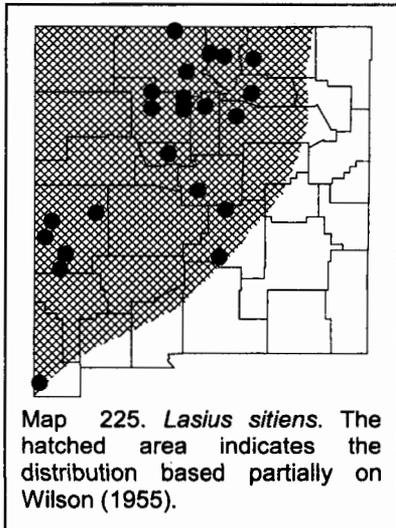
Wheeler, 1915; Wilson, 1955; Medler, 1958; Gregg, 1963 (as *L. niger sitkaensis*); Wheeler and Ayre, 1963; Corbet and Ayre, 1968, 1969 (as *Lasius sitkaensis*); Kanno, 1969; Akre and Hill, 1973 (as *L. niger sitkaensis*)

### ***Lasius sitiens* Wilson**

Map 225

**Discussion.** This species can be recognized by the lack of erect hairs on the scapes (there are numerous appressed hairs, and erect hairs at the apex), the medium sized eyes with about 11 ommatidia in greatest diameter, and the yellowish-brown color. The tibiae are also without erect hairs (appressed hairs present).

**Distribution.** USA: NV, CO, AZ; NM: **Bernalillo Co.**, NW Albuquerque, **Catron Co.**, 37 k N Apache Creek, Mogollon Mts.,



Map 225. *Lasius sitiens*. The hatched area indicates the distribution based partially on Wilson (1955).

Sawtooth Mts., near Snow Lake, **Colfax Co.**, 41 k E Eagle Nest, **Hidalgo Co.**, Clanton Draw, **Lincoln Co.**, Cibola National Forest, 2 mi. W Alto, **Los Alamos Co.**, Los Alamos, 4 k W Los Alamos; 4 k N Los Alamos, Rio Grande, **Mora Co.**, 10 k SE Mora, **Rio Arriba Co.**, 7 k S Cebolla, 4 k N Chama, **Sandoval Co.**, Bandelier National Monument, 4 k W Cuba, 26 k S Cuba, **San Miguel Co.**, 20 k NW Las Vegas, **Santa Fe Co.**, Santa Fe, **Socorro Co.**, 5 k N Camp Luna, **Taos Co.**, 5 mi. SE Dixon, 20 k NW Taos, 6 k SW Tres Piedras, **Torrance Co.**, 24 k S Mountainair; MEXICO: Chihuahua.

**Habitat.** Residential areas, disturbed sites, grasslands, juniper, pinyon-juniper, ponderosa pine, aspen-spruce forests.

**Biology.** This is a common species, which nests under stones in sandy soils, loam and rocky soils. One nest was in a rotten log. Brood was present in nests from March to August, reproductives were captured in nests from late June to early August. This species occasionally nests together with other *Lasius*, *Formica argentea*, and *F. occulta*, as well as with *Monomorium minimum*, *Camponotus* and *Solenopsis molesta*. In other instances, this species was nesting together under a rock with *Crematogaster punctulata*, *Solenopsis molesta*, *Formica argentea*, and *Monomorium minimum*, in a second case, with *Acanthomyops latipes*, *Myrmica hamulata* and *Formica occulta*. It is the host of the cricket *Myrmecophila* sp.

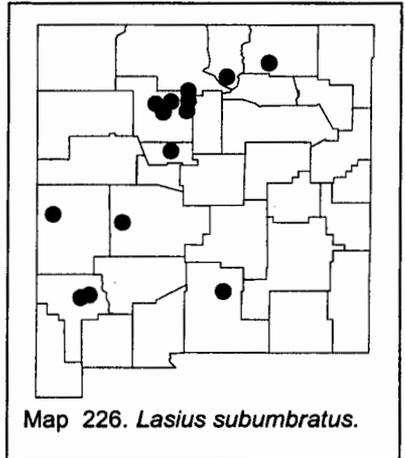
Cole, 1966

## *Lasius subumbratus* Viereck

Figs. 427, 432; Map 226

**Discussion.** These ants are yellow or pale brown, with small eyes (about 0.13 - 0.15 mm in greatest diameter, with about 50 ommatidia). The longest hairs on the posterior half of the first gastral tergite are at least 0.60 times as long as the maximum width of the posterior tibia at mid length. The erect hairs are dense enough that their length is less than the distance between their tips. The apex of the petiole is flat or slightly concave, as seen from the front.

**Distribution.** USA: Most of North America; NM: **Bernalillo Co.**, Albuquerque, **Catron Co.**, 29 k N



Map 226. *Lasius subumbratus*.

Apache Creek, Catwalk, **Colfax Co.**, 5 mi. E Eagle Nest (Wilson, 1955), 16 k E Eagle Nest, **Grant Co.**, 77 k E Silver City, 88 k E Silver City, **Los Alamos Co.**, Camp May, Los Alamos, Mortandad Canyon, Chupaderos Canyon, **Otero Co.**, Cloud-

croft (Wheeler, 1917), 14 mi. S Mes-calero (Wilson, 1955), **Sandoval Co.**, Bandelier National Monument, 26 k S Cuba, 100 k E Cuba, 12 mi. NE Jémez Springs, **Santa Fe Co.**, Tesuque Canyon (Wilson, 1955), Little Tesuque Canyon (Wilson, 1955), **Socorro Co.**, Washington Lookout, **Taos Co.**, 18 mi. E Taos (Wilson, 1955), 20 k S Taos; MEX-ICO: Chihuahua.

**Habitat.** Ranging from meadows and dry open slopes through mixed forest into ponderosa pine - riparian up to spruce forests.

**Biology.** This species nests under stones or logs in loam soils with rocks. It is a temporary social parasite of *L. pallitarsis*. Two dealate females were found in one nest, suggesting that this species may be polygynous. Brood was found in nests in March and August, reproductives were found in nests in July and August. Dealate females were collected in July and August. It tends mealybugs.

Wheeler, 1917; Wilson, 1955; Gregg, 1963; Wheeler and Wheeler, 1963

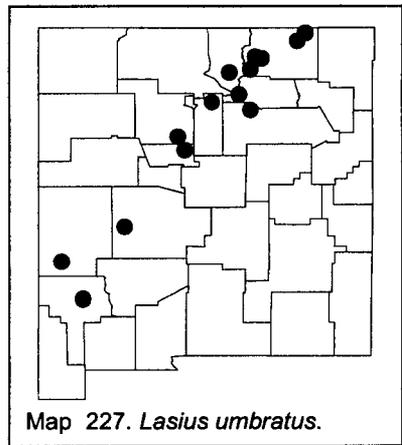
### ***Lasius umbratus* (Nylander)**

Figs. 422, 431; Map 227

**Discussion.** The workers of this species are yellow or pale brown ants, which have small eyes (35 - 65 ommatidia). The length of the longest hairs on the posterior half of the first gastral tergum (excluding those along the posterior strip) are less than  $\frac{1}{2}$  the maximum width of the posterior tibia at mid-length (Fig.

431). The hairs on the first gastral tergum are spaced far enough apart that the distances between the tips of most or all hairs are greater than their lengths.

**Distribution.** USA: North America; NM: **Bernalillo Co.**, Sandia Mts. (Wilson, 1955), **Catron Co.**, Mogollon Mts. (Wilson, 1955), **Colfax Co.**, Cimarron Canyon (Wilson, 1955), 15 mi. N Cimarron (Wilson, 1955), 4 mi. W Eagle Nest, Raton (Wilson, 1955), Ute Park (Wilson, 1955), **Grant Co.**, 77 k E Silver City, **Sandoval Co.**, Sandia Mt., **San Miguel Co.**, Sapello Canyon (Wilson, 1955), **Mora Co.**, Sangre de Cristo, **Santa Fe Co.**, Hyde Park (Sangre de Cristo Mts.), **Socorro Co.**, Grassy Lookout, **Taos Co.**, 20 k S Taos.



**Habitat.** Moist areas, ranging from pastures to mixed forests and pine forests.

**Biology.** This species nests under stones and logs, tends Homoptera, and is a temporary social parasite of *L. alienus*, *L. niger* and *L. neoniger*. Reproductives were found

in nests July and September, dealate females were found in September. It may form a plesio biotic relationship with *Leptothorax rugatulus*.

Wheeler, 1905a; Smith, 1928c, 1965; Wesson and Wesson, 1940; Wilson, 1955; Kanno ski, 1959; Wheeler and Wheeler, 1963; Gregg, 1963; DuBois and Danoff-Burg, 1994

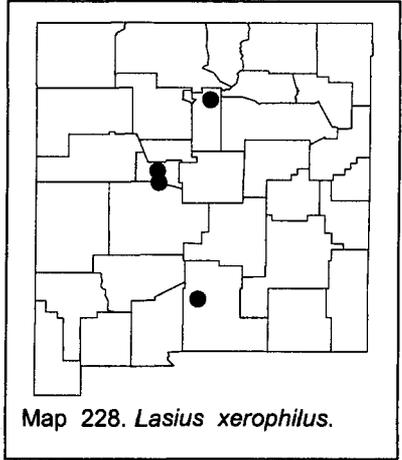
***Lasius xerophilus*  
Mackay & Mackay**

Map 228

**Discussion.** This species is similar to *L. neoniger*, and would key to this species in Wilson (1955). It differs in that the worker is covered with short, bristly hairs. The extensor surface of the front tibia has at least 6, usually over 10 such hairs (usually 1 or none in *L. neoniger*), the same surface of the mid tibia has up to 14 such hairs (usually fewer than 10 in *L. neoniger*) and the same surface of the posterior tibia has more than 15 (fewer than 15 in *L. neoniger*). The females are also much more hairy, with more than 20 hairs on the extensor surface of the mid tibia and hind tibia (fewer than 6 on these surfaces in *L. neoniger*). The extensor surface of the mid tibia of the male has more than 5 erect hairs (1 or none in *L. neoniger*), the

hind tibia has more than 10 erect hairs (0 - 2 in *L. neoniger*).

**Distribution.** USA: NM: Bernalillo Co., NW Albuquerque, Bosque Forest, Otero Co., White Sands National Monument, Santa Fe Co., Hyde Park (Sangre de Cristo Mts.).



**Habitat.** Arid and semi arid Chihuahuan Desert.

**Biology.** Nests are found in the soil, usually in sandy sites. The nest entrance is small, inconspicuous, and surrounded by a small mound. Foraging activity is nocturnal or crepuscular, except on cloudy, cool days, when it continues throughout the day. Nests contain about 100 workers. Flights occur at night in July.

Mackay and Mackay, 1993

### Genus *Myrmecocystus*

(Key: Snelling, 1976)

This is a common, easily recognized genus in New Mexico. One character is sufficient to distinguish it from all others: the long maxillary palps in which the fourth segment is especially long (Fig. 433). It could be confused with *Formica*, but the fourth segment of the maxillary palp

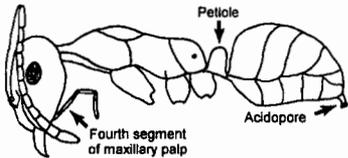


Fig. 433. Side view of a worker of *M. depilis*.

of *Formica* is not elongate. The maxillary palp is similar to that of *Dorymyrmex*, but this dolichoderine has a pyramid on the propodeum, which is very different than the type of propodeum in *Myrmecocystus*. All of the species have a psammophore or basket of long hairs on the underside of the head.

This is the genus of "honey pot" ants in which repletes fill their crops with liquids and hang inside the nests, serving as storage structures. These "honey pots" are consumed in Mexico. This genus is common in New Mexico, especially in arid and semiarid regions. These ants nest in the soil and often have a well developed mound (5 - 20 cms dia.) with a surprisingly large (up to 2 - 3 cm diameter) entrance hole (Plate 2 Fig. 434), which allows rapid escape when the nest is attacked by army ants. The genus is

distributed in the southwestern section of the United States and in northern Mexico. Cole (1954c) discusses the genus in New Mexico. Identification to species is difficult unless a series has a good representation of major workers.

#### Key to the workers of *Myrmecocystus* (See Snelling, 1976)

- 1. Mandible with 8 - 10 teeth (Fig. 435, left); light yellow or brownish-yellow, entire ant basically same color; primarily nocturnal .... 2
- Mandible with 6 or 7 teeth (Fig. 435, right); workers are either 1) bicolored, head brownish-red, mesosoma and gaster blackish; or 2) uniformly black or dark brown, anterior part of head may be lighter; primarily diurnal ..... 3



navajoa                      depilis  
Fig. 435. Mandibles of workers of *M. navajoa* and *M. depilis*.

- 2(1). Head, pronotum and gaster shining, with little or no appressed pubescence; mid and hind tibiae with not more than 3 or 4 erect hairs beyond basal third of outer face, usually none (Fig. 436) ..... *navajo* Wheeler
- Head, pronotum and gaster with abundant appressed pubes-

cence; mid and hind tibiae usually with numerous erect hairs along the apical half of outer face (Fig. 437) ..... *mexicanus* Wesmael

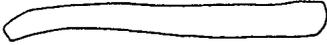


Fig. 436. Mid tibia of a worker of *M. navajoa*, as seen from the front.

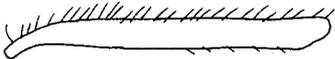


Fig. 437. Mid tibia of a worker of *M. mexicanus*, as seen from the front.

3(1). Bicolored, head reddish, mesosoma dark, often mixed with red, gaster black; common ..... 4

- Essentially entire ant dark brown or black; unknown from NM. (previous subgenus *Eremnocystus*)

4(3). Twenty or more hairs on malar area in full face view (Fig. 438); first 3 (usually 4) terga (upper surfaces of segments of gaster) with dense pubescence ..... 5

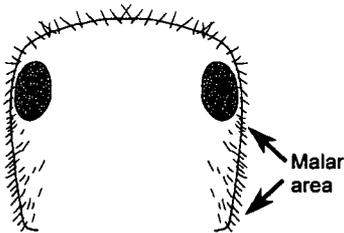


Fig. 438. Outline of the head of a worker of *M. placodops*.

- Fewer than 20 erect hairs on malar area (Fig. 439); usually fewer than 6; third tergum often with sparse or no pubescence ..... 7

5(4). Longest posterior lateral and pronotal hairs (Fig. 440) usually shorter than eye length (EL), longest hairs on second tergum shorter than EL ..... 6

- Longest posterior lateral, pronotal and gastral hairs exceeding length of eye; not recorded from New Mexico (TX, SO, CH) ..... *melliger* Forel

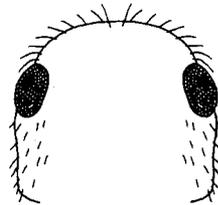


Fig. 439. Outline of the head of a worker of *M. romainei*.

6(5). Longest hairs on pronotal dorsum (Fig. 440) and disc of second tergum no more than half minimum eye diameter ..... *placodops* Forel

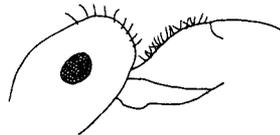


Fig. 440. Head and pronotum of a worker of *M. placodops*, as seen from the side.

- Longest hairs on pronotal dorsum and disc of second tergum at least 0.6 X minimum eye diameter (Fig. 441), usually about 0.75 X minimum eye diameter ..... *mendax* Wheeler

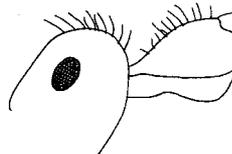


Fig. 441. Head and pronotum of a worker of *M. mendax*, as seen from the side.

7(4). Malar area (Fig. 439) with 6 or more (usually 12 - 16) erect hairs; third tergum with dense pubescence, not differing from second tergum ....  
 ..... *romainei* Snelling  
 - Malar area usually with not more than 4 erect hairs (Figs. 442 & 443); third tergum with less pubescence than second tergum ..... 8

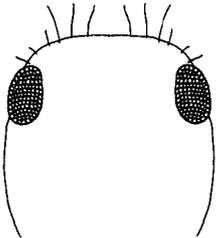


Fig. 442. Outline of the head of a worker of *M. depilis*.

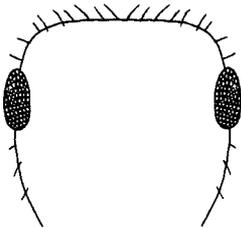


Fig. 443. Outline of the malar area of a worker of *M. mimicus*.

8(7). Longest posterior lateral hairs of head at least equal to minimum eye diameter in majors (Fig. 442) .....  
 ..... *depilis* Forel  
 - Longest posterior lateral hairs no more than 0.6 X minimum eye diameter (Fig. 443) , usually about 0.5 X minimum diameter of eye .....  
 ..... *mimicus* Wheeler

### *Myrmecocystus depilis* Forel

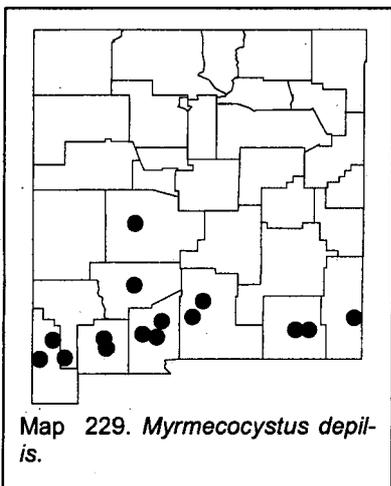
Figs. 25, 65, 433, 435, 442; Map 229

**Discussion.** This species can usually be distinguished from the others in the genus as the malar area has few or no erect hairs (frontal view), the gaster is blackish, the head and mesosoma are extensively infuscated, and some of the pronotal hairs are longer than the length of the eye in the large workers. Larger workers have abundant pubescence on the disc of the third tergum, medias and minor workers have scattered pubescence on the same surface.

The smaller workers of this species are easily confused with similar workers of *M. mimicus*. They may be separated as the minor workers of *M. depilis* possess hairs of variable length on the pronotal dorsum, a few of which are as long as three times that of the shortest hairs, those of *M. mimicus* are uniform in length. The majors and media workers of *M. depilis* always possess long, slender, flexuous hairs on the pronotum, some of which equal or exceed the length of the eye. In addition, the third gastral tergum usually has conspicuous appressed pubescence, except in the smallest workers.

**Distribution.** USA: NV, AZ, TX; NM: Doña Ana Co., Aden (Snelling, 1976), Jornada Experimental Range (Snelling, 1976), Mesilla, Eddy Co., Carlsbad Caverns, 32°22.2'N 103°51.4'W, Grant Co., Hachita, Hidalgo Co., Lordsburg (Snelling, 1976), Rodeo (Snelling, 1976), 22 mi. N Rodeo (Snelling,

1976), **Lea Co.**, 20 mi. WSW Hobbs, **Luna Co.**, Deming (Snelling, 1976), 23 mi. S Deming (Snelling, 1976), **Otero Co.**, Alamogordo (Snelling, 1976), White Sands National Monument (Snelling, 1976), **Sierra Co.**, Truth or Consequences (Snelling, 1976), **Socorro Co.**, Water Canyon; MEXICO: Sonora, Chihuahua, Coahuila, Nuevo León, Durango, Zacatecas, San Luis Potosí, Jalisco.



**Habitat.** In most arid habitats (creosote bush scrub, mesquite woodlands, weedy areas), except grasslands.

**Biology.** Nests are found in sandy soil. It tends aphids and coccids and collects dead insects as well as preys on living arthropods, and collects nectar from flowers of *Opuntia rastrera*, *Parthenium incanum* and *Euphorbia albomarginata*. This species forages individually or in groups. The scarabaeid beetles *Cremastocheilus stathamae* and *C. constricticollis* are found in the nests.

Snelling, 1976; Rojas and Fragoso, 1994, 2000

### *Myrmecocystus melliger* Forel

**Discussion.** The worker has numerous erect hairs on the malar area (between the base of the mandible and the eye), the longest hairs on the posterior border of head, pronotum and dorsum of second gastral tergum exceed the eye length; the longest pronotal hairs are flexuous and somewhat curled at the tip.

The long-haired *Myrmecocystus* from New Mexico are apparently all *M. mendax* to which it is closely related (Snelling 1976). The largest workers of *M. mendax* have a head width less than 1.5 mm and the hairs on the pronotal hairs are usually evenly curved along their lengths. This species has been referred to as *M. comatus*.

**Distribution.** USA: TX; NM: not reported from New Mexico (Snelling 1976), but as it occurs in west Texas and Chihuahua, it would be expected to occur in the southern part of the state; MEXICO: throughout the northern half. Cole (1954c) reports *M. comatus* from New Mexico.

**Habitat.** Semi arid mountain habitats, oak juniper, pinyon juniper woodlands.

**Biology.** This species nests in the soil and is apparently predaceous. Snelling, 1976

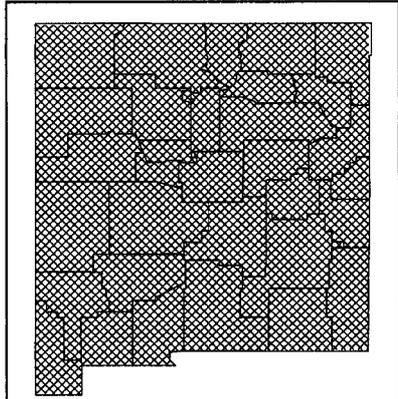
***Myrmecocystus mendax*  
Wheeler**

Fig. 441; Map 230

**Discussion.** This ant can be recognized by the numerous hairs on the malar area; the long hairs on pronotum and dorsum of second tergum of large workers are at least 60% of the length of the longest diameter of the eye; the longest hairs on pronotum are evenly curled and not simply curled at the tip.

**Distribution.** USA: NV, CA, AZ, CO, TX; NM: **Bernalillo Co.**, Cibola National Forest, Embudo Canyon, Petroglyph Park, **Catron Co.**, Cruzville, Datil (Snelling, 1976), 20 mi. E Alma (Snelling, 1976), **Colfax Co.**, 5 mi. S Raton Pass (Snelling, 1976), 16 mi. E Raton (Snelling, 1976), 20 mi. W Raton (Snelling, 1976), Cimarron Canyon (Snelling, 1976), **Doña Ana Co.**, near Aguirre Springs Recreational Area (Snelling, 1976), Las Cruces (Snelling, 1976), **Grant Co.**, 4 k SE Mule Creek, 26.5 mi. S Silver City (Snelling, 1976), 23 mi. SW Silver City (Snelling, 1976), 20 mi. N Silver City (Snelling, 1976), 70 mi. N Silver City (Snelling, 1976), 15 mi. E Silver City (Snelling, 1976), 80 k E Silver City, 9 k E White Signal, 14 k NE White Signal, **Guadalupe Co.**, 0.6 m N Dilia (Snelling, 1976), Santa Rosa (Snelling, 1976), **Lea Co.**, Hobbs (Snelling, 1976), state line (Snelling, 1976), **Lincoln Co.**, 5 mi. W Capitán, near Carrizozo, Malpais Lava Bed (Snelling, 1976), **Los Alamos Co.**, Los Alamos, Rio Grande, **Luna Co.**, 6 mi. NW Dem-

ing (Snelling, 1976), **McKinley Co.**, near Gallup (Snelling, 1976), 25 m E Gallup (Snelling, 1976), Zuni Mts. (southeast of Gallup), **Otero Co.**, Alamogordo (Snelling, 1976), White Sands National Monument (Snelling, 1976), **Quay Co.**, 9 m W Glenrio (Snelling, 1976), 3 m W Tucumcari (Snelling, 1976), **Rio Arriba Co.**, 4 k NW Navajo City, **Sandoval Co.**, Bandelier National Monument, Cim-



Map 230. *Myrmecocystus mendax*.

arron Canyon, Tunnel Springs, **San Juan Co.**, 4 k E Aztec, **San Miguel Co.**, 25 m S Las Vegas (Snelling, 1976), **Santa Fe Co.**, Santa Fe (Snelling, 1976), 24 k NE Santa Fe, 10 m S Santa Fe (Snelling, 1976), 1 m S Golden (Snelling, 1976), **Socorro Co.**, Water Canyon, 16 m W Socorro (Snelling, 1976), 25 m E Socorro (Snelling, 1976), 25 m N Bernardo (Snelling, 1976), **Torrance Co.**, Gran Quivira, 9 m E Mountainair (Snelling, 1976), 24 k S Mountainair, **Union Co.**, 6 mi. E Clayton, **Valencia Co.**, 22 k S Fence Lake; MEXICO: Sonora, Chihuahua. Cole (1954c) lists several additional New Mexican localities.

**Habitat.** Arid grasslands and desert shrublands up to pinyon juniper woodlands.

**Biology.** Nests are found in the soil or under stones. Flights occur in the afternoon after a rain. This species is carnivorous (insects) and feeds on dead insects. Workers also collect honeydew and nectar. Foraging occurs during the day. The ant cricket *Myrmecophila nebrascensis* occurs within the nest.

Wheeler, 1910a; Cole, 1942, 1954c; Gregg, 1963 (as *M. comatus*); Snelling, 1976

### *Myrmecocystus mexicanus* Wesmael

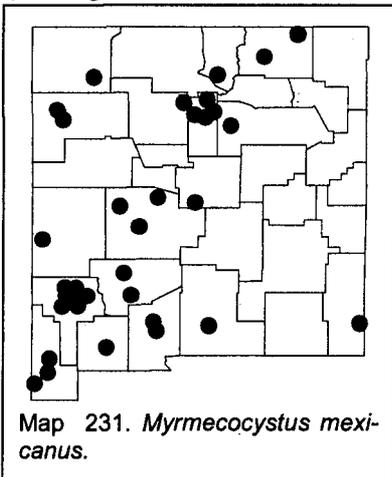
Fig. 437; Map 231

**Discussion.** This is a pale yellow ant with black eyes. The head length of the largest workers exceeds 1.3 mm, the eyes have few or no short, erect hairs, the propodeal dorsum is evenly convex and abundantly hairy and the metanotal suture is usually distinctly impressed.

This species can be easily confused with *M. navajo*, see discussion of the latter species.

**Distribution.** USA: NV, CA, UT, CO, AZ, TX; NM: **Catron Co.**, 21 k N Glenwood, **Colfax Co.**, 2 mi. S Raton Pass (Cole, 1954c; Snelling, 1976), **Cimarron Canyon** (Cole, 1954c; Snelling, 1976), **Doña Ana Co.**, 28 m N Las Cruces (Cole, 1954c, Snelling, 1976), **Las Cruces** (Snelling, 1976), **Grant Co.**, 15 m E Silver City (Cole, 1954c; Snelling, 1976), 20 m N Silver City (Snelling, 1976), 13 mi. N Silver City (Snelling, 1976), 14 mi. N Silver City

(Snelling, 1976), 70 mi N Silver City (Cole, 1954c), **McMillan Camp** (Snelling, 1976), **Cherry Creek Camp** (Snelling, 1976), 14 m N Silver City, **Hidalgo Co.**, **Granite Pass** (Snelling, 1976), 12 m E Animas (Snelling, 1976), 15 m N Rodeo (Snelling, 1976), **Lea Co.**, 2 m E



**Hobbs** (Cole, 1954c; Snelling, 1976), **Los Alamos Co.**, **Los Alamos**, **Luna Co.**, 14 mi S Deming, **McKinley Co.**, 25 m E Gallup (Cole, 1954c; Snelling, 1976), **Zuni Mts.** (southeast of Gallup), **Otero Co.**, **Otero Mesa** (Ft. Bliss), **San Juan Co.**, **Chaco Canyon**, **Santa Fe Co.**, **Santa Fe** (Snelling, 1976), 6 mi. NW Santa Fe (Snelling, 1976), 4 m NE Santa Fe (Snelling, 1976), **San Miguel Co.**, **Pecos** (Snelling, 1976), **Sierra Co.**, **Caballo** (Snelling, 1976), **Truth or Consequences**, **Socorro Co.**, **Bear Mt.**, **Sevilleta**, **Socorro**, **Taos Co.**, 18 m S Taos (Cole, 1954c; Snelling, 1976), **Torrance Co.**, 24 k S Mountainair; MEXICO: Chihuahua, Coahuila, San Luis Potosí, Durango, Guanajuato, Baja California.

**Habitat.** Typical creosote-bush desert scrub, sagebrush, oak woodland up to pinyon-juniper. This is one of the most common species of *Myrmecocystus* in New Mexico.

**Biology.** The nest of this species is usually a crater surrounded by pebbles or coarse gravel. The nest entrance consists of a single, large diameter (over 2 cm) tunnel. The foragers are active just before dusk, and throughout the night, until after dawn. It also forages on cool, overcast days. Workers forage individually, collecting nectar and excretions of Homoptera. Although they collect dead arthropods, they are apparently not predaceous. Flights occur late in the afternoon just before dusk. A myrmecophilous scarabaeid beetle appears to be an obligate predator on the larvae of this species.

Snelling, 1976

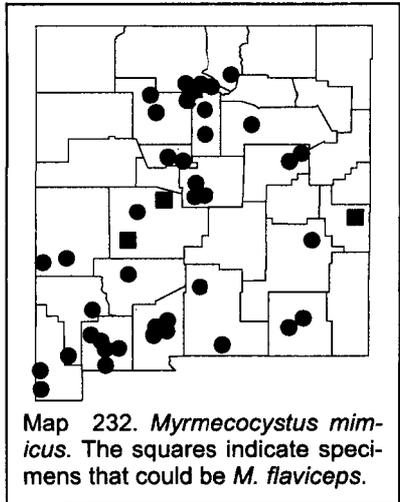
### *Myrmecocystus mimicus* Wheeler

Fig. 443; Map 232

**Discussion.** The malar area of this species has fewer than ten erect hairs, usually only on the lower half, the frons and vertex are smooth, shiny and with little or no pubescence, the third tergum of the gaster with only sparse pubescence, and the pronotal hairs are short, stiff and blunt. Specimens from three localities in New Mexico (**Roosevelt Co.**, 1 k E Oasis, **Socorro Co.**, Magdalena Mts. [Water Canyon], and 33°48'32.2"N 107°22'57.2"W) have dense pubescence on the third tergum of the gaster, and may be *M. flaviceps* Wheeler. They are indi-

cated by squares on the *M. mimicus* map.

**Distribution.** USA: CA, NV, UT, AZ, CO, KS, OK, TX; NM: **Bernalillo Co.**, Albuquerque (Cole, 1954c; Snelling, 1976), 3 mi S Embudo (Cole, 1954c), **Catron Co.**, 2 mi N Frisco Hot Springs, Mogollon Mts., **Chaves Co.**, 37 mi SW Kenna, **Doña Ana Co.**, 6 mi N Las Cruces



(Cole, 1954c), 45 k NE Las Cruces (Long Term Ecological Research site), Isaac's Lake, 28.8 mi. W Las Cruces (Snelling, 1976), **Eddy Co.**, 12 mi N Carlsbad, 32°22.2'N 103°47.4', **Grant Co.**, 7.5 m W Hachita (Snelling, 1976), 2 m N San Juan (Cole, 1954c), **Guadalupe Co.**, Cuervo (Snelling, 1976), 0.6 m S Cuervo (Snelling, 1976), **Hidalgo Co.**, 1 mi. W Rodeo (Snelling, 1976), Peloncillo Mts. (Snelling, 1976), **Los Alamos Co.**, Los Alamos, **Luna Co.**, Columbus, Deming, 6 mi. NW Deming (Snelling, 1976), 18 k NW Deming, 23 m E Deming (Snelling, 1976), 14 mi S Deming,

Pancho Villa State Park, **Otero Co.**, Alamogordo (Snelling, 1976), North MacGregor Range, **Rio Arriba Co.**, Alcalde (Snelling, 1976), 2 k N Dixon, Embudo (Snelling, 1976), Truchas (Snelling, 1976), **Roosevelt Co.**, without locality, **Sandoval Co.**, 4 k W Cuba, West Mesa, **San Miguel Co.**, 25 mi S Las Vegas (Cole, 1954c), **Santa Fe Co.**, Galisteo (Cole, 1954c), 10 m S Santa Fe (Snelling, 1976), **Sierra Co.**, Truth or Consequences, **Socorro Co.**, Duffee Canyon, Magdalena (Cole, 1954c), Sevilleta National Wildlife Refuge, **Taos Co.**, 18 mi S Taos (Cole, 1954c), **Torrance Co.**, Mountainair, 9 mi E Mountainair (Cole, 1954c), 24 k S Mountainair; MEXICO: Chihuahua, Durango, Coahuila, San Luis Potosí, Guanajuato, Morelos, Sonora, Baja California.

**Habitat.** Desert grasslands (fluff grass, grama grass), weedy areas, through creosote bush scrub, mesquite woodlands, sagebrush, oak forest to pinyon juniper woodland.

**Biology.** Nests range from a hole hidden at the base of a desert plant to a normal crater surrounded by pebbles or a mound as is found in other species in the genus. Foraging occurs during the day with the workers scavenging on dead arthropods or preying on living insects and feeding on nectar in flowers. This species also tends aphids. Workers are timid and rapid. Mating flights occur late in the afternoon after a significant rain event, although flights may occur in the morning. Several queens may start a single nest, although this is apparently uncommon.

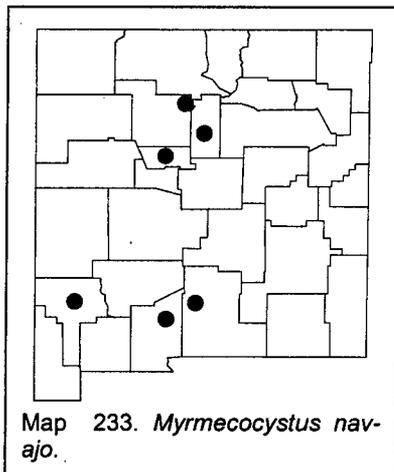
Cole, 1934a, 1966; Mallis, 1941; Wheeler and Wheeler, 1973; Hölldobler, 1976; Snelling, 1976

### *Myrmecocystus navajo* Wheeler

Figs. 435, 436; Map 233

**Discussion.** The dorsum of the propodeum is evenly convex with abundant erect hairs, appressed pubescence is sparse on the head, mesosoma and gaster, and the hind tibia has few or no erect hairs on the outer face.

Workers are similar to those of *M. mexicanus*, but differs in being smaller, having sparser cephalic pubescence, and lack the erect hairs on the extensor surfaces of the extensor surfaces of the femora and tibiae. The node of the petiole of *M. navajo* workers is usually thinner and with fewer erect hairs than that of *M. mexicanus*. Often workers of the two species cannot be separated.



Map 233. *Myrmecocystus navajo*.

**Distribution.** USA: NV, CA, UT, CO, KS, AZ, TX; NM: Berna-

lillo Co., Albuquerque (Snelling, 1976), Doña Ana Co., Jornada Experimental Range, Grant Co., 23 m SW Silver City (Snelling, 1976), Los Alamos Co., Rio Grande, Otero Co., White Sands National Monument, Santa Fe Co., Kennedy (Snelling, 1976); MEXICO: Chihuahua, Sonora, San Luis Potosí.

**Habitat.** Chihuahuan Desert, sagebrush and grasslands up to oak and pinyon juniper woodlands.

**Biology.** These ants nest in the soil with the entrance surrounded by a low mound of soil. Wheeler (1908) reports that the colonies are small, 100 - 150 workers, although this estimate is probably low as was suggested by Snelling (1976). Larvae occurred in nests in March. Foraging occurs primarily at night, with the workers tending Homoptera and feeding on flower nectar. Dead arthropods are also collected.

Cole, 1942; Gregg, 1963; Wheeler and Wheeler, 1973; Snelling, 1976; DuBois and Danoff-Burg, 1994

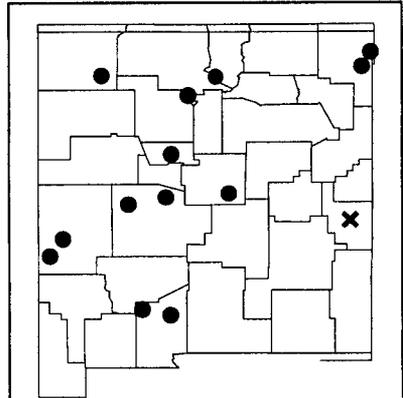
### *Myrmecocystus placodops* Forel

Figs. 438, 440; Map 234

**Discussion.** The longest hairs on the pronotum and dorsum of second segment of gaster are less than half the maximum diameter of eye, those on the pronotum are abruptly tapered at the tip; the malar area has numerous erect hairs. The head of the larger workers is orbiculate.

Only the largest workers can be separated from those of *M. mendax*, smaller workers of the two spe-

cies are indistinguishable. The sexuals of the two species cannot be separated with morphological characters.



Map 234. *Myrmecocystus placodops*. The "X" indicates an unknown locality.

**Distribution.** USA: AZ, TX; NM: Bernalillo Co., Albuquerque, Catron Co., 21 k N Glenwood, Mogollon Mts., Doña Ana Co., Hatch (Snelling, 1976), 45 k NE Las Cruces (Long Term Ecological Research site), Los Alamos Co., Rio Grande, Roosevelt Co., without locality, San Juan Co., Chaco Canyon, Socorro Co., 49k SE Datil, Magdalena Mts. (Water Canyon), Taos Co., 5 mi. SE Dixon, Torrance Co., 5 mi. NE Corona, Union Co., 10 mi. SE Clayton, 6 mi. E Clayton; MEXICO: Sonora, Chihuahua, Durango, Nuevo León, Tamaulipas.

**Habitat.** Sagebrush (Rio Grande). Found in most habitats in arid environments, ranging from grasslands and shrub grassland to mesquite savannas and creosotebush/tarbrush grassland.

**Biology.** Workers forage diurnally, and feed on small arthro-

Pods and visit flowers for nectar. They nest in the soil in open areas, usually in rocky soil, with the maximum depth being 4.8 m. There are as many as 1500 repletes in a nest.

Creighton and Crandall, 1954; Snelling, 1976; Rojas-Fernández and Fragoso, 1994, 2000

### *Myrmecocystus romainei* Snelling

Fig. 439; Map 235

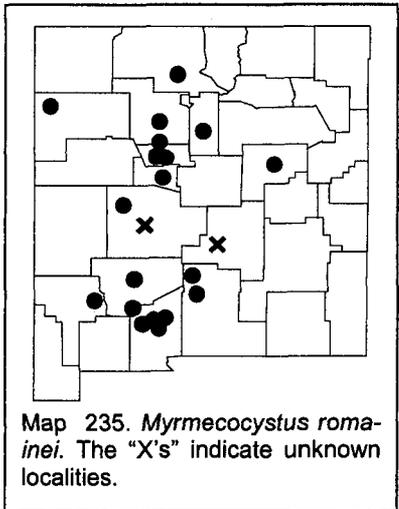
**Discussion.** In this species, the malar area (front view) has 5 - 17 hairs extending beyond the margin, the head width is less than 1.55 mm, the frons and vertex are finely and closely punctate and the longest posterior lateral hair is less than half the maximum eye diameter.

**Distribution.** USA: Throughout the southwest; NM: **Bernalillo Co.**, Albuquerque, Petroglyph Park, **Doña Ana Co.**, Hatch (Snelling, 1976), 45 k NE Las Cruces (Long Term Ecological Research site), 3 mi. E Las Cruces, 20 m W Las Cruces (Snelling, 1976), Mesilla Park (Snelling, 1976), **Grant Co.**, 2 m N San Juan (Snelling, 1976), **Guadalupe Co.**, Santa Rosa State Park, **Lincoln Co.**, without locality, **McKinley Co.**, 30 m N Gallup (Snelling, 1976), **Otero Co.**, White Sands Nat. Monument (Cole, 1954c), Tularosa Desert (Snelling, 1976), **Rio Arriba Co.**, Abiquiu Dam, **Sandoval Co.**, Rio Rancho, 1 mi. S Zia Indian Pueblo, **Santa Fe Co.**, Kennedy, **Sierra Co.**, Truth or Con-

sequences, **Socorro Co.**, Water Canyon, without locality, **Valencia Co.**, Los Lunas (Snelling, 1976); MEXICO: Chihuahua, Nuevo León.

**Habitat.** Numerous habitats, ranging from grasslands through creosotebush scrub up to pinyon juniper woodlands.

**Biology.** These ants have irregular craters, with a diameter up to 20 cms. This species can nest in loose, sandy soils, but prefers the



Map 235. *Myrmecocystus romainei*. The "X's" indicate unknown localities.

more stable interdunal areas at White Sands National Monument. Cole (1954c) reports that the population at White Sands National Monument had brilliant blue gasters, that disappeared after the specimens were preserved. We have not seen this in any of this species that we have collected.

Cole, 1954c (as *M. semirufa*, in part); Gregg, 1963 (as *M. semirufus* in part); Snelling, 1976

## Genus *Paratrechina*

(Key: Trager, 1984)

This is a common, widely distributed genus in New Mexico which can be easily recognized by the numerous thick, dark, erect hairs on the mesosoma (Fig. 444). These



Fig. 444. Pronota of workers of *P. bruesii* (top) and *P. terricola* (bottom) as seen in profile.

are slender ants with a scape which extends past the posterior edge of the head. The antennal fossae are inserted near to, but not touching posterior border of clypeus. The metanotal region is impressed dorsally, but without the strong constriction seen in *Prenolepis*. The petiolar node is somewhat hidden by the anterior surface of the gaster. Identification to species is difficult and the workers of two common species, *P. vividula* and *P. terricola*, are almost impossible to separate.

Nests have up to a few hundred species and are usually found in the soil or under stones, especially in arid and semiarid ecosystems. These ants tend Homoptera and may be house pests.

### Key to the workers of *Paratrechina*

(See Trager, 1984)

1. Pubescence on head dense, partially obscuring the surface (Fig. 445, left); weak bluish reflections often present on head and mesosoma; pronotum angular, with short, steep anterior face and longer, flattened or concave dorsal face (Fig. 446, top) ..... *austroccidua* Trager

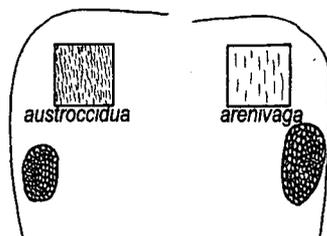


Fig. 445. Pubescence on the dorsum of the heads of workers of *P. austroccidua*, and of *P. arenivaga*.

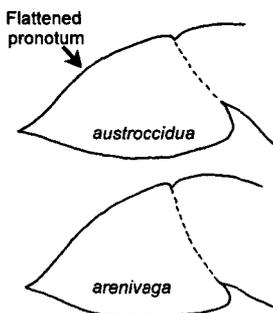


Fig. 446. Pronota of workers of *P. austroccidua* (indicating the concave or flat area on dorsum of pronotum) and *P. arenivaga* as seen in profile.

- Pubescence on head dilute (Fig. 445, right) or absent, surface strongly shining and easily seen; pronotum more convex in profile, or only weakly angular (Fig. 446, bottom) ..... **2**

**2(1).** Yellow with large black eyes (Fig. 445, right); nesting in mounds in sandy areas; not known from New Mexico (caution: callows, or immature workers of other species, may be yellow with black eyes, be sure to look at more than 1 worker) .....

..... *arenivaga* (Wheeler)

- Usually darker, if yellow, eyes are smaller (Fig. 445, left); nests under stones or other objects, or not in sandy areas ..... **3**

**3(2).** Scape (Fig. 447, top) with fewer than 10 coarse, nearly erect hairs (usually less than 0.04 mm in length), other finer semierect hairs may be present; pronotum usually with 9 or fewer coarse hairs (Fig. 444, bottom); head length less than 0.65 mm ..... **4**

- Scape (Fig. 447, bottom) with 13 - 19 coarse (most longer than 0.06 mm), nearly erect hairs (in addition to many finer, semierect hairs), pronotum (Fig. 444, top) with at least 9 coarse hairs (usually few very

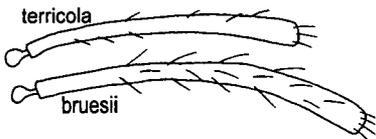


Fig. 447. Antennal scapes of workers of *P. terricola* and *P. bruesii*.

long, many short); head length greater than 0.65 mm .....  
 ..... *bruesii* (Wheeler)

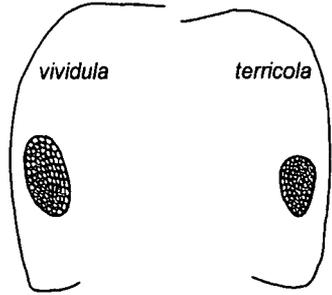


Fig. 448. Full face views of heads of workers of *P. vividula* and *P. terricola*, showing the relative eye sizes.

**4(3).** Eye larger (Fig. 448, left), about 1/4 head length or larger (greater than 0.13 mm in greatest length, eye length / head length ranges from 0.24 - 0.27) .....

..... *vividula* (Nylander)

- Eye smaller (Fig. 448, right), less than 1/4 head length (less than 0.12 mm in greatest length, eye length / head length ranges from 0.20 - 0.24) ..... *terricola* (Buckley)

***Paratrechina arenivaga* (Wheeler)**

Figs. 445, 446

**Discussion.** This is a yellow ant with large, black eyes. The head is densely pubescent, the mesosoma usually lacks pubescence, but has a few, erect hairs.

It can be separated from both *P. terricola* and *P. vividula* by the large eyes, and usually the lighter color.

**Distribution.** USA: southeastern part of country, as far west as north western Texas near Union Co.,

**NM:** No records from the state, but may occur in northeastern New Mexico.

**Habitat.** Open areas with sandy soils

**Biology.** These ants nest in the soil, and the entrance is surrounded by a small mound. It rarely nests under objects. They are predominantly nocturnal. Sexu- als were found in the nest throughout the year, flights occurred in the spring (April or May). Colonies have multiple mounds (up to 20 entrances over 1 meter apart). This species tends a variety of homopterans. They also feed on dead insects.

Van Pelt, 1956, 1958b; Trager, 1984

***Paratrechina austroccidua***  
**Trager**

Figs. 445, 446

**Discussion.** This is a yellow-brown to dark brown (or weakly bi-colored) species, which often has bluish reflections on the head and mesosoma).

It can usually be separated from other New Mexican species by the dense, appressed pubescence on the head. The dorsum of the pronotum is flat or concave.

**Distribution.** USA: AZ (southeast), UT, TX (Brewster Co.); NM: none, but expected to be in southwestern corner of state; MEXICO: Chihuahua, Hidalgo, Nuevo León.

**Habitat.** Mesic habitats at elevations of 1400 - 2400 m, in oak-maple forest, oak pine forest and pine forests (on north-facing slope).

It is moderately abundant in high forest and canyons of the Chisos Mountains.

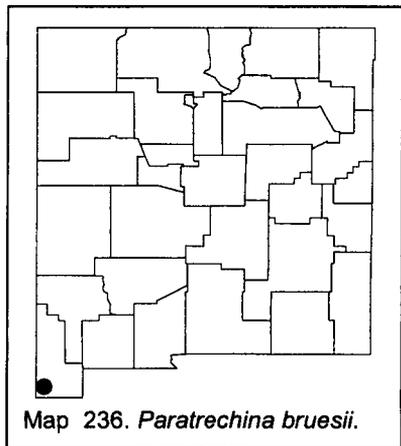
**Biology.** This ant nests in the soil, often under a stone. Brood was found in nests in July, callow males and mature females were in nests in July, mature alates in September. Flights occurred in May and July. It nests together with *Liometopum apiculatum* as well as with *P. melanderi* and *P. bruesii*.

Chew and Chew, 1980; Van Pelt, 1983; Trager, 1984

***Paratrechina bruesii***  
**(Wheeler)**

Figs. 444, 447; Map 236

**Discussion.** The workers of this species are brown with a shining gaster, which is often enlarged. Appressed pubescence on the head is sparse, there is little or no such pubescence on the mesosoma. The hairs on the scape are abundant (usually), and erect or semierect.



Map 236. *Paratrechina bruesii*.

**Distribution.** USA: AZ (Cochise Co.), TX (Brewster Co.),

Presidio Co.); NM: **Hidalgo Co.**, Guadalupe Canyon (first state record); MEXICO: Baja California Sur, Chihuahua, Nayarit, Jalisco, Coahuila, Hidalgo.

**Habitat.** This species nests under stones in streambeds or arroyos in the lowlands and foothills in scrub lands or grasslands of the Chihuahuan Desert, at elevations of 750 - 1800. It is also found in subtropical thorn forest, juniper-oak or juniper-cottonwood woodlands.

**Biology.** This ant nests under stones or under wood (such as a dead *Yucca* log). Alates were found in nests from April to December. Apparently the alates remain in the nest throughout the winter and fly at the outset of hot weather or after spring rains.

### ***Paratrechina terricola* (Buckley)**

Figs. 67, 444, 447, 448; Map 237

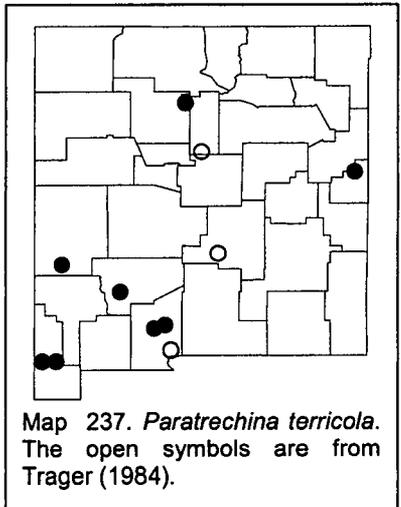
**Discussion.** This is a small, yellow-brown or even dark brown species (occasionally bicolored, with darker head and gaster), that is rarely encountered in New Mexico.

It is nearly impossible to separate the workers of this species from those of *P. vividula*, differing only in having smaller eyes. If males are collected, they can be separated by the structure of the genitalia (see Trager, 1984 for details).

Some specimens have abundant, bristly, fine, semierect hairs, on the scape, and the few nearly erect, coarse hairs are slightly longer (nearly 0.05 mm in length) than those found in the "typical" *P. terri-*

*cola*, and may represent an undescribed species.

**Distribution.** USA: throughout southern part of country, as far north as South Dakota, south into México; NM: **Catron Co.**, Mogollon Mts., **Curry Co.**, Grady Roadside Park, **Doña Ana Co.**, Dripping Springs, 45 k NE Las Cruces (Long Term Ecological Research site), **Hidalgo Co.**, 3 m W Animas, Rodeo, **Los Alamos Co.**, Rio Grande, **Sierra Co.**, 4 k W Hillsboro, other unspecified localities in Trager (1984); MEXICO: Chihuahua.



Map 237. *Paratrechina terricola*. The open symbols are from Trager (1984).

**Habitat.** Open disturbed areas, grasslands, mesquite shrubland, pinyon woodland, sagebrush (1770m elevation), post-oak woodlands, areas adjacent to forests, or even in dense, mesic woodlands.

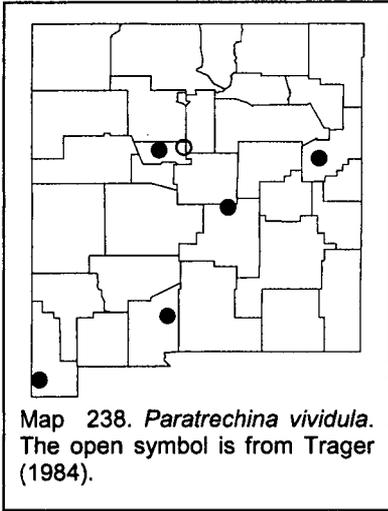
**Biology.** This species nests under stones, logs or cow dung, or in the soil. Alates overwinter in the nest, and fly early in the spring.

DuBois and Danoff-Burg, 1994; Trager, 1984

***Paratrechina vividula*  
(Nylander)**

Fig. 448; Map 238

**Discussion.** This is a weakly bicolored, shiny species (head and



gaster yellowish-brown to nearly black, mesosoma and appendages yellow to dark reddish-brown). The pubescence on the head is mostly limited to the posterior half. The scape has a few erect hairs.

The workers of this species are nearly impossible to separate

from those of *P. terricola*. They differ in having slightly larger eyes and the sides of the head are straighter. If males are available, they series may be identifiable on the basis of the genitalia (see Trager, 1984, for details).

**Distribution.** USA: Southern part of country as far north as northern California and Kansas. NM: **Bernalillo Co.**, NE Albuquerque, **Doña Ana Co.**, 45 k NE Las Cruces (Long Term Ecological Research site), **Hidalgo Co.**, Clanton Draw, **Lincoln Co.**, Corona, **Quay Co.**, 7 mi. S Quay, unspecified locality in Trager (1984); MEXICO: Chihuahua.

**Habitat.** Open, disturbed areas, urban habitats, greenhouses, and grasslands in the Chihuahuan Desert.

**Biology.** These ants nest in the soil, often under a stone. Brood was present in April and July. Alates were present throughout the year and fly on any warm day with high humidity. Most flights occur from May to October, between 18:00 and 22:00. Females are attracted to lights, even though flights occur during daylight.

Trager, 1984

## Genus *Polyergus*

(See Smith 1947b, Creighton, 1950, Wheeler, 1968)

This genus is rarely collected in New Mexico. Workers are easily recognized by the long, slender mandibles (Fig. 449). Other characters would include the monomorphic

workers, the antennal fossa is located close to, or touching the posterior edge of the clypeus, the ocelli are distinct, the eyes are well developed, and the petiole thickened (Fig. 450).

It differs from other genera in that it has a four-segmented maxillary palp and a two segmented labial palp.

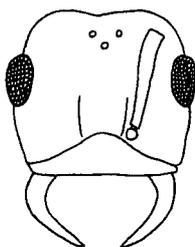


Fig. 449. Head of a worker of *P. breviceps*.

Workers invade the nests of ants of the subgenera *Formica* and *Neoformica* (Plate 2, Fig 451), where they eat part of the brood and take the remainder back to the nest to serve as slaves.

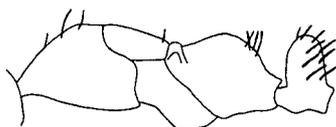


Fig. 450. Mesosoma of a worker of *P. breviceps*.

This genus is not commonly collected in the state. Cole (1954c) discusses the distribution of the genus in New Mexico.

**Key to the workers of  
*Polyergus***

1. Antennal scapes reaching or surpassing posterior lateral border (Fig. 452); gastral pubescence dense, giving surface a grayish sheen ..... *lucidus* Mayr
- Antennal scapes not reaching posterior lateral border (Fig. 449);

gastral pubescence dense, giving surface a grayish sheen .....  
..... *breviceps* Emery

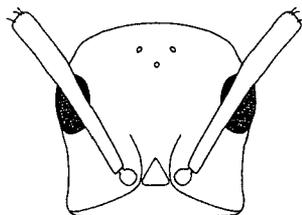
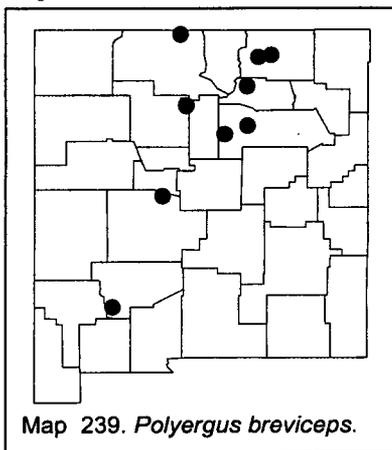


Fig. 452. Head of a worker of *P. lucidus*.

***Polyergus breviceps*  
Emery**

Figs. 61, 449, 450; Map 239

**Discussion.** This species is the more common of the two species that occur in New Mexico. It can be easily recognized by the short scapes.



**Distribution.** USA: North America; NM: Colfax Co., Cimarron Canyon (Cole, 1954c), Sapello

Canyon (Cole, 1954c), Ute Park (Cole, 1954c), Los Alamos Co., Los Alamos, 4 k N Los Alamos, Mora Co., Coyote Creek State Park, Rio Arriba Co., 4 k N Chama, San Miguel Co., Beulah (Cole, 1954c), Sierra Co., 21 k SW Hillsboro, Socorro Co., Sevilleta National Wildlife Refuge,

**Habitat.** Urban habitats, meadows, up to pine and aspen forests.

**Biology.** This species nests in logs or under stones and enslaves species of the genus *Formica* (*F. altipetens*, *F. argentea*, *F. fusca*, *F. lepida*, *F. montana*, *F. neoclara*, *F. neorufibarbis*, *F. occulta*, *F. nitidiventris*, *F. podzolica*, *F. schaufussi schaufussi*, *F. subpolita*, and *F. subsericea*). A dealate female was collected in September. It is not commonly collected in the state.

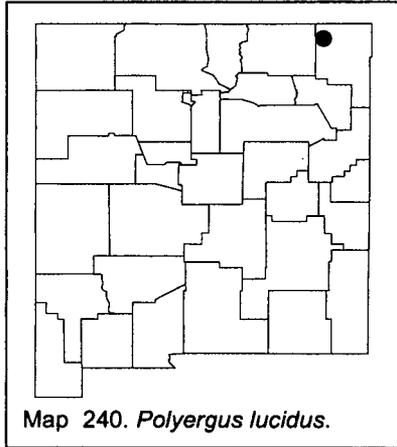
Wheeler, 1910a; Smith, 1928b; Mallis, 1941; Wheeler and Wheeler, 1944, 1963; Gregg, 1946, 1963; Hung, 1973; DuBois and Danoff-Burg, 1994

### ***Polyergus lucidus* Mayr**

Fig. 452; Map 240

**Discussion.** This species can be recognized by the elongate mandibles.

It can be easily separated from *P. breviceps* by the elongate antennal scapes.



Map 240. *Polyergus lucidus*.

**Distribution.** USA: Eastern United States W to ND S to NM; NM: Union Co., Capulin Volcano National Monument (Cole, 1954c).

**Habitat.** Meadows and woodlands.

**Biology.** This species nests under stones, and enslaves *F. lasioides*, *F. neogagates*, *F. nitidiventris* and *F. schaufussi*.

McCook, 1880; Wheeler, 1910a; Cole, 1954e; Gregg, 1963; Wheeler and Wheeler, 1963; Talbot, 1967, 1968; Harman, 1968; Marlin, 1968, 1969, 1971

## **Genus *Prenolepis***

(Key: Wheeler, 1930; Creighton, 1950)

This is not a common genus in New Mexico. It can be easily recognized due to the constriction of the

mesosoma, as can be best seen from above (Fig. 68). The scape is very long, extending past the posterior

edge of the head by about one half of its length, the antennal fossa either touches the posterior edge of the clypeus or is extremely close to it, the mesosoma is strongly constricted into two parts as mentioned above (Fig. 68).

This genus is similar to *Paratrechina*, but can be easily distinguished by the strongly constricted mesosoma and by the lack of course, erect, dark hairs.

This genus is usually found nesting under stones in mesic lowland sites. Workers tend Homoptera and feed on liquids from decaying fruit. They are often found foraging during the coolest time of the year (Tschinkel, 1987), even when the ground is frozen and the air temperature is below 0°C. Repletes are often found in the nests, and ants with somewhat enlarged gasters are common. Mating flights often occur early in the year when it is still cool, in March and April.

### ***Prenolepis imparis* (Say)**

Figs. 64, 68; Map 241

**Discussion.** This species can be easily recognized by the narrowed region in the middle of the mesosoma, and can be seen by looking at the mesosoma in profile and from the top. No other species in New Mexico has such a mesosoma.

There are currently five subspecies of *P. imparis*, three of which (*P. imparis imparis*, *P. imparis arizonica*, and *P. imparis coloradensis*) occur in the United States and two (*P. imparis colimana* and *P. imparis veracruzensis*) which occur in

México. It is doubtful that the subspecies in the United States are valid taxa. The separation of *P. arizonica* on the basis of the concavity of the apex of the petiole is doubtful, due to the variability among individuals of a nest series, and as *P. imparis imparis* from eastern United States, often have this notch. The separation of *P. imparis coloradensis* on the basis of the shape of the propodeum (see Creighton, 1950:413) is also a character with considerable variation. All of the remaining subspecies of *P. imparis* must be looked at carefully to determine the status of this taxon. For the present time, both subspecies that occur in New Mexico will continue to be recognized, and can be separated with the following key:

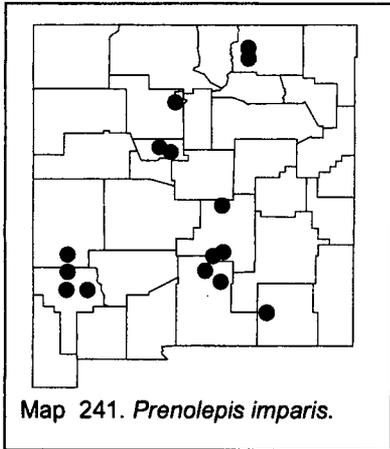
#### **Key to the workers of the subspecies of *Prenolepis imparis* in New Mexico**

1. Apex of the petiole distinctly concave in the middle, the concavity approximately 2/3 as wide as the greatest width of the apex .....  
..... *imparis arizonica* Wheeler
- Apex of petiole flat, or if feebly concave, the concavity is only about 1/2 width of apex .....  
..... *imparis coloradensis* Wheeler

The subspecies *Prenolepis imparis arizonica* Wheeler can be recognized as the apex of the petiole is distinctly concave in the majority of the workers in a series. There is a considerable amount of variability in this character, even among workers from a single nest series. Creighton (1950) also mentions that the sides of

the head are almost straight and the mesosoma is especially stout, especially at the metanotal "waist".

The subspecies *Prenolepis imparis coloradensis* Wheeler can be recognized by the lack of a concavity on the apex of the petiole. It is doubtful that this subspecies is distinct from *P. imparis arizonica*.



**Distribution.** USA: AZ, CO, NM: **Bernalillo Co.**, near Albuquerque (Ciénega Canyon, Sandia Mts.), **Catron Co.**, (Mogollon Mts.) near Snow Lake, **Colfax Co.**, Cimarron Canyon (Cole, 1954d), 41 k E Eagle Nest, **Eddy Co.**, Hidden Cave, **Grant Co.**, (Gila Mts.) Iron Creek, 5

m N Pinos Altos, near Snow Lake, **Lincoln Co.**, Sacramento Mts. (2 mi. W Alto, 2 mi. SE Alto), 5 m E Red Cloud Campground, **Otero Co.**, Mayhill, Mescalero (Cole, 1954d), **Sandoval Co.**, Bandelier National Monument; MEXICO: Chihuahua.

**Habitat.** Grasslands and forested areas, including juniper woodlands (with cholla), forests of silver leaf oak, white oak, Chihuahua pine, ponderosa pine, Douglas fir.

**Biology.** This species nests in the soil, with simply a hole or with a small mound, occasionally it nests under stones, in loam soils. Brood was found in nests in June to August, reproductives from March to June and in August. It is apparently polygynous as up to four dealate females were found in a single nest. One colony was nesting under a stone together with *Formica podzolica*. The two species were completely mixed, including the brood of the two species. Foragers are attracted to baits, including grape jelly, tuna fish, and rotten liver.

Smith, 1924, 1928c, 1965; Dennis, 1941; Talbot, 1943; Gregg 1963; Tarpley, 1965; DuBois and Danoff-Burg, 1994

## ACKNOWLEDGMENTS

We would like to thank a number of individuals who helped in the project. Richard Fagerlund, Elizabeth Milford, David Richman, and James Cokendolpher, Donald Lowrie, Fairley Barnes, and Alan Fisher provided numerous specimens. Douglas Lowrie, helped pin specimens. Carol Southerlund provided records and literature. Personnel of Los Alamos National Laboratory offered suggestions, logistic support, materials and allowed us to work at the various sites. John Mangemelli and Bill Fuchs arranged for permission for us to work on White Sands National Monument. The New Mexico Game and Fish Office issued collecting permits for the work. David Smith and André Francoeur identified the ants listed in the paper of Pippin and Pippin (1984); Robert Gregg identified the ants from Mortandad Canyon and the high explosives test site. Voucher specimens are deposited in the New Mexico Museum of Natural History (Albuquerque). Edward Wilson allowed access to his unpublished keys

to *Pheidole*. David Kistner granted permission to use figures that were originally published in the journal Sociobiology. R. and G. Snelling allowed the use of unpublished distributional records of *Neivamyrmex*. Richard Fagerlund and Stefan Cover reviewed the manuscript, and Richard Fagerlund wrote the foreword.

The research was supported by the Association of Western Universities, a faculty research grant from New Mexico State University, The Los Alamos National Environmental Research Park, operated by the Los Alamos National Laboratory, the United States Air Force Academy, White Sands National Monument, the National Institutes of Health (Grant # 5 G12RR08124) and The Environmental Sciences Gift Fund of the University of Texas at El Paso. The Ernst Mayr Fund of the Museum of Comparative Zoology supported several visits to the Museum. This book would not have been published without the support of these individuals and institutions.

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## GLOSSARY

**Acidopore** - orifice at the end of the gaster which is used by ants of the subfamily Formicinae to spray formic acid, among other uses.

**Alitrunk** - same as mesosoma.

**Ammochaetae** - see psammophore.

**Angle** - dull spine or triangular projection.

**Antenna** - One of the pair of appendages on the dorsum of the head. This appendage consists of the basal most segment, the scape and several distal segments, the funiculus. Antennae is plural form.

**Apical** - section of structure farthest from body.

**Appressed** - refers to hairs, which form an angle of less than 30° with body surface, usually laying on the body surface.

**Articulation** - area where two sections of the body unite and where they are movable. An example would be the union of the antenna and the head.

**Basal border** - edge of mandible which is located under the clypeus when the mandibles are closed.

**Bicarinate** - with two carinae, for example the clypeus of some ant species, in which two small teeth often extend from the carinae anteriorly from the medial border.

**Buccal cavity** - the mouth cavity.

**Carina** - a ridge in the sculpture of an ant. Carinae is plural form.

**Caste** - a form of an adult ant, for example worker, soldier, female, male.

**Cheek** - same as the gena.

**Claustral** - Type of nest formation in which a single female digs a nest and later plugs the entrance before egg laying.

**Club** - Enlarged apical segment or segments of the funiculus, which form a distinct mass separated from the remainder of the funiculus.

**Clypeus** - a sclerite of the head located between the frons and labrum, above and posterior to the mandibles.

**Colony** - a single unit, consisting of a reproducing female (queen) and workers. Other castes, such as soldiers, winged females and winged males, together with brood, may occur in the nest.

**Connule** - lateral tooth or projection on the sides of the postpetiole, common in *Pheidole*.

**Cordate** - heart shaped.

**Coriaceous** - leather-like sculpture.

**Coronula** - circle of hairs located around the acidopore.

**Cotype** - one of several specimens chosen to represent a species by the individual who originally described the species.

**Coxa** - basal segment of leg. Coxae is plural.

**Crenulate** - scalloped with small, blunt teeth.

**Denticle** - small tooth.

**Denticulate** - covered with small teeth or spines.

**Dimorphic** - Refers to a situation in which workers are of two sizes or forms. For example, most ants of the genus *Pheidole* are in the form of small workers and large headed soldiers. See monomorphic and polymorphic.

**Distal** - section of an appendage farthest from the to body.

**Dorsal** - top of structure.

**Dorsum** - referring to the top of structure.

**Ecarinate** - lacking carina or ridge.

**Edentate** - without teeth.

**Emarginate** - notched.

**Epigaecic** - Active on soil surface. (See hypogaecic).

**Epinotum** - Old term for propodeum.

**Epistome** - Old term for clypeus.

**Erect** - refers to hairs ,which are at or close to a 90° angle with the surface. See suberect, subappressed and appressed.

**Ergatogyne** - individual intermediate between a worker and a female.

**Extensor surface of leg** - outer surface.

**Female** - reproductive individual in the nest, or the queen, or winged individuals that are capable of reproduction after mating. Although workers and soldiers are also female, they are not referred to as the female.

**Femur** - Third segment of the leg, located between the trochanter and the tibia. The pleural is femora.

**Fenestra** - circle in the integument located in the ventral part of the petiole of ants in the genus

*Ponera*. The integument is so thin in the area that it allows the transmission of light, similar to a window.

**Flexor surface of leg** - posterior surface.

**Flexuous** - refers to hairs, which are long and curved.

**Fossa** - The concavity where the base of the scape articulates with the head. Fossae is plural form.

**Foveolate** - sculpture of holes or round depressions.

**Frons** - section of the head located between the frontal area and the region of the medium ocellus.

**Frontal area** - small triangular area located between the frontal carinae and posterior to the clypeus.

**Frontal carinae** - longitudinal ridges on the inner side of the insertion of the antenna. Frontal carinae is the plural form.

**Frontal lobe** - plate-like extension of the frontal carina above the insertion of the antenna.

**Foramen** - hole, such as at the posterior of the head where it attaches to the mesosoma (posterior lateral foramen).

**Funiculus** - The remainder of the antenna distal to the first segment or scape.

**Gaster** - the section of the abdomen posterior to the petiole of the postpetiole in those subfamilies that have one. Actually composed of the third or fourth segment of the abdomen posterior to the end of the abdomen.

**Gena** - part of the head on each side, below (anterior to) the eyes. Genae is the plural form.

**Granulose** - form of sculpture in which the surface resembles sandpaper.

**Gula** - ventral surface of the head behind the labium, extending to the posterior lateral foramen and bounded laterally by the malar area. *Gulae* is the plural form.

**Gyne** - female or queen.

**Habitus** - general form of the body of an ant.

**Haplodiploid** - method of reproduction in which the determination of sex is due to the number of chromosomes, the male is haploid, the female is diploid. This form of sexual determination occurs in ants and other Hymenoptera.

**Holotype** - a single specimen selected by the authority who described a species to represent the species. It is considered to be the true form of the species.

**Humeral angles** - anterolateral corners of the pronotum, in the region of the "shoulder".

**Hypogaecic** - subterranean.

**Inquiline** - a species which lives in the nest of an ant species, usually doing no harm other than consuming food from ant workers.

**Insertion** - The place where the antenna connects to the head.

**Labial palp** - one of the two elongated appendages located in the mouth region. This palp is shorter than the maxillary palp and is often composed of 4 segments.

**Labium** - One of the mouthparts, the second maxilla, forms the floor of the buccal cavity.

**Labrum** - one of the mouthparts located immediately below the clypeus, which covers the base of the mandibles and forms the roof of the buccal cavity.

**Laterad** - towards the side.

**Lectotype** - a single specimen chosen by a reviewer of a group, to represent a species. It is selected from a series of 2 or more cotypes, which were named by the individual who originally described the species.

**Lenticular** - lens shaped, with anterior and posterior faces convex.

**Lestobiosis** - situation in which a species of tiny ants lives in the walls of the nest of a larger species and steals food from the larger ants.

**Lobe** - rounded structure, for example when the frontal carinae are rounded and cover the insertion of the antennae or the posterior lateral corners of the head (posterior lateral lobe).

**Major** - Largest worker (see minor).

**Malar area** - region between the base of the mandible and the compound eye, along the side of the head.

**Male** - the masculine caste in an ant nest. These members normally have wings and mating with females is their only function, after which they die. They play no other role in the nest, such as excavation, caring for brood, foraging etc. Those of many species are not even able to feed themselves. These individuals have only one set of chromosomes, see haplodiploidy.

**Mandibles** - the jaws, or first pair of appendages, located in the head anterior to the buccal cavity.

**Marginate** - bounded by an elevated border.

**Masticatory border** - surface of mandible with teeth.

**Maxilla** - one of the mouthparts, located immediately behind or under the mandibles. The pleural is maxillae.

**Maxillary palp** - one of the two elongated appendages located in the region of the mouth. This palp is longer than the labial palp and is often composed of 6 segments.

**Mesonotum** - the dorsum of the second section of the mesosoma.

**Mesopleuron** - the side of the mesonotum.

**Metanotal suture** - suture separating the mesonotum from the propodeum.

**Mesosoma** - middle region of the ant's body, consisting of the thorax and the propodeum, or first segment of the abdomen. It cannot be called thorax as it is a compound structure. Also referred to as alitrunk, especially in winged ants. Mesosomata is the pleural form.

**Metapleuron** - the region on the lower side of the propodeum, below where it fuses with the metathorax.

**Metapleural lobe** - rounded structures on the metapleuron adjacent to the point of insertion of the peduncle of the petiole.

**Minim** - smallest worker in a dimorphic or polymorphic species, or one of the first, small workers to appear as a result of the formation of a new nest.

**Minor** - smallest worker (see major).

**Monogynous** - species in which there are several queens or reproducing individuals, in a single nest.

**Monomorphic** - refers to a situation in which all of the workers

of a species are of a single size or form. See dimorphic and polymorphic.

**Myrmecology** - the study of ants.

**Myrmecologist** - ant specialist.

**Nanitic** - small worker that is a member of a new nest. Later the workers will be normal sized as in other colonies.

**Nest** - often synonymous with colony, but may be simply a satellite group of ants, which are part of a larger colony.

**Node** - the dorsal section of the petiole, which is somewhat differentiated from the remainder of the petiole.

**Nodiform** - in the form of a knot or knob, referring to the shape of the petiole of some ants (*Tranopelta*).

**Nuptial flight** - a situation found in most species of ants in which individuals of both sexes fly from the nest and either mate in the air or mate on the ground some distance from the nest,

**Ocellus** - one of the small, single faceted eyes located near the posterior border of the head in workers of a few genera of ants and in females and males of most genera of ants.

**Posterior lateral lobe** - prominent posterolateral corner of the head in some genera of ants.

**Posterior lateral corners** - the posterolateral areas of the head.

**Posterior lateral lobes** - same as posterior lateral corner, but usually refers to well developed structures which are separated by a

deep depression, such as the lobes of the head of soldiers of *Pheidole*.

**Ommatidium** - a single ocular unit of the compound eye of an insect (pleural form is ommatidia).

**Palp** - a segmented appendage located either on the maxilla or labium.

**Parabiosis** - situation in which two species of ants live together in a single colony, but maintain their brood separately.

**Paratype** - one of the specimens chosen to represent a species by the individual who originally describes a species (see holotype).

**Pectinate** - refers to a situation in which a structure has a row of tiny teeth or spines. This occurs on the tibial spurs of many genera (*Pogonomyrmex*, *Myrmica*, *Manica*) of ants and on the tarsal claws of *Lep-togenys*.

**Pedicel** - One or two segments of the abdomen, which are called the petiole and the postpetiole. Actually they are the second and third segments of the abdomen, the first being the propodeum. Also refers to the second segment of the antennae, part of the funiculus, and attached to the remaining segments of the antenna.

**Peduncle** - anterior portion of the petiole which is long and stalk-like in some genera of ants. The peduncle articulates with the mesosoma.

**Petiole** - the single segment of the pedicel or the anterior segment in subfamilies that have two segments in the pedicel. It is actually the second segment of the abdomen.

**Pheromone** - a chemical substance used for communication

between members of a species. Common examples would include the alarm pheromone which alerts others to a threat, trail pheromone, which attracts and guides workers to a food site, and the sexual pheromone which serves to attract males to females.

**Piligerous** - bearing hair.

**Pleometrosis** - situation in which two or more females participate in the formation of the same initial nest. They may continue to coexist or may fight and be reduced to a single female at a later time after the nest is well established.

**Pleural** - lateral section of a body part.

**Polydomous** - refers to a species in which a single colony occupies several nesting sites.

**Polyethism** - division of labor in workers. It can be based on age (younger workers responsible for nest activities, older ants responsible for foraging), or size

**Polygynous** - two or more reproducing females in a single nest. In a situation in which a single male mates with several females, it is simply referred to as multiple mating.

**Polymorphic** - refers to a situation in which ant workers are of several sizes or forms. See monomorphic and dimorphic.

**Porcate** - sculpture that consists of longitudinal and parallel raised lines.

**Postpetiole** - the second segment of the pedicel of ants which have a two segmented pedicel. It is actually the third abdominal segment.

**Promesonotal suture** - suture located between the pronotum and the mesonotum.

**Pronotum** - The dorsum of the first section of the mesosoma.

**Propodeum** - The posterior most part of the mesosoma, which is actually the first segment of the abdomen which has become fused with the thorax in ants and most other Hymenoptera. Two parts are extremely important for the identification of ants: the basal face or the dorsal surface, and the declining face, or the posterior, usually vertical surface.

**Prothorax** - first segment of mesosoma.

**Protuberance** - protruding bump on the surface.

**Proximal** - section closest to body, i.e. of an appendage (see distal).

**Pruinose** - covered with fine silvery hairs, giving the surface a frosted appearance.

**Psamphophore** - a beard of long hairs located at the underside of the head. This is commonly found in desert ants, especially those that live in sandy areas. The ants use it to carry "baskets" of small sand grains during excavation.

**Pubescence** - short, usually fine, appressed hairs covering a specific area of the body surface.

**Punctate** - sculpture marked by small, round depressions.

**Pygidium** - dorsal surface of the last exposed gastral segment.

**Queen** - egg laying female in nest.

**Queenright** - Colony with a queen, usually used to refer to a laboratory colony.

**Replete** - an inactive worker with a greatly distended gaster which is used for food storage. Occurs in *Myrmecocystus* and *Prenolepis*.

**Reticulate** - net-like sculpture,

**Rugae** - wrinkles on the surface of a specific structure. (ruga is singular).

**Rugulae** - small wrinkles.

**Rugulose** - with small wrinkles.

**Scale** - refers to a rudimentary, forward angled petiole in some genera of ants (i.e. *Tapinoma*).

**Scape** - The first segment of the antenna, which is elongated in ant workers (as well as females and most males).

**Scrobe** - a groove on the dorsum of the head which serves for the reception of the antennal scape.

**Sculpture** - the pattern of elevated and impressed surfaces on an ant.

**Sensu lato** - Latin for "in the wide sense", referring to the widest interpretation of a taxon, for example, arbitrarily including subspecies and varieties within a single species.

**Sensu stricto** - Latin for "in the strict sense", referring to the narrowest interpretation of a taxon, when subspecies or variety names could be used.

**Soldier** - a worker ant, which is much larger than normal workers and often has an enlarged head. Often their function is not that of a soldier. For example, soldiers of *Pheidole* are often the first to hide and workers are more involved in defense of the nest. The function of the soldiers in this genus may be to break larger seeds.

**Spatulate** - spoon shaped.

**Spine** - a thorn-like outgrowth of the body, often located on the propodeum.

**Spongiform** - resembling a sponge, soft and porous, poorly defined mass surrounding the petiole and postpetiole of the ants of the tribe Dacetini (*Strumigenys*).

**Spur** - Stiff, sharp projection located on the distal surface of the tibia.

**Sting** - spine-like organ located at the apex of the gaster and is used for defense in ant workers.

**Sternum** - ventral section of a structure, especially of the mesosoma.

**Stria** - fine raised line on the surface of specimen. Pleural is striae.

**Striate** - possessing striae.

**Stridulation** - production of sound produced by friction between two body parts. Used for communication, especially when a worker alerts others that she is buried.

**Subappressed** - refers to hairs, which are about 45° with the body surface.

**Subequal** - almost equal in length or size to another structure.

**Suberect** - not quite upright, at between 44 -90°.

**Subopaque** - nearly opaque but with a slight luster.

**Sulcus** - a furrow or groove. Pleural is sulci.

**Suture** - a elongate depression, usually located at the juncture of two body sections.

**Tarsus** - The ultimate part of the leg, consisting of several segments and two tarsal claws. Pleural is tarsi.

**Tergum** - dorsum of each segment, usually refers to the gaster. Pleural is terga.

**Tergite** - dorsum of a segment, usually used when only 1 sclerite is involved.

**Thorax** - the generalized middle section of an insect. In ants, it is referred to as either the mesosoma or alitrunk, and includes the propodeum, which is actually the first segment of the abdomen. Thus it should not be referred to as the thorax.

**Trophallaxis** - the interchange of food between individual ants. These liquids are stored in the crop, which is located inside the gaster.

**Type** - a specimen chosen to represent a species. It could be any of a number of forms, including holotype, paratype and lectotype, among many others.

**Type locality** - location where the specimen or series were collected, which were used to describe the species.

**Ventral** - refers to the underside of a structure.

**Voucher specimen** - a specimen (usually a series of several specimens) which is (are) deposited in a museum, as part of an ecological, behavioral or other study. It can be referred to if there is any question concerning the identity of the specimens. The deposition of voucher specimens is an essential part of any scientific investigation.

**Worker** - a normally non-reproductive member of the colony which is responsible for nest activities such as nest excavation, foraging, brood care, etc.

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## **APPENDIX 1.**

Field notebook pages. Put your name in the upper left-hand corner, and enlarge by 130% for standard field notebooks.



Mackay

Locality: \_\_\_\_\_ Number \_\_\_\_\_

Latitude: \_\_\_\_\_ ° \_\_\_\_\_ ' \_\_\_\_\_ " N Longitude: \_\_\_\_\_ ° \_\_\_\_\_ ' \_\_\_\_\_ " W

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Elevation: \_\_\_\_\_ m

BL = blacklight, L = log, LG = loose on ground, LV = loose on vegetation, M = under/in manure, R = under rock, S = nest in soil, St = nest in stump, T = twig, Tr = nest in tree, trunk or branch of tree, e = eggs, l = larvae, p = pupae, c = callows, f=females, m=males, A = aggressive, H = hide,

\* = \_\_\_\_\_ \*\* = \_\_\_\_\_

Level=surface flat, SFS=south facing slope, NFS=north facing slope, EFS=east facing sl., WFS=west facing sl.  
 Pitfall trap / hr. Surface bait / hr. Vegetation bait / hr. Subterranean baits / hr. Litter / hrs extra

| # | Nest site                                | Position                             | Blood            | Sexuals | Behavior | See | Deposit-<br>ion                                       | Species |
|---|--|--------------------------------------|------------------|---------|----------|-----|---|---------|
|   | R S<br>LG LV<br>M St T<br>L Tr<br>BL *** | Level,<br>SFS<br>NFS,<br>EFS,<br>WFS | e<br>l<br>p<br>c | f<br>m  | A<br>H   | 1   | ____ pinned<br>few, some<br>many or<br>____ in<br>ROH |         |
|   | R S<br>LG LV<br>M St T<br>L Tr<br>BL *** | Level,<br>SFS<br>NFS,<br>EFS,<br>WFS | e<br>l<br>p<br>c | f<br>m  | A<br>H   | 2   | ____ pinned<br>few, some<br>many or<br>____ in<br>ROH |         |
|   | R S<br>LG LV<br>M St T<br>L Tr<br>BL *** | Level,<br>SFS<br>NFS,<br>EFS,<br>WFS | e<br>l<br>p<br>c | f<br>m  | A<br>H   | 3   | ____ pinned<br>few, some<br>many or<br>____ in<br>ROH |         |
|   | R S<br>LG LV<br>M St T<br>L Tr<br>BL *** | Level,<br>SFS<br>NFS,<br>EFS,<br>WFS | e<br>l<br>p<br>c | f<br>m  | A<br>H   | 4   | ____ pinned<br>few, some<br>many or<br>____ in<br>ROH |         |
|   | R S<br>LG LV<br>M St T<br>L Tr<br>BL *** | Level,<br>SFS<br>NFS,<br>EFS,<br>WFS | e<br>l<br>p<br>c | f<br>m  | A<br>H   | 5   | ____ pinned<br>few, some<br>many or<br>____ in<br>ROH |         |
|   | R S<br>LG LV<br>M St T<br>L Tr<br>BL *** | Level,<br>SFS<br>NFS,<br>EFS,<br>WFS | e<br>l<br>p<br>c | f<br>m  | A<br>H   | 6   | ____ pinned<br>few, some<br>many or<br>____ in<br>ROH |         |
|   | R S<br>LG LV<br>M St T<br>L Tr<br>BL *** | Level,<br>SFS<br>NFS,<br>EFS,<br>WFS | e<br>l<br>p<br>c | f<br>m  | A<br>H   | 7   | ____ pinned<br>few, some<br>many or<br>____ in<br>ROH |         |
|   | R S<br>LG LV<br>M St T<br>L Tr<br>BL *** | Level,<br>SFS<br>NFS,<br>EFS,<br>WFS | e<br>l<br>p<br>c | f<br>m  | A<br>H   | 8   | ____ pinned<br>few, some<br>many or<br>____ in<br>ROH |         |
|   | R S<br>LG LV<br>M St T<br>L Tr<br>BL *** | Level,<br>SFS<br>NFS,<br>EFS,<br>WFS | e<br>l<br>p<br>c | f<br>m  | A<br>H   | 9   | ____ pinned<br>few, some<br>many or<br>____ in<br>ROH |         |
|   | R S<br>LG LV<br>M St T<br>L Tr<br>BL *** | Level,<br>SFS<br>NFS,<br>EFS,<br>WFS | e<br>l<br>p<br>c | f<br>m  | A<br>H   | 10  | ____ pinned<br>few, some<br>many or<br>____ in<br>ROH |         |

|                             |  |                      |                             |                 |                       |                             |                             |                           |                      |            |                                 |        |                                 |                         |                    |              |                                      |            |                          |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |
|-----------------------------|--|----------------------|-----------------------------|-----------------|-----------------------|-----------------------------|-----------------------------|---------------------------|----------------------|------------|---------------------------------|--------|---------------------------------|-------------------------|--------------------|--------------|--------------------------------------|------------|--------------------------|-------|------------------------|------|------------------------|--------|-------------------|--|---------------|--|--------------------------------|--|-----------|--|----------------------------|--|--|--|--|
| Mackay                      | <b>Field Trip supplies checklist</b>   |                      |                             |                 |                       |                             |                             |                           |                      |            |                                 |        |                                 |                         |                    |              |                                      |            |                          |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |
| <b>Notes:</b>               | <b>First Priority:</b>   |                      |                             |                 |                       |                             |                             |                           |                      |            |                                 |        |                                 |                         |                    |              |                                      |            |                          |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |
|                             | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 33%; padding: 2px;">Vials, alcohol, jars</td><td style="width: 33%; padding: 2px;">Sleeping bag &amp; ground cloth</td></tr> <tr><td style="padding: 2px;">Field bag</td><td style="padding: 2px;">Money (amount? _____)</td></tr> <tr><td style="padding: 2px;">Field notebook, pen, pencil</td><td style="padding: 2px;">Long sleeve shirt / T-shirt</td></tr> <tr><td style="padding: 2px;">Ant books, waterproof pen</td><td style="padding: 2px;">Toilet paper, shovel</td></tr> <tr><td style="padding: 2px;">Pick</td><td style="padding: 2px;">Boots, long pants</td></tr> <tr><td style="padding: 2px;">Trowel</td><td style="padding: 2px;">Food, water, ice, fuel, matches</td></tr> <tr><td style="padding: 2px;">Forceps (+ extra pairs)</td><td style="padding: 2px;">Prescription drugs</td></tr> <tr><td style="padding: 2px;">Saw, Pruners</td><td style="padding: 2px;">Flashlight (+ batteries, extra bulb)</td></tr> <tr><td style="padding: 2px;">Blacklight</td><td style="padding: 2px;">Jacket (or coat, gloves)</td></tr> <tr><td style="padding: 2px;">Knife</td><td style="padding: 2px;">Identification (Visa?)</td></tr> <tr><td style="padding: 2px;">Lens</td><td style="padding: 2px;">Soap, toothbrush, etc.</td></tr> <tr><td style="padding: 2px;">Camera</td><td style="padding: 2px;">Change of clothes</td></tr> <tr><td style="padding: 2px;"></td><td style="padding: 2px;">First aid kit</td></tr> <tr><td style="padding: 2px;"></td><td style="padding: 2px;">Hat, sunglasses, suntan lotion</td></tr> <tr><td style="padding: 2px;"></td><td style="padding: 2px;">Beverages</td></tr> <tr><td style="padding: 2px;"></td><td style="padding: 2px;">Utensils, cups etc., stove</td></tr> <tr><td style="padding: 2px;"></td><td style="padding: 2px;"></td></tr> <tr><td style="padding: 2px;"></td><td style="padding: 2px;"></td></tr> </table> | Vials, alcohol, jars | Sleeping bag & ground cloth | Field bag       | Money (amount? _____) | Field notebook, pen, pencil | Long sleeve shirt / T-shirt | Ant books, waterproof pen | Toilet paper, shovel | Pick       | Boots, long pants               | Trowel | Food, water, ice, fuel, matches | Forceps (+ extra pairs) | Prescription drugs | Saw, Pruners | Flashlight (+ batteries, extra bulb) | Blacklight | Jacket (or coat, gloves) | Knife | Identification (Visa?) | Lens | Soap, toothbrush, etc. | Camera | Change of clothes |  | First aid kit |  | Hat, sunglasses, suntan lotion |  | Beverages |  | Utensils, cups etc., stove |  |  |  |  |
| Vials, alcohol, jars        | Sleeping bag & ground cloth  |                      |                             |                 |                       |                             |                             |                           |                      |            |                                 |        |                                 |                         |                    |              |                                      |            |                          |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |
| Field bag                   | Money (amount? _____)  |                      |                             |                 |                       |                             |                             |                           |                      |            |                                 |        |                                 |                         |                    |              |                                      |            |                          |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |
| Field notebook, pen, pencil | Long sleeve shirt / T-shirt  |                      |                             |                 |                       |                             |                             |                           |                      |            |                                 |        |                                 |                         |                    |              |                                      |            |                          |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |
| Ant books, waterproof pen   | Toilet paper, shovel   |                      |                             |                 |                       |                             |                             |                           |                      |            |                                 |        |                                 |                         |                    |              |                                      |            |                          |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |
| Pick                        | Boots, long pants  |                      |                             |                 |                       |                             |                             |                           |                      |            |                                 |        |                                 |                         |                    |              |                                      |            |                          |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |
| Trowel                      | Food, water, ice, fuel, matches  |                      |                             |                 |                       |                             |                             |                           |                      |            |                                 |        |                                 |                         |                    |              |                                      |            |                          |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |
| Forceps (+ extra pairs)     | Prescription drugs   |                      |                             |                 |                       |                             |                             |                           |                      |            |                                 |        |                                 |                         |                    |              |                                      |            |                          |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |
| Saw, Pruners                | Flashlight (+ batteries, extra bulb)   |                      |                             |                 |                       |                             |                             |                           |                      |            |                                 |        |                                 |                         |                    |              |                                      |            |                          |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |
| Blacklight                  | Jacket (or coat, gloves)   |                      |                             |                 |                       |                             |                             |                           |                      |            |                                 |        |                                 |                         |                    |              |                                      |            |                          |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |
| Knife                       | Identification (Visa?)   |                      |                             |                 |                       |                             |                             |                           |                      |            |                                 |        |                                 |                         |                    |              |                                      |            |                          |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |
| Lens                        | Soap, toothbrush, etc.   |                      |                             |                 |                       |                             |                             |                           |                      |            |                                 |        |                                 |                         |                    |              |                                      |            |                          |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |
| Camera                      | Change of clothes  |                      |                             |                 |                       |                             |                             |                           |                      |            |                                 |        |                                 |                         |                    |              |                                      |            |                          |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |
|                             | First aid kit  |                      |                             |                 |                       |                             |                             |                           |                      |            |                                 |        |                                 |                         |                    |              |                                      |            |                          |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |
|                             | Hat, sunglasses, suntan lotion   |                      |                             |                 |                       |                             |                             |                           |                      |            |                                 |        |                                 |                         |                    |              |                                      |            |                          |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |
|                             | Beverages  |                      |                             |                 |                       |                             |                             |                           |                      |            |                                 |        |                                 |                         |                    |              |                                      |            |                          |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |
|                             | Utensils, cups etc., stove   |                      |                             |                 |                       |                             |                             |                           |                      |            |                                 |        |                                 |                         |                    |              |                                      |            |                          |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |
|                             |  |                      |                             |                 |                       |                             |                             |                           |                      |            |                                 |        |                                 |                         |                    |              |                                      |            |                          |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |
|                             |  |                      |                             |                 |                       |                             |                             |                           |                      |            |                                 |        |                                 |                         |                    |              |                                      |            |                          |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |
| <b>Notes:</b>               | <b>Second Priority:</b>  |                      |                             |                 |                       |                             |                             |                           |                      |            |                                 |        |                                 |                         |                    |              |                                      |            |                          |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |
|                             | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 33%; padding: 2px;">Bait traps</td><td style="width: 33%; padding: 2px;">Extra shoes and socks</td></tr> <tr><td style="padding: 2px;">Bags for litter</td><td style="padding: 2px;">Shorts / cut-offs</td></tr> <tr><td style="padding: 2px;">Canteen</td><td style="padding: 2px;">Pillow, extra blankets</td></tr> <tr><td style="padding: 2px;">Calculator</td><td style="padding: 2px;"></td></tr> <tr><td style="padding: 2px;">Binoculars</td><td style="padding: 2px;">Folding chair, Novel / Magazine</td></tr> <tr><td style="padding: 2px;">Cot</td><td style="padding: 2px;">Swimming suit</td></tr> <tr><td style="padding: 2px;">Folding table</td><td style="padding: 2px;">Snacks</td></tr> <tr><td style="padding: 2px;"></td><td style="padding: 2px;">Towel, washcloth</td></tr> <tr><td style="padding: 2px;"></td><td style="padding: 2px;">Tent, lantern</td></tr> <tr><td style="padding: 2px;"></td><td style="padding: 2px;"></td></tr> <tr><td style="padding: 2px;"></td><td style="padding: 2px;"></td></tr> </table>   | Bait traps           | Extra shoes and socks       | Bags for litter | Shorts / cut-offs     | Canteen                     | Pillow, extra blankets      | Calculator                |                      | Binoculars | Folding chair, Novel / Magazine | Cot    | Swimming suit                   | Folding table           | Snacks             |              | Towel, washcloth                     |            | Tent, lantern            |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |
| Bait traps                  | Extra shoes and socks  |                      |                             |                 |                       |                             |                             |                           |                      |            |                                 |        |                                 |                         |                    |              |                                      |            |                          |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |
| Bags for litter             | Shorts / cut-offs  |                      |                             |                 |                       |                             |                             |                           |                      |            |                                 |        |                                 |                         |                    |              |                                      |            |                          |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |
| Canteen                     | Pillow, extra blankets   |                      |                             |                 |                       |                             |                             |                           |                      |            |                                 |        |                                 |                         |                    |              |                                      |            |                          |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |
| Calculator                  |  |                      |                             |                 |                       |                             |                             |                           |                      |            |                                 |        |                                 |                         |                    |              |                                      |            |                          |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |
| Binoculars                  | Folding chair, Novel / Magazine  |                      |                             |                 |                       |                             |                             |                           |                      |            |                                 |        |                                 |                         |                    |              |                                      |            |                          |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |
| Cot                         | Swimming suit  |                      |                             |                 |                       |                             |                             |                           |                      |            |                                 |        |                                 |                         |                    |              |                                      |            |                          |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |
| Folding table               | Snacks   |                      |                             |                 |                       |                             |                             |                           |                      |            |                                 |        |                                 |                         |                    |              |                                      |            |                          |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |
|                             | Towel, washcloth   |                      |                             |                 |                       |                             |                             |                           |                      |            |                                 |        |                                 |                         |                    |              |                                      |            |                          |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |
|                             | Tent, lantern  |                      |                             |                 |                       |                             |                             |                           |                      |            |                                 |        |                                 |                         |                    |              |                                      |            |                          |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |
|                             |  |                      |                             |                 |                       |                             |                             |                           |                      |            |                                 |        |                                 |                         |                    |              |                                      |            |                          |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |
|                             |  |                      |                             |                 |                       |                             |                             |                           |                      |            |                                 |        |                                 |                         |                    |              |                                      |            |                          |       |                        |      |                        |        |                   |  |               |  |                                |  |           |  |                            |  |  |  |  |



Fig. 1. A small hand saw and a collapsible saw for use in the field.

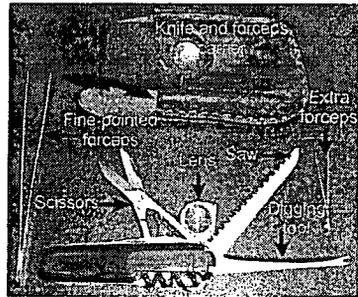


Fig. 2. Examples of forceps and knife used for field work. The forceps fit in the leather carrier, as indicated by the arrow.

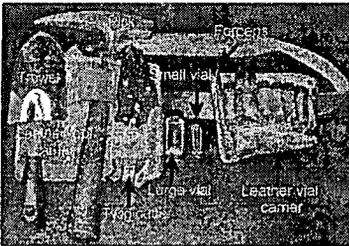


Fig. 3. Field tools for collecting ants.



Fig. 4. Two sizes of hand-made field bags.

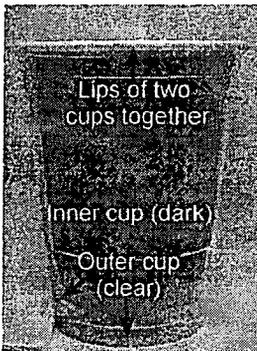


Fig. 5. Pitfall trap made of two plastic cups.



Fig. 6. Examples of plastic bottles which can be reused for field work. The bottles used for refilling printer cartridges are excellent for injecting alcohol into twigs containing ants.

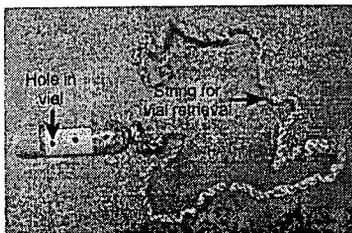


Fig. 7. Vial used for bait trap.

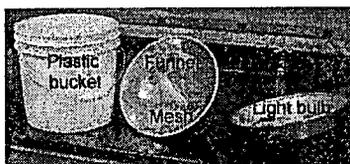


Fig. 8. Berlese funnel.

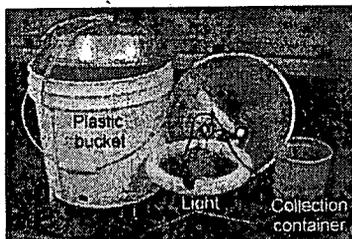


Fig. 9. black light trap.

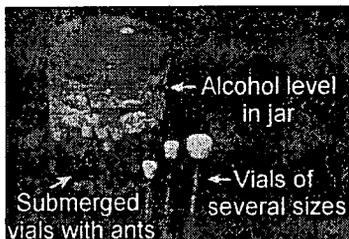


Fig. 11. Vials containing specimens, which are stored in a larger jar.



Fig. 353. A thatched nest of a member of the *Formica rufa* group.

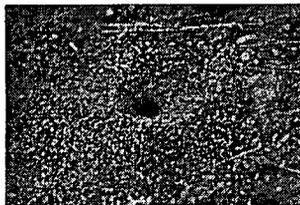


Fig. 434. Nest of *Myrmecocystus* sp., showing the large entrance hole.

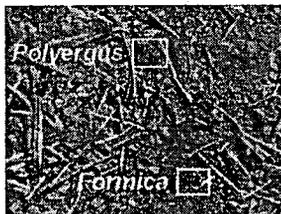


Fig. 451. Mixed nest of *Polyergus* and a species of *Formica* of the *rufa* group.

Plate 2. Figs. 7-9, 11, 353, 434, & 451



