A NEW SPECIES OF ANT (HYMENOPTERA: FORMICIDAE) FROM NORTH FLORIDA[1]

Mark. Deyrup[2], David Lubertazzi[3]

ABSTRACT: A new species of dacetine ant, *Pyramica apalachicolensis*, is described. Specimens were found in poorly drained, fire-maintained flatwoods with an open canopy of large pines and dense herbaceous ground cover in the Apalachicola National Forest of Florida. Diagnostic features of the species are the cuneiform head, the conspicuous mandibular diastema, and the long, fine, sparse, suberect, slightly recurved clypeal hairs. It is generally similar to several of the other 26 species of *Pyramica* native to southeastern North America.

The genus *Pyramica* includes 26 described native species in southeastern North America, which is apparently a center of distribution of Arctotertiary elements of the genus (Deyrup and Cover 1998). It is the most speciose genus of southeastern ants, but the small size (workers are about 2mm in length) and cryptic habits of the species guarantee their obscurity. There is no satisfactory way to survey for these ants: they can be found by minutely examining leaf litter, or by extraction with a Berlese funnel or a similar device, but processing large quantities of leaf litter in these ways is a laborious process. Scarce species and those that occur in some unknown special microhabitat are likely to be overlooked. The species described below may be a good example of a species that has escaped notice by occurring in an unlikely habitat. It was discovered during a study of ant assemblages in low pine flatwoods, a habitat that is prone to both fire and flooding, phenomena inimical to most litter-inhabiting ants. Two specimens were found in pitfall traps, and an intensive search of the area around these pitfall traps yielded a nest with 332 individuals.

For a formal diagnosis of the genus *Pyramica* and the reasons for placing the genus *Smithistruma* in synonymy with *Pyramica* see Bolton 1999. For a key to the genera of Nearctic ants, see Hölldobler and Wilson (1990); in this key most members of the genus *Pyramica* will key out to *Smithistruma*.

Pyramica apalachicolensis Deyrup and Lubertazzi, NEW SPECIES

Diagnosis. Distinguished from all other Nearctic *Pyramica* by the following combination of character states: head with preocular laminae convergent distally, so head in frontal view roughly cuneiform; mandibles with a conspicuous diastema between the triangular basal tooth and the subapical series of teeth; marginal and discal hairs of clypeus sparse, long, filiform, slightly recurved.

[1] Received March 28, 2000. Accepted June 12, 2000.

[2] Archbold Biological Station, P.O. Box 2057, Lake Placid, FL 33862.

[3] University of Connecticut, 75 North Eagleville Rd., U-43, Storrs, CT 06269-3043.

Description. Holotype worker. Measurements in mm: total length: 2.11; head length: 0.65; maximum head width: 0.33; length of mesosoma: 0.53.

Features described below as in Fig. 1. Head in frontal view with preocular laminae convergent distally and clypeus narrow, so head in frontal view roughly cuneiform. Mandibular diastema conspicuous at full closure; mandibular apices strongly decurved in lateral view; mandible (as in Fig. 2) with a triangular basal tooth, two large subequal subapical teeth, followed by two teeth about one half the length of the first pair, followed by an indistinct series of vestigial teeth. Clypeus about as long as wide, finely reticulate, with sparse erect, somewhat recurved filiform hairs in marginal, submarginal, antesubmarginal series, each hair rising from a small tubercle. Antennal scapes with proclinate, curved, unmodified hairs. Frontal and occipital areas with suberect curved hairs that appear in lateral view similar in length and type to those on the clypeus; a pair of long, irregularly curved, filiform hairs on the edge of the antennal scrobe above the eyes, on the sides of the occipital lobes, and on the tops of the occipital lobes. Head and body without any spatulate or spoon-shaped hairs, though the larger, proclinate,

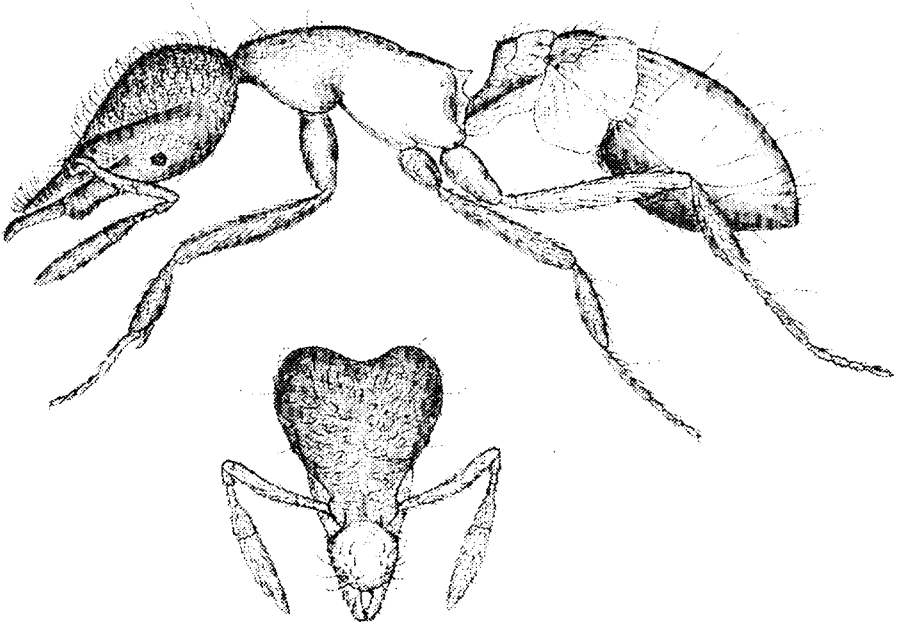

Figure 1. *Pyramica apalachicolensis*, new sp., worker

Figure 2. *Pyramica apalachicolensis*, new sp., right mandible of worker

curved hairs on the femora and tibiae are slightly flattened, so that they shine under illumination. Pronotum reticulate, with two pairs of long, irregularly curved, filiform hairs on a pair of weak carinae along the lateral margins of the pronotal disc; remainder of mesosoma reticulate dorsally, shining along sides. Propodeal teeth short, triangular; infradental laminae conspicuously emarginate above. Mid and hind tibiae and basitarsi with a long, irregularly curved, filiform hair at proximal third of length. Petiole and postpetiole finely reticulate; infrapetiolar lamina gradually emarginate medially; lower postpetiolar spongiform process large, extending length of basal face of first sternite of gaster; gaster shining, with sparse, long, irregularly curved, filiform, erect hairs.

Paratype female. Measurements in mm: Total length: 2.43; head length: 0.67; maximum head width: 0.40; length of mesosoma: 0.62; length of forewing: 2.12.
Paratypes. Paratype material is 213 workers and 27 alate females.
Collecting data for type material. All type material is from the same site: FLORIDA: Leon County, Apalachicola National Forest, off Forest Service Road 373, T1S, R2W, S19; pine flatwoods habitat, stand of *Pinus palustris* Mill. All specimens collected by D. Lubertazzi. Two specimens collected in pitfall traps, 21 July 1997; remaining specimens collected from nest in soil, 20 September 1997.
Deposition of type material. Holotype, 36 paratypes: Museum of Comparative Zoology, Harvard University, Cambridge, Mass.; 20 paratypes: National Museum of Natural History, Smithsonian Institution, Washington, D.C.; 20 paratypes: The Natural History Museum, London; 20 paratypes: Los Angeles County Museum of Natural History; 12 paratypes: Florida State Collection of Arthropods, Gainesville, Florida; 20 paratypes: arthropod collection, Archbold Biological Station, Lake Placid, Florida; remaining paratypes: temporarily housed in the collection at Archbold Biological Station.

Etymology. This species is named for the Apalachicola National Forest, which is the type locality and the only area from which the species has been recorded.

Assignment in the Genus *Pyramica*. The closest relatives of the species described above are undoubtedly members of a group of species formerly placed in the genus *Smithistruma*, especially the apparent Arctotertiary relicts of North America and temperate East Asia. In Bolton's 1999 revision of the Dacetonini the genus *Smithistruma* is combined with 17 other genera in the genus *Pyramica*. Bolton's work contains so much detailed examination of specimens (many representing undescribed species) and such thoughtful analysis of character states that we must gratefully accept its conclusions. Nevertheless, further work is likely to destabilize *Pyramica*, a genus so heterogeneous as to verge on an oxymoronic genus concept. The divergence between species such as *Pyramica eggersi* (Emery) and *Pyramica membranifera* (Emery) is so extreme, and in all likelihood so ancient, that the genus *Pyramica* will probably require some disassembly to maintain the utility and consistency of generic concepts within the ants. For the moment, however, it seems best to assign *apalachicolensis* to *Pyramica*, even though its relationship to the type species of *Smithistruma* and the relatively early establishment of the latter genus suggest that it could easily end up in some revised version of *Smithistruma*.

DISCUSSION

Similar species. In Brown's 1953 key to the North American species of *Smithistruma* north of Mexico, *P. apalachicolensis* specimens cannot be readily taken past couplet past couplet 10, which separates species with a wedge-shaped head and no conspicuous mandibular diastema from species that do not have a wedge-shaped head and do have a conspicuous mandibular diastema. *Pyramica apalachicolensis*, and another recently described species, *P. archboldi* (Deyrup and Cover) (1998), have both the wedge-shaped head and the conspicuous mandibular diastema. The clypeal pilosity of *P. archboldi* is not suberect and filiform, but proclinate and narrowly spatulate. If one were to de-emphasize the shape of the head, *P. apalachicolensis* would easily key to *P. filitalpa* (Brown) in Brown's treatment; while the two species are similar, the clypeal pilosity is different (Fig. 3), and the mandibular dentition is also different, according to the description of the mandibles of *P. filitalpa* (Brown 1953). If one were to ignore the mandibular diastema, *P. apalachicolensis* would key to *P. laevinasis* (M. R. Smith), but the latter species has much denser clypeal pilosity, with the hairs not suberect. (Fig. 4). As indicated by these disparities between *P. apalachicolensis* and other species, this new species does not fit into the provisional species groups in Brown's 1953 work, falling somewhere between the *clypeata* group and the *talpa* group.

Notes on habitat. The large nest series and two collections of stray specimens were in open, low pine flatwoods (for a discussion of Florida pine flatwoods, see Myers and Ewel 1990). The open, sparsely forested character of this habitat is maintained by frequent fires (about every 4-15 years). Before European settlement of Florida, fires were probably caused by summer thunderstorms, but the fragmentation of the landscape now requires fire management by national forest personnel to prevent the development of unnaturally dense hardwood forest and thickets over much of the flatwoods habitat. The fires remove much of the standing vegetation, except pines, and most of the ground litter. The water table is high, and in the summer rainy season the soil may become flooded or saturated for a few days or weeks. In such habitats we usually find dacetine ants, including *Strumigenys louisianae* Roger and several species of *Pyramica*, confined to patches that escape burning along the edges of streams or swamps, or more rarely in large grass tussocks or in the thick layers of bark at the bases of large pines.

The nest was in an area with scattered *Pinus palustris*, shrubs (*Ilex glabra* (L.) Gray, *Quercus minima* (Sarg.) Small, *Serenoa repens* (Bartr.) Small, *Lyonia fruticosa* (Mich.) G. S. Torr.), and herbaceous plants (*Aristida beyrichiana* Trin. & Rupr., *Pteridium aquilinum* (L.) Kuhn, *Balduina uniflora* Nutt., *Seymeria cassioides* (G. F. Gmel.) S. F. Blake, *Sabatia brevifolia* Raf., *Aster tortifolius* L.). The soil type was Leon sand.

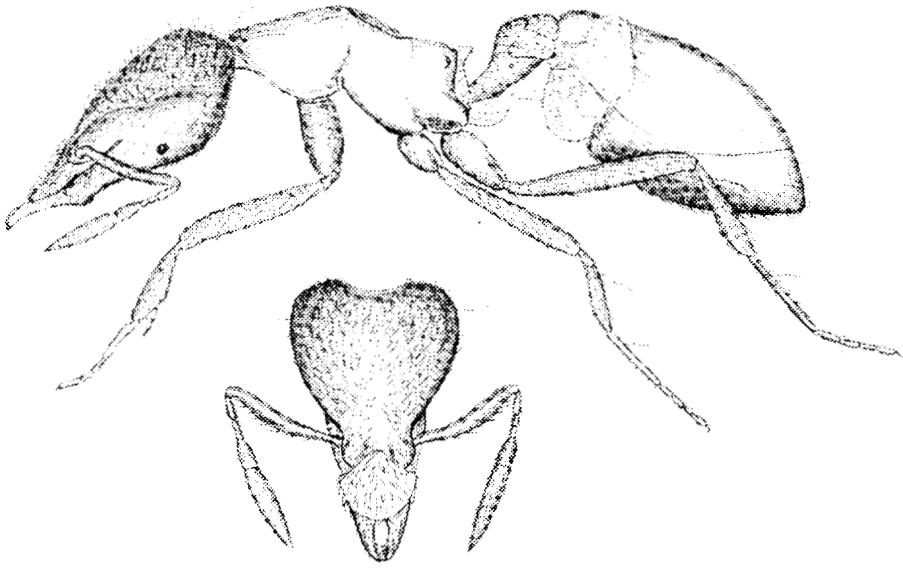

Figure 3. *Pyramica filitalpa* (Brown), worker

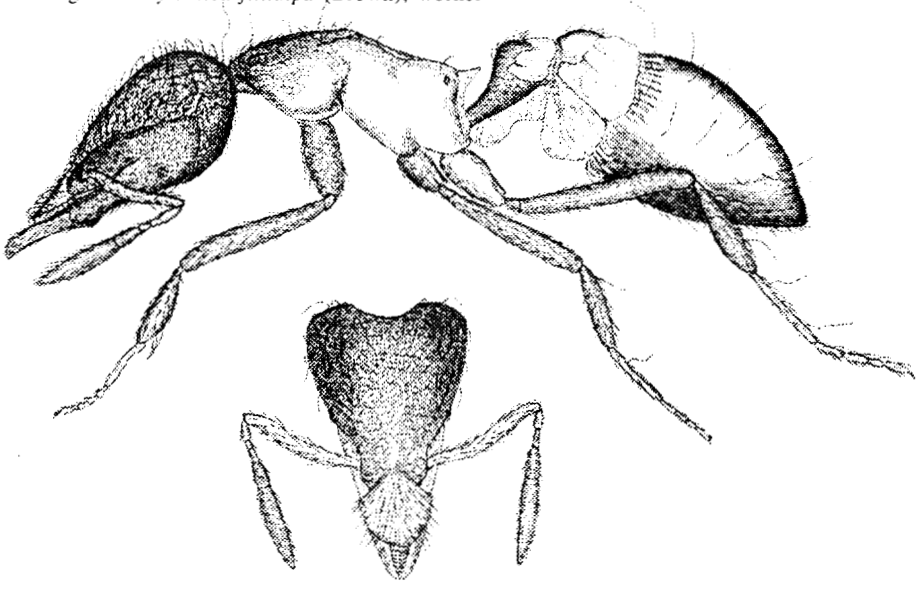

Figure 4. *Pyramica laevinasis* (M. R. Smith), worker

With over 300 individuals, the nest is the most populous *Pyramica* nest the authors have seen in Florida. It is tempting to relate this to some habitat feature, such as a scarcity of suitable nest sites or a lack of competition from other dacetines, but it is possible that this nest was abnormally large for the species; only additional field research could clarify this.

General comments on southeastern *Pyramica*. With the description of *P. apalachicolensis*, there are now 27 native species of *Pyramica* known from the southeastern United States. Almost all of these species can be identified by species-specific, highly consistent elaborations of the clypeus and the clypeal hairs, and often by elaborations of the mandibles as well. Nobody knows enough about the natural history of these *Pyramica* to explain the details of this remarkable diversity. In a more general way, the evolution of morphological peculiarities in *Pyramica* and related genera can be understood by perusing Brown and Wilson's classic paper on the subject (1959). The jaws of these ants can be cocked back and held open by a catch, which can be released to allow the jaws to snap shut with great speed. This allows these ants to capture small but speedy subterranean invertebrates, especially springtails (Collembola), whose escape mechanism involves a spring-loaded appendage that allows them to leap away faster than anything other than the spring-loaded jaws of a specialized ant. One might assume that the specific differences in the length of the jaws and the configuration of their teeth might reflect specialized prey preferences, but there is no observational evidence of this, and even the significance of major features, such as the presence or absence of the mandibular diastema, is unclear. There is the additional confounding factor that the teeth should mesh when they snap shut empty, so any change in dentition that evolves in relation to prey capture must be matched by a certain amount of repositioning that has nothing to do with predation.

The types and patterns of modified hairs on the clypeus are even more inscrutable. Brown and Wilson tentatively suggest (1959) that these hairs might be tactile lures or tactile "camouflage." There is the additional possibility that the modified hairs might dispense attractive chemicals. In the forty years since the lure hypothesis was proposed nobody has looked at the biology of dacetines in enough detail for corroboration; these are, after all, extremely small ants that have no economic importance and live in total obscurity in a fantastically complex environment. Nonetheless, the lure hypothesis is intuitively convincing, and one thinks immediately of a set of fishermen who fish the same lake, each with his favorite lure, one with rubber worms, one with shiner spoons, one with pop-up frogs, all of which work with varying and unpredictable degrees of success depending upon which fish are swimming by and biting. Working out the adaptive significance of the jaws and hairs of *Pyramica* and related genera should provide instructive enjoyment for several generations of myrmecologists.

ACKNOWLEDGMENTS

We thank Andrew Colaninno and Jim Ruhl of the Apalachicola National Forest for supporting the study of ants found in the forest. We are grateful to the managers past and present of the Apalachicola National Forest for their efforts in maintaining the natural habitats of the forest, with their vast assemblages of interesting organisms, including the ant described above. We thank Howard Horne for identifying plants, Mark Hollingsworth and Charlie Walker for their help in the field. We are particularly grateful to Walter Tschinkel for his encouragement and support of this and other myrmecological projects.

LITERATURE CITED

Bolton, B. 1999. Ant genera of the tribe Dacetonini (Hymenoptera: Formicidae). J. Nat. Hist. 33: 1639-1689.

Brown, W. L., Jr. 1953. Revisionary studies in the ant tribe Dacetini. Amer. Midland Nat. 50: 1-137.

Brown, W. L., Jr. and E. O. Wilson. 1959. The evolution of the dacetine ants. Quart. Rev. Biol. 34: 278-294.

Deyrup, M. and S. Cover. 1998. Two new species of *Smithistruma* Brown (Hymenoptera: Formicidae) from Florida. Proc. Entomol. Soc. Wash. 100: 214-221.

Hölldobler, B. and E. O. Wilson. 1990. The ants. Harvard Univ. Press, Cambridge, MA. 732 pp.

Myers, R. L., and T. T. Ewel. 1990. Ecosystems of Florida. Univ. Cent. Fl. Press, Orlando. 765 pp.