

A TAXONOMIC REVISION OF THE NEW WORLD *HYPOPONERA*  
SANTSCHI, 1938 (HYMENOPTERA: FORMICIDAE)

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## **Dedication**

To my mother Joyce Dash, as she was and is always encouraging of my exploits and understanding of my Naturalist's behaviors. My family was always loving and supportive though they have no idea what being a "bug doctor" means. A special recognition must be given to all of my teachers and professors, who did not let the system get them down, or be discouraged from the many stresses from students. I am where I am today because they guided me and introduced me to the path of the roving scholar. In addition, two major influences in my life who were professors, mentors, and friends: Charles Bartlett and Jake Bowman did so much to shape who I am and what I wish to become.





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by

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DISSERTATION

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## Abstract

The New World taxa of the pantropic ant genus *Hypoponera* (Ponerinae: Ponerini) is revised for the first time. The 55 previously recognized taxa have been evaluated using morphological and, when possible, ecological and biogeographical data to resolve taxon validity and species limits. Currently I recognize 42 species of *Hypoponera*, a number of which are new. I propose the following taxonomic outline: *Hypoponera agilis* (Borgmeier), *Hypoponera aliena* (F. Smith), *Hypoponera antoniensis* (Forel) stat. nov., *Hypoponera apateae* sp. nov., *Hypoponera capilosa* sp. nov., *Hypoponera clinei* sp. nov., *Hypoponera clavatula* (Emery) [= *fiebrigi* (Forel) syn. nov., = *neglecta* (Santschi) syn. nov.], *Hypoponera coveri* sp. nov., *Hypoponera creola* (Menozzi), *Hypoponera distinguenda* (Emery) [= *argentina* (Santschi) syn. nov., = *distinguenda dispar* (Santschi) syn. nov., = *distinguenda histrio* (Forel) syn. nov.], *Hypoponera faceta* (Menozzi) *incertae sedis*, *Hypoponera fallax* (Forel) stat. nov., *Hypoponera famini* (Forel) stat. nov., *Hypoponera fenestralis* (Gallardo) *incertae sedis*, *Hypoponera foeda* (Forel) [= *gracilicornis* (Menozzi) syn. nov.], *Hypoponera foreli* (Mayr), *Hypoponera gleadowi* (Forel), *Hypoponera idelettae* (Santschi), *Hypoponera iheringi* (Forel), *Hypoponera ignigera* (Menozzi), *Hypoponera impartergum* sp. nov., *Hypoponera inexorata* (Wheeler), *Hypoponera inexpedita* (Forel) stat. nov., *Hypoponera leninei* (Santschi), *Hypoponera leveillei* (Emery) comb. nov., *Hypoponera menozzii* (Santschi) *incertae sedis*, *Hypoponera nitidula* (Emery), *Hypoponera opaciceps* (Mayr) [= *opaciceps gaigei* (Forel) syn. nov., = *opaciceps postangustata* (Forel) syn. nov.], *Hypoponera opacior* (Forel) [= *opaciceps jamaicensis* (Aguayo) syn. nov., = *opacior chilensis* (Forel) junior syn.], *Hypoponera pampana* (Santschi) stat. nov. [= *opaciceps cubana* (Santschi) syn. nov.], *Hypoponera parva* (Forel) [= *reichenspergeri* (Santschi) syn. nov.], *Hypoponera perplexa* (Mann), *Hypoponera punctatissima* (Roger) [= *beebei* (Wheeler) syn. nov., = *ergatandria* (Forel) syn. nov.], *Hypoponera schmalzi* (Emery), *Hypoponera schwebeli* (Forel), *Hypoponera stoica* (Santschi), *Hypoponera subsarissa* sp. nov., *Hypoponera transiens* (Santschi) stat. nov., *Hypoponera trigona* (Mayr) [= *distinguenda vana* (Forel) syn. nov., = *trigona cauta* (Forel) syn. nov., = *collegiana* (Santschi) syn. nov., = *collegiana paranensis* (Santschi) syn. nov.], *Hypoponera vernacula* (Kempf) and *Hypoponera viri* (Santschi). All recognized species are illustrated and described with notes on natural

history and biogeography. Additionally, type images for these species are provided, serving as a photographic record. Also present is the first key to treat the New World species.

This assessment provides a framework that will aid in biodiversity surveys since *Hypoponera* is one of the most commonly collected ants in Neotropical regions. *Hypoponera* is a good candidate for conservation efforts because of the genus' importance in brown food webs, its abundance, and the fact that numerous species are known only from type localities. Additionally, distributional patterns suggest *Hypoponera* is limited to tropical and subtropical climates with limited ranges in temperate areas. When found in temperate areas, microhabitat selection favors warm areas. I propose the use of *Hypoponera* monitored in ant assemblages as a metric for evaluating the effects of climate change on ant communities. The revised taxonomy of the New World *Hypoponera* and the recent treatment of the African fauna is a major leap forward in understanding the diversity of *Hypoponera* and the Ponerinae as a whole.

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## Chapter 1: Introduction

### BACKGROUND

The Formicidae is a diverse hymenopterous taxon with more than 12,000 described species (Bolton et al. 2006). This family is considered a derived clade within the aculate superfamily Vespoidea, whose species are all eusocial (Grimaldi et al. 1997, Brothers 1999, Moreau et al. 2006). Ants are major components of terrestrial ecosystems; dominating habitats by their biomass (Hölldobler and Wilson 1990, Kaspari 2000), filling numerous niches, such as predators, granivores, mutualists and resource specialists (Hölldobler and Wilson 1990, LaSalle and Gauld 1993, Agosti et al. 2000). Furthermore, ants manipulate species composition, influence trophic interactions, possess numerous mutualistic and symbiotic relationships, and shape both the abiotic and biotic components of communities (Agosti et al. 2000).

Understanding ecological roles and documenting natural histories has mostly been afforded to pest, widespread, “interesting” or charismatic species. The red imported fire ant (*Solenopsis invicta*), for example, is the subject of numerous books and over 25,000 publications (Taber 2000, Tschinkel 2006), whereas related species of *Solenopsis* have few articles or only portions of monographs devoted to them (e.g., Tschinkel 2006, Pacheco 2007). Taxa that are common or of biological curiosity, such as the fungus-growing ants (Wheeler 1907, Weber 1937, 1938, 1966, 1970; Rabeling et al. 2007), army ants (Watkins 1982, 1985; Gotwald 1979, 1985, 1995; Brady 2003, Snelling and Snelling 2007) and harvester ants (Cole 1968, Hölldobler 1971, Taber 1990, 1998) have received comprehensive treatments. However, for the majority of ant species little more than a collection locality is known. Additionally, many genera have not received contemporary revisions, resulting in confused taxonomy and poorly documented biodiversity (Davidson et al. 2003, Armbrrecht et al. 2004). The majority of contemporary studies have focused on the evolutionary relationships of higher taxonomic categories (Shattuck 1992, Ward and Brady 2003, Astruc et al. 2004, Ward et al. 2005, Brady et al. 2006, Ward 2010), with limited attention devoted to particular genera.



One such genus that has very limited taxonomic work and no systematic study is *Hypoponera*. Often referred to as one of the most “confused” taxa, *Hypoponera* Santschi, 1938 is an obvious candidate for study. *Hypoponera* is often described as lacking any defining characters and being rather featureless. Longino (2010) related the genus to the potato in the Mr. Potato Head Game. The body forms are very similar to other ponerines so detailed study of meristic and morphometric parameters is required to accurately distinguish between species. Morphometric measurements are hypothesized as being important for revealing phylogenetically and taxonomically informative characters. However, even though *Hypoponera* species are very similar, noncongruent and distinct meristic characters such as sculpturing and pilosity are also informative. Because a contemporary taxonomic revision has not been attempted, species limits are unclear, variability of morphology has not been documented, validity of known taxa has not been tested, distributional patterns have not been explored, and collection of ecological data is lacking. The taxonomy is riddled with nebulous subspecies and varieties. Species described based on reproductives that are lacking worker associations in addition to the presence of intercastes have only added to the confusion of *Hypoponera*’s taxonomy.

Many ecological studies focused on ants found in leaf litter rarely denote species of *Hypoponera*, instead utilizing morphospecies groupings (e.g., King et al. 1998, Soares and Schoereder 2001, Berghoff et al. 2003, Theunis et al. 2005, Longino 2010, Calcaterra et al. 2010). Wild’s (2007b) study of the Paraguayan ant fauna found a number of taxa not assignable to known *Hypoponera* species. The lack of assigned species restricts future research as well as freezes the documentation and recording of natural history. This obstacle can be thought of as an “ignorance cycle” because taxonomy is so poor and thus so is the ecological data. Then the lack of ecological characters retards species discrimination, which in turn limits identification thereby continuing the cycle. Without accurate species determination, the accumulation of natural history is limited, as no information can be assigned to a particular species. This interrelationship of lost or ignored data and undefined species results in a further continuation of the cycle. A complete review of this genus is not only long overdue, but is crucial to understanding ant taxonomy and

ecology. Proper taxonomic keys and notes on biogeography will facilitate study of not only the genus *Hypoponera* but entire communities in which they are members.

This project represents the only alpha taxonomic analysis of the New World *Hypoponera*. Once species are recognized and evolutionary relationships are resolved, the door is open for more advanced studies. For example: How does localized high species richness relate to niche partitioning? Does the spread of tropical species into North America support theories of global climate change? What taxa may be of future concern with regards to pest status? The legacy of this revisionary study is the foundation for future research in ecology, evolution, and taxonomy. This research is guided by two domains of investigation: 1) Does the current taxonomy (Table 1) actually reflect species richness of *Hypoponera*? and 2) Can modern methodology produce a functional taxonomy? The resulting monograph represents a complete taxonomic assessment of the New World fauna.

**Table 1.** Specific and subspecific taxa of New World *Hypoponera* with country of type country.  
This table represents the alpha taxonomy as of 2005.

<i>H. agilis</i> (Borgmeier, 1934): Surinam	<i>H. inexorata fallax</i> (Forel, 1909): Guatemala
<i>H. aliena</i> (Smith, 1885): Brazil	<i>H. leninei</i> (Santschi, 1924): Brazil
<i>H. argentina</i> (Santschi, 1922): Argentina	<i>H. menozzii</i> (Santschi, 1932): Costa Rica
<i>H. beebei</i> (Wheeler, 1924): Ecuador	<i>H. neglecta</i> (Santschi, 1923): Brazil
<i>H. clavatula</i> (Emery, 1906): Argentina	<i>H. nitidula</i> (Emery, 1890): Costa Rica
<i>H. collegiana</i> (Santschi, 1924): Brazil	<i>H. opaciceps</i> (Mayr, 1887): Brazil
<i>H. collegiana paranensis</i> (Santschi, 1924): Brazil	<i>H. opaciceps cubana</i> (Santschi, 1930): Cuba
<i>H. creola</i> (Menozzi, 1931): Costa Rica	<i>H. opaciceps gaigei</i> (Forel, 1908): Colombia
<i>H. distinguenda</i> (Emery, 1890): Venezuela	<i>H. opaciceps pampana</i> (Santschi, 1925): Argentina
<i>H. distinguenda dispar</i> (Santschi, 1925): Brazil	<i>H. opaciceps postangustata</i> (Forel, 1914): Paraguay
<i>H. distinguenda histrio</i> (Forel, 1912): Brazil	<i>H. opaciceps jamaicensis</i> (Aguayo 1932): Jamaica
<i>H. distinguenda inexpedita</i> (Forel, 1911): Brazil	<i>H. opacior</i> (Forel 1893): West Indies
<i>H. distinguenda vana</i> (Forel, 1909): Guatemala	<i>H. parva</i> (Forel, 1909): Guatemala
<i>H. ergatandria</i> (Forel, 1895): West Indies	<i>H. perplexa</i> (Mann, 1922): Honduras
<i>H. faceta</i> (Menozzi, 1931): Costa Rica	<i>H. punctatissima</i> (Roger, 1859): Germany
<i>H. fenestralis</i> (Gallardo, 1918): Argentina	<i>H. reichenspergeri</i> (Santschi, 1923): Brazil
<i>H. fiebrigi</i> (Forel, 1908): Paraguay	<i>H. schmalzi</i> (Emery, 1896): Brazil
<i>H. fiebrigi antoniensis</i> (Forel, 1912): Colombia	<i>H. schmalzi fugitans</i> (Forel, 1912): Brazil
<i>H. fiebrigi famini</i> (Forel, 1912): Colombia	<i>H. schmalzi paulina</i> (Forel, 1913): Brazil
<i>H. fiebrigi transiens</i> (Santschi, 1925): Argentina	<i>H. schwebeli</i> (Forel, 1913): Brazil
<i>H. foeda</i> (Forel, 1893): West Indies	<i>H. stoica</i> (Santschi, 1912): Uruguay
<i>H. foreli</i> (Mayr, 1887): Brazil	<i>H. trigona</i> (Mayr, 1887): Brazil
<i>H. gleadowi</i> (Forel, 1895): India	<i>H. trigona cauta</i> (Forel, 1912): Brazil
<i>H. gracilicornis</i> (Menozzi, 1931): Costa Rica	<i>H. vernacula</i> (Kempf, 1962): Brazil
<i>H. idelettae</i> (Santschi, 1923): Brazil	<i>H. viri</i> (Santschi, 1923): Brazil
<i>H. ignigera</i> (Menozzi, 1927): Costa Rica	<i>H. wilsoni</i> (Santschi 1924): Brazil
<i>H. iheringi</i> (Forel, 1908): Brazil	
<i>H. inexorata</i> (Wheeler, 1903): USA	

## INTRODUCTION TO *HYPOPONERA*

### Taxonomy and Systematics

Santschi (1938) described *Hypoponera* as a subgenus of *Ponera* Latreille, 1804; the subgenus *Ponera* (*Ponera*) was defined as having a distinct mesometanotal suture ("suture mesoepinotale") and *Ponera* (*Hypoponera*) lacks this suture, with the type species designated as *Ponera* (*Hypoponera*) *abeillei* André, 1881 (Santschi 1938: 79). Taylor (1967) noted that the absence of an incised mesometanotal suture lacked any diagnostic value, as this character is variable across taxa but *Ponera* (*Hypoponera*) and *Ponera* (*Ponera*) can be separated by several other diagnostic morphological differences (Table 2). Taylor (1967) employed these characters to raise the subgenus (*Ponera* (*Hypoponera*)) to full generic status.

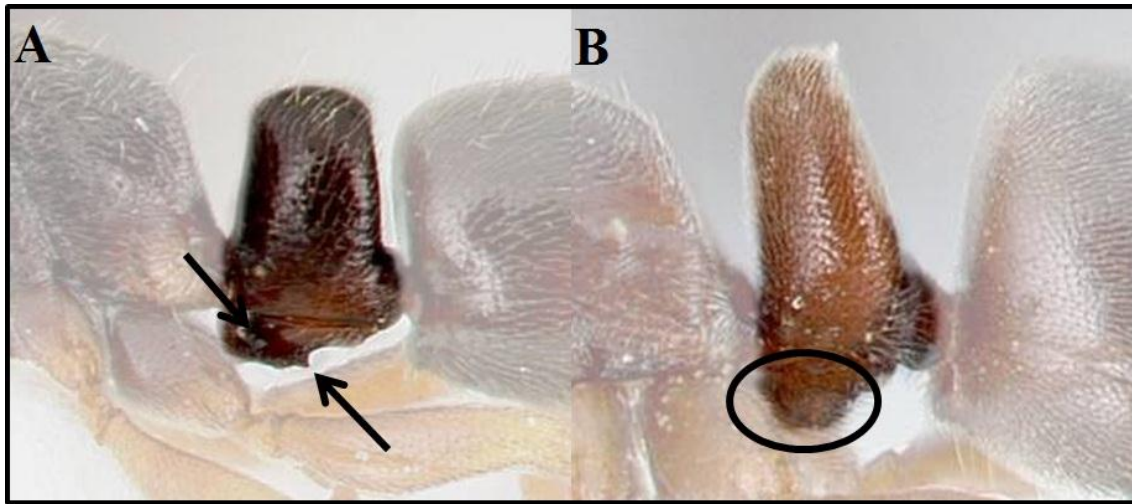
*Hypoponera* (Ponerinae: Ponerini) is comprised of small to medium sized ants ranging from 1–4 mm in length. This genus contains 138 nominative species-level taxa (including subspecies or varieties, 183 taxa comprise the genus) (Bolton et al. 2006). In *Ponera*, the subpetiolar process has a fenestra and a pair of posteriorly directed teeth, but in *Hypoponera* the subpetiolar process lacks both a fenestra and posterior teeth (Taylor 1967). I document, however, that a number of *Hypoponera* species have a fenestra (ex: *H. reichenspergeri* (Santschi, 1923), *H. perplexa* (Mann, 1922), *H. pruinosa* (Emery, 1900), and *H. zwaluwenburgi* (Wheeler, 1933)). No species of *Hypoponera* have paired posterolateral teeth on the subpetiolar process as in *Ponera* (Fig. 1). Other ponerine genera also have some species with a fenestra, including some *Pachycondyla* (=Emeryopone) and *Gnamptogenys*.

**Table 2.** Comparison of diagnostic character that separate *Ponera* and *Hypoponera* (based on Taylor 1967 and Yoshimura and Fisher 2007; W=worker, G=gyne, and M=male).

<b>Morphological Character</b>	<b><i>Ponera</i></b>	<b><i>Hypoponera</i></b>
<b><i>Maxillary palp segmentation</i></b>	3(W)-3(G)-2(M)	1(W)-1(G)-1-2 <sup>1</sup> (M)
<b><i>Labial palp segmentation</i></b>	2(W)-2(G)-5(M)	1–2(W)-0(G)-1–4(M)
<b><i>Subpetiolar process</i></b>	shallow, with acute posteriorly directed teeth; distinct circular fenestra present	simple lobe, lacking a fenestra <sup>2</sup> or paired posterolateral teeth
<b><i>Male form</i></b>	all winged, no ergatoid males	ergatoid and normal males
<b><i>Male abdomen tergum VII<sup>1</sup></i></b>	with distinct spine	lacking spine
<b><i>Male subgenital plate</i></b>	broad and bluntly pointed	often spatulate
<b><i>Male gonoforceps</i></b>	a sclerotized posterodorsal process-low with thickened marginal ridge	simple, lacking a posterolateral process
<b><i>Larvae</i></b>	3 or 4 doorknob-shaped glutinous tubercles on abdominal segments 3–5 or 3–4	2 pairs of doorknob-shaped glutinous tubercles on abdominal segments 4 and 5

<sup>1</sup> Yoshimura and Fisher (2007) noted some clarifying data to Taylor's (1967) revision.

<sup>2</sup> A few *Hypoponera* species possess fenestra including: *Hypoponera reichenspergeri*, *H. perplexa*, *H. pruinosa*, *H. coveri* and *H. zwaluwenburgi*. *Hypoponera distinguenda* and *H. famini* possess an area on the subpetiolar fenestra which is thinner but not clear as a true fenestra. Although a fenestra may be present, no species have paired posterolateral teeth on the subpetiolar process as in *Ponera*.



**Figure 1.** Lateral habitus of pedicel region of *Ponera* (A) and *Hypoponera* (B). In *Ponera* (A) the arrows are pointing to the fenestra on the subpetiolar process and the posteriorly directed teeth. In contrast, *Hypoponera* (B) frequently lacks a fenestra and never has posteriorly directed teeth.

The taxonomy of *Hypoponera* is complicated and unresolved. *Hypoponera* is often considered to lack major unifying characters at the generic level (Schmidt 2009); with some species being exceptionally similar to taxa in three other ponerine genera (i.e. *Cryptopone* Emery, 1893, *Pachycondyla* Smith, 1858, and *Ponera*). *Hypoponera* does follow a common pattern seen in ants in having a correlation between reduction in body size and eye size, therefore other similarities between taxa may be convergences or plesiomorphies (such as the fenestra). The monophyly of these allied genera has recently been assessed using molecular tools and they were found to be valid (Brady et al. 2006, Moreau et al. 2006, Ouellette et al. 2006, Schmidt 2009). Contemporary evolutionary studies suggest that *Hypoponera* forms a sister group to a clade that contains *Cryptopone*, *Pachycondyla* and *Diacamma*, which diverged in the mid-Cretaceous (Moreau et al. 2006). Conversely, Brady et al. (2006) suggest *Hypoponera* to be allied with *Centromyrmex*, *Psolidomyrmex*, *Loboponera* and *Plectroctena*. Schmidt (2009) found that *Hypoponera* forms a distinct lineage (with its sister group *Plectroctena*) that diverged early (63 mya) in the radiation of the Ponerini. Dlussky and Fedoseeva (1988) noted finding *Hypoponera* in Baltic amber dated at 44.1 mya. Molecular clock estimates place the crown age of *Hypoponera* at 35 mya (Schmidt 2009). Though higher phylogenetic placement has been investigated, little alpha-level taxonomy has been afforded to the genus. *Hypoponera* has been avoided in revisions

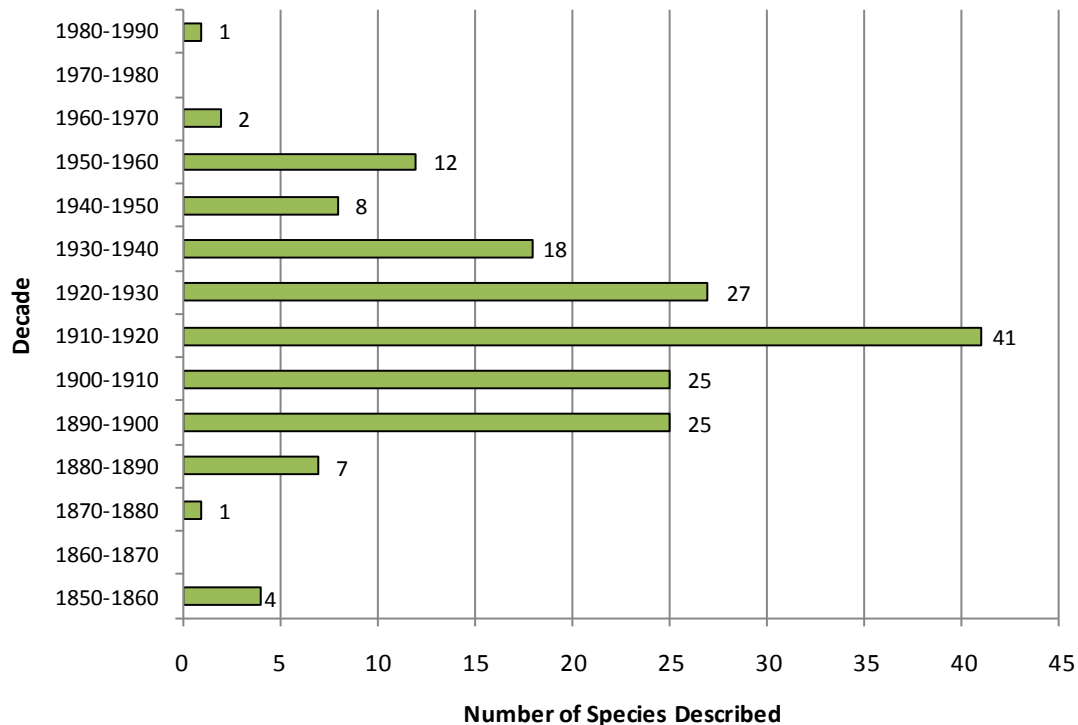
due to inherent complexities resulting from “homogeneous” morphology, reproductive intercastes, species diversity, global distribution and trampy species. This assertion is supported in light of the limited historical coverage of the genus (Table 3). At least nine genera (in the tribe Ponerini) have been relatively recently revised; i.e. *Anochetus* by Kempf (1964) and Brown (1978), *Centromyrmex* by Kempf (1967), *Dilioponera* by Brown (1974), *Emeryopone* by Baroni Urbani (1975), *Leptogenys* by Bolton (1975), *Myopias* by Willey and Brown (1983), *Odonotomachus* by Kempf (1962), Brown (1976) and Deyrup et al. (1985), *Pachycondyla* by Arnold (1951, 1952), Kempf (1961, 1964), Wild (2002), and Mackay and Mackay (2010) and *Ponera* by Taylor (1967). However, the New World *Hypoconera* have received little attention from contemporary myrmecologists.

**Table 3.** Contributions to the study of *Hypoconera*. A historic summary of the taxonomic and regional research focused on *Hypoconera* (\* denotes taxonomically important work).

<u>Researcher</u>	<u>Year</u>	<u>Contributions</u>
Emery *	1911	Classification of Ponerini
Menozzi	1931	Costa Rica species key
Smith	1936	Species in North America
Santschi *	1938	Defined & described subgenus
Creighton	1950	North American species key
Bernard	1952	North African species key
Taylor *	1967	Raised & redefined genus
Alayo	1974	Cuba species key
Kutter	1977	Switzerland species key
Agosti & Collingwood	1987	Balkans species key
Morisita et al.	1989	Treatment of Japanese species
Dlussky et al.	1990	Turkmenistan species key
Atunsov & Dlussky	1992	Bulgaria species key
Wu & Wang	1995	China species key
Collingwood & Agosti	1996	Saudi Arabia species key
Kim et al.	1998	Korean species key
Longino *	2004	Costa Rica species key

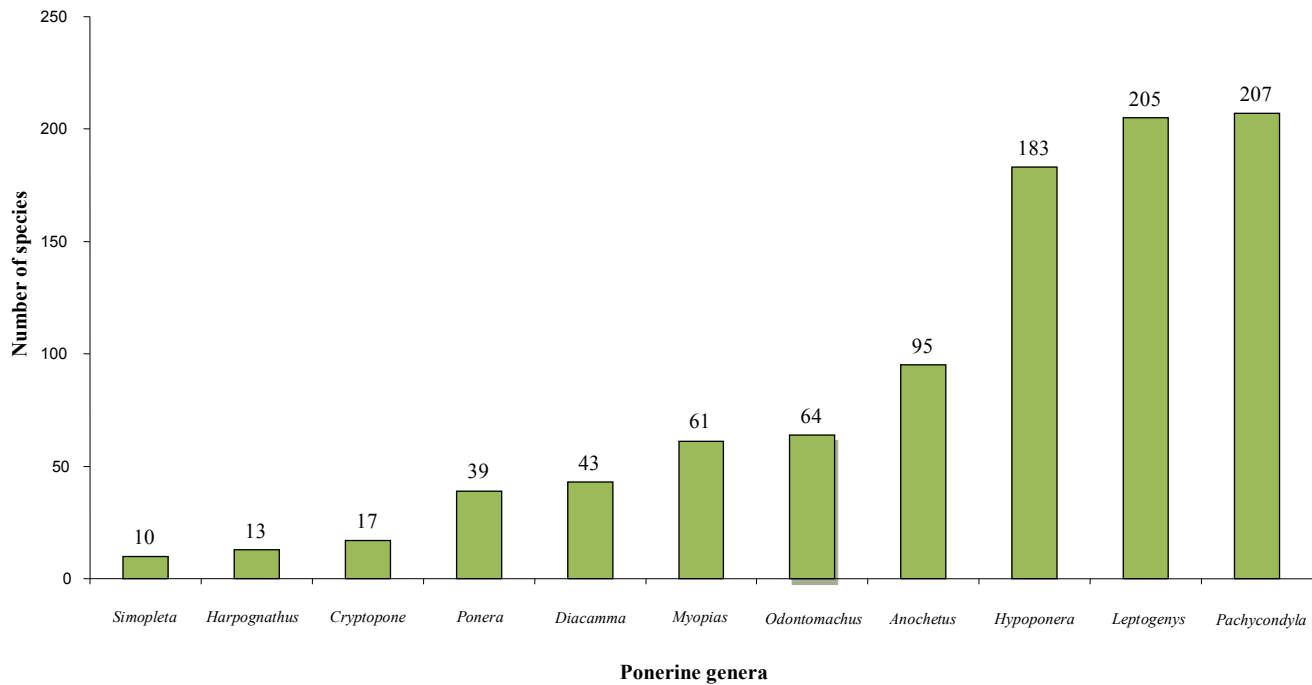
A number of regional treatments (Table 3) include *Hypoconera*, but none are devoted solely to the genus. The limited Nearctic fauna (4 species) have been subject to few studies (Smith and Haug 1931, Smith 1936, 1939), whereas *Ponera* (2 Nearctic species) has received greater attention (Smith 1962, Johnson 1987, Mackay and Anderson 1991, Deyrup et al. 2003) as have other Nearctic

poneromorph fauna: *Amblyopone* (Haskins 1931, Brown 1949, Traniello 1982, Ward 1988), *Discothyrea* (Smith and Wing 1954), *Gnamptogenys hartmanni* (Echols 1964, Mackay and Vinson 1989), *Leptogenys* (Trager and Johnson 1989), *Odontomachus* (Brown 1976, Deyrup et al. 1985, Deyrup and Cover 2004), *Pachycondyla* (Haskins 1928, 1934), and *Proceratium* (Kennedy 1939, Brown 1958, Snelling 1967, Ward 1988, Baroni Urbani and de Andrade 2003). The majority of *Hypoconera* species designations are from 1890 to 1940, the earliest designation was in 1850 and most contemporary in 1989 (Fig. 2). *Hypoconera* is the third most speciose taxon within the Ponerini and yet has not received extensive treatment (Fig. 3 and Tab. 3).



**Figure 2.** Description of New World *Hypoconera* species over time. The majority of new species descriptions are centered around the turn of the 20<sup>th</sup> century with few descriptions before 1880 or after 1960. Data from Bolton 1995, Bolton et al. 2006.





**Figure 3.** Number of valid species in selected Ponerini genera. *Hypoponera* is the third largest genus within Ponerini (compiled from Bolton et al. 2006). This bar-graph represents the richness (described species) of *Hypoponera* compared to other genera within Ponerini.

## NATURAL HISTORY

### Biogeography

Few specifics are available concerning the habits and distribution of *Hypoponera* species. The little that is established is based on generalizations or the studies of a few species. Nevertheless, broad generalizations can serve as templates on which to build specific observations. *Hypoponera* species are found in a wide range of habitats; from open grasslands to deep rainforests, disturbed lands, in termitaries, in the soil, or in root-tree interface of arboreal epiphytes (Torres 1984, Dejean et al. 1996, Longino 2010). Species are distributed globally, with the highest diversity occurring in the subtropics and tropics (Taylor 1967). Dispersal capabilities are linked to reproductive castes. Within *Hypoponera* there are winged and wingless reproductives, and limited dispersal may be contributed to by wingless reproductives; however a number of species have both winged and wingless reproductives. Additionally, a few species are widespread and invasive, such *H. opacior* (Forel, 1983) and *H. punctatissima* (Roger, 1859). The cryptobiotic or hypogenic lifestyle of *Hypoponera* may facilitate dispersal via plants and

soils (ship's ballast), both of which have an anthropomorphic pantropic distribution. Schmidt (2009) considers the origin of the genus as Old World with invasions into the New World.

## **Habitat**

*Hypoponera* is comprised of mostly cryptobiotic species. *Hypoponera* are one of the top 10 (and often within the top 5) ant genera collected in Neotropical regions (Brühl et al. 1998, Alonso 2000, Ward 2000, Wetterer and Wetterer 2004, LaPolla et al. 2007). Species in this genus are common and important components of leaf-litter communities in the tropics, making them good metrics in evaluating ecosystem function and health (Kaspari 2000). Soares and Schoereder (2001) found that the majority of nesting sites for *Hypoponera* in rainforest remnants were in leaf litter and soil, although some species are arboreal and form nests within twigs and branches (Byrne 1994, Brühl et al. 1998, Soares and Schoereder 2001). Some species inhabit arboreal vegetation when it provides soil-like habitats, such as in epiphytic root masses (Dejean et al. 1996, Brühl et al. 1998). Dejean et al. (1996) found individuals of *H. opacior* among the epiphyte species *Aechmea baracteata* and *Schomburgkia tibicinus*. An undetermined species of *Hypoponera* in New Caledonia was found nesting and foraging in *Meryta coriacea* (Araliaceae) (Le Breton et al. 2005). Le Breton et al. (2005) noted that *Meryta coriacea* creates leaf-debris mats which produce hanging soil, consistent with *Hypoponera*'s hypogenic ecology. Timmins and Stradling (1993) found that *H. punctatissima* used dung as nesting sites in temperate regions in Europe. Interestingly, a comparison of forest and agricultural management systems by Roth et al. (1994) reported two morphospecies that were found exclusively in banana plantations. Schonberg et al. (2004) noted that a few species (*H. opacior* and morphospecies JTL003) inhabit trees both in primary forest and relict pasture trees. It is clear that more focused studies on both macro and micro habitat selection are needed.

## **Pest Status**

While a number of species have economic significance, Wetterer (1998) noted that economic impacts are minimal. The term "pest" has no ecological value because the noted intensity of status is often nebulously applied (Dash et al. 2005). At least five species are considered pestiferous, including *Hypoponera punctatissima* (Roger, 1859), *H. gleadowi* (Forel, 1895), *H. opacior* (Forel, 1893) *H.*

*opaciceps* (Mayr 1887) and *H. eduardi* (Forel, 1894) (Taylor 1967). *Hypoponera punctatissima* is uncommon as a pest in Florida, where alates have been reported to sting. Similarly, *H. opacior* is considered a pest resulting from the species' nuptial flights (Vail et al. 1994). Gray et al. (1995) reported an infestation of *H. punctatissima* in an intensive care unit of a British Hospital. The ants were tested microbiotically and were found to be colonized by *Streptococcus lactis* (Lister, 1873) and *Cunninghamella elegans*.

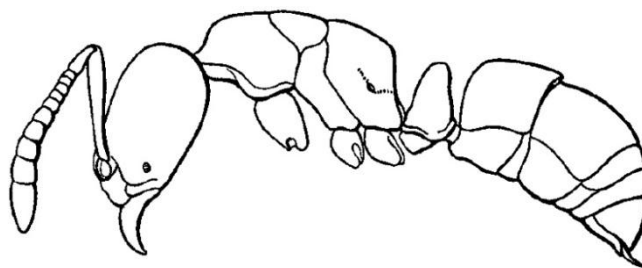
## COLONY ECOLOGY

### Colony Composition

#### *Castes of Hypoponera*

Resulting from liberal application of nebulous or conflicting terms and definitions (throughout the literature: Wheeler 1910, Smith and Haug 1931, Smith 1939, Yamauchi et. al 1996) for various castes of *Hypoponera*, a discussion and presentation of unambiguous definitions for castes and reproductive forms follows. A number of terms were employed by Wheeler (1910) and Emery (1911), but are misapplied in the literature and thusly are defined here.

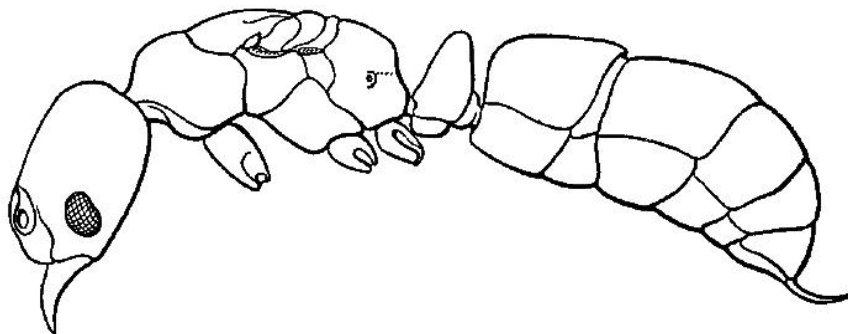
**Worker** (Figs. 4, 6E and 12) - a normally non-reproductive (reproductive organs are absent or vestigial) female member of the colony, which conducts routine tasks such as nest maintenance, brood care and foraging. In *Hypoponera* the eyes are normally small or reduced and the mesosoma has no development to support wings or their musculature.



**Figure 4.** Lateral view of a typical worker of *H. opacior*. Adopted from Creighton 1950.

**Female** - In the literature females are often synonymous with queens; who are the reproductive individuals in the nest. However, because of the haplodiploidy genetics, workers are also considered genetically female.

**Gyne** (Figs. 5 and 6C) - a sexually specialized female with well-developed reproductive organs. Normally these ants are larger in stature than a worker. The head has well-developed large eyes and ocelli. The mandibles are not normally reduced. The thorax is macronotal, with the typical development present in female Hymenoptera. The wings are usually present or wing scars are present after wing shedding.

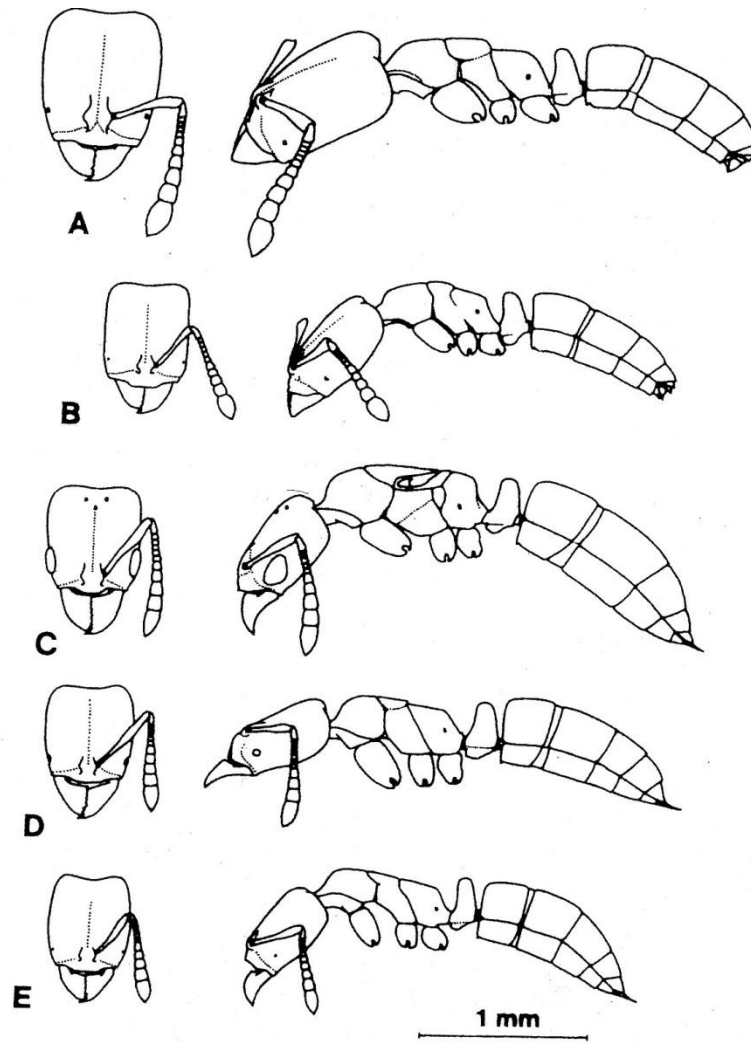


**Figure 5.** Lateral view of typical gyne (female) of *H. opacior*. Taken from Creighton 1950.

**Ergatogyne** (Fig. 6D) – (also referred to generally as an ergatoid), worker-like in form, that is an intermediate between a worker and a female regarding some morphological characters. Yamauchi et al. (1996) referred to this caste as an intercaste. Determination of an ergatogyne is not always easy and comparison with numerous workers from nest series may be required.

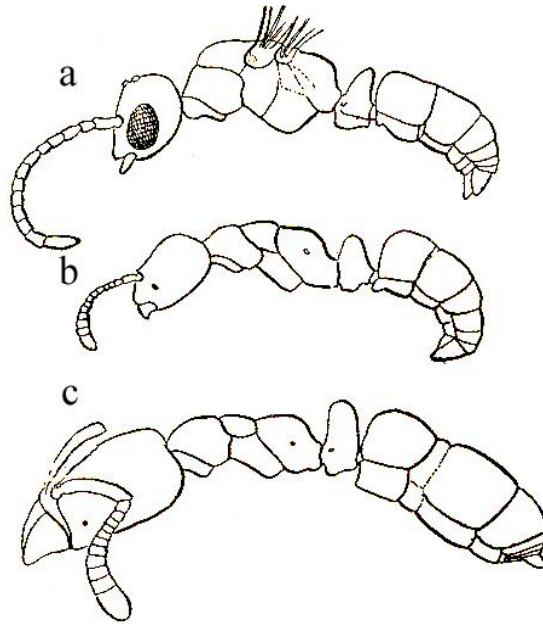
**Ergatogyne  $\alpha$**  – The eyes are large and the ocelli are present. The mesosoma is of the basic form of a gyne but lacks the wings and/or wing scars, but with some notal development.

**Ergatogyne  $\beta$**  (Fig. 6D) – The eyes are large and the ocelli absent. The mesosoma is worker-like in form i.e. lacking notal development.



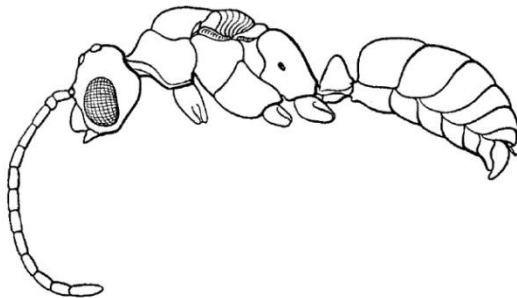
**Figure 6.** Dimorphism of males and gynes in *Hypoponera bondroiti*. Major ergatoid male (A), minor ergatoid male (B), dealate queen (gyne) (C), ergatogyne (D), and worker (E). From Yamauchi et al. (1996) used with permission of authors.

**Male** (Figs. 6A–B, 7, 8, 9, 10, and 11) - the masculine caste with individuals that are haploid.



**Figure 7.** Males of *Hypoponera*. Normal (winged) male of *H. eduardi* (A), ergataner male of *H. eduardi* (B), and ergatoid male of *H. punctatissima* (C). Adapted from Wheeler 1910.

**“Typical” male** (Figs. 7A and 8) – The mandibles are reduced and vestigial. The eyes are large and ocelli well-developed. Antennae are usually filliform (12 or 13 segments) with short scapes. Notal development is associated with wing presence. The petiolar node is reduced (in comparison with workers) and the parameres are exposed.



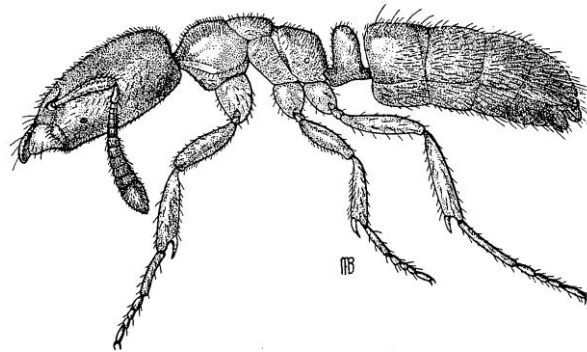
**Figure 8.** Lateral view of “typical” male of *H. opacior*. Taken from Creighton 1950.

**Ergatoid male** (Figs. 6A-B and 7C) – These are worker-like in overall appearance. The eyes are reduced, ocelli are absent and the antennae are geniculate like that of a worker. The scapes of the antennae are not reduced as in normal males, and the antennal segments range in number from 12 to 13. Wings and notal development are absent with the mesosoma like that of a worker.

Yamauchi et al. (1996) noted two types of ergatoid males within a Japanese species.

**Major males** (Figs. 6A, 7C and 9) – There are the largest members of the colonies, often with well-developed and enlarged heads.

**Minor males** (Fig. 6B) – Head of typical worker-like form, body smaller than major males.

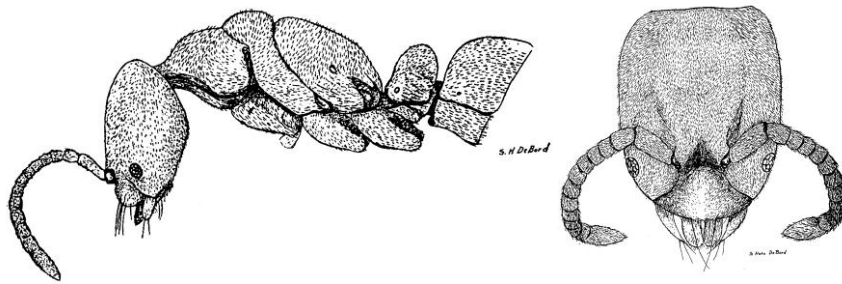


**Figure 9.** Ergatoid male of *H. gleadowi*. Note the worker-like appearance, however the parameres are apparent. Taken from Smith (1939).

**Ergataner male** (Figs. 7B, 10, 11 and 12) - Superficially resembling a wingless male. Head round or quadrate, similar to that of typical males; mandibles reduced, eyes reduced; lacking ocelli. Antennae with 13 segments (*H. pampana*, 1 undetermined specimen from Costa Rica) Mesosoma wingless but not worker-like; gibbous in profile, petiole reduced. Gaster worker-like, however the genitalia are apparent. Ergatomorphic males are thought to be linked with the loss of males due to dispersal and mating with female nest mates (Hölldobler and Wilson 1990 and references therein).



**Figure 10.** Ergataner male of *H. opacior*. Taken with SEM.



**Figure 11.** Ergataner male of *H. opaciceps* lateral habitus and frontal view. Figure taken from Smith and Haug (1931).



**Figure 12.** Ergataner and worker of *H. pampana* interacting (photo used with permission of A. Wild).



Denis et al. (2002, et cite) and Foitzik et al. (2002) report on polydomy and polygyny in *H. nubatama*, *H. opaciceps*, *H. bondroiti*, *H. gleadowi*, and *H. opacior*. Most ant species have distinct castes that differ morphologically and behaviorally. In a number of genera, including *Hypoponera*, morphological differentiation is limited or absent (Hölldobler and Wilson 1990). That is, in some species the males and reproductive females look very similar to the workers and are referred to as ergatoid reproductives. An extreme case can be found in *Hypoponera bondroiti*, in which the classic system of winged as well as ergatoid males and females are found within the same nest (Yamauchi et al. 1996). Yamauchi et al. (1996) described in detail the morphological differences between the castes with notes on morphometrics. For the majority of *Hypoponera* species the presence of ergatoid males is rare (Yamauchi et al. 1996). Like other species of ants, the males of most *Hypoponera* species provide no direct services to the colony (Hölldobler and Wilson 1990, Yamauchi et al. 1996). However, males of some Japanese species store liquid food in their crops and participate in trophallaxis (Hashimoto et al. 1995). Hamilton (1979) noted lethal fighting between ergatoid males of *H. punctatissima* within the nest. Major (alpha) males of *H. bondroiti* were also very aggressive toward each other but no lethal fights were noted (Yamauchi et al. 1996). In nests of *H. bondroiti* that contain both major and minor (beta) males aggression was rare (Yamauchi et al. 1996).

### **Reproduction**

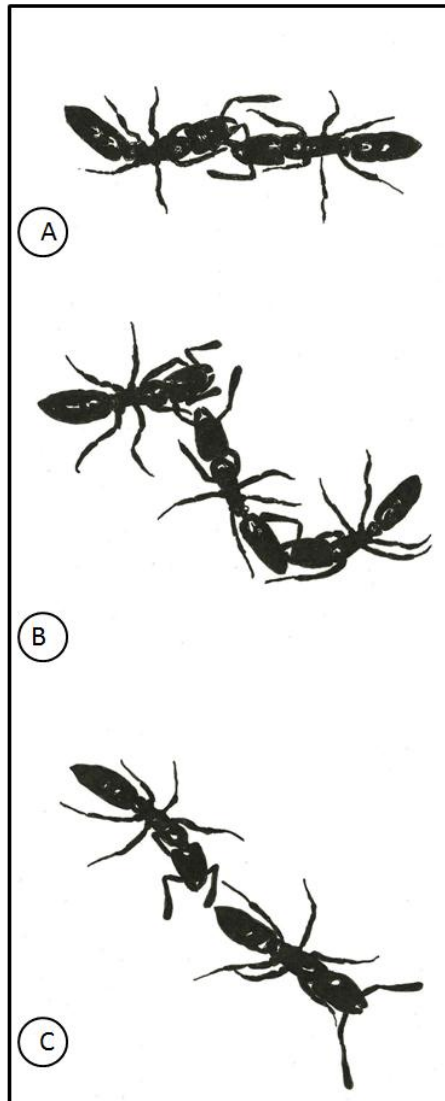
Little is known about the reproductive behavior of *Hypoponera*, and this information is widely scattered in the literature. Tschinkel (1987) found that species of *Hypoponera* and *Ponera* held tens of thousands of sperm in the spermatheca. Le Masne (1953) noted that workers were reproductive in an undetermined species. Workers reproduced in queenless nests once they were inseminated and produced new gynes. Yamauchi et al. (1996) found that ergatoid males (both major and minor) of *H. bondroiti* mate with alate females and intercastes. In some species, such as *H. punctatissima*, males fight for occupancy of brood chambers where females are likely to emerge (Hamilton 1979). This behavior has also been observed in ergatoid males of *H. edwardi* and *H. bondroiti*. For *H. edwardi*, the males would mate with females still within their cocoons (Le Masne 1956). Foutzik et al. (2002) found little intrasexual competition between apterous (the intercaste used in their study is unclear) males of *H.*

*opacior* (although this identification is questionable). Similar to Le Masne (1956), Foutzik et al. (2002) found males mating with gynes in their cocoons, and staying in copula for extended periods of time, presumably as post-copulatory mate guarding behavior. As previously noted, *H. bondroiti* has two types of ergatoid males that remain in the nest. Unlike males of *H. punctatissima* that regularly engage in combat, those of *H. bondroiti* do not (Yamauchi et al. 1996). Yamauchi et al. (1996) suggested the reason for the lack of aggression is that minor males are not “sneakers” but female mimics. This conclusion is based on major males having few conflicts (as they were ignored) and often trying to mate with the minor males (Yamauchi et al. 1996). However, this assessment may be suspect because ants use olfactory cues rather than visual cues (it should be noted that most *Hypoponera* have a reduction in the facets of the eyes and overall eye size). Therefore, smell, not appearance, should be mimicked. Additionally, Escoubas et al. (1987) and Peeters and Hölldobler (1992) conducted detailed morphological and histological studies of the larvae of *Hypoponera*.

### ***Foraging and Feeding***

*Hypoponera* exhibit varied predatory motifs, from generalist to specialist. Specialists may feed exclusively on Collembola (ex: *H. nr coeca*) or termites (Wheeler 1936, Levieux 1983, Hölldobler and Wilson 1990, Seifert 2003). Hashimoto et al. (1995) reared colonies of a Japanese species on Collembola and honey water. Trophallaxis is common and widespread throughout most ant species (Hölldobler and Wilson 1990); however, Hölldobler (1985) claimed this behavior was absent in ponerine ants. Nevertheless, Villet et al. (1990) found larva-to-adult trophallaxis in *Platythyrea*. Le Masne (1953) noted that *Hypoponera* workers feed on liquid excreted from the larva’s anus. Additionally, some Japanese species of *Hypoponera* have been found to store liquid food and participate in stomodeal trophallaxis between adults (Hashimoto et al. 1995). Trophallaxis in *Hypoponera* sp. (JF11104), however, was found to vary among castes (Hashimoto et al. 1995). *Hypoponera* has had limited research on its social interactions regarding foraging or colony movement but a few details on tandem running, odor trail orientation, and antennation have been observed (Agbogba 1984, Hölldobler and Wilson 1990). Tandem running (Fig. 13) appears to be employed infrequently in *Hypoponera* but is occasionally utilized to recruit colony members to aid in the dismembering of “large” prey (Agbogba

1984). Hölldobler (1985) summarized the behavior of antennal signaling and invitation as “after a pair of workers meet face to face, the recruiter tilts her head sideways almost 90° and strikes the upper and lower surface of the nest mate’s head with her antennae. After the solicited ant responds with similar antennation, the recruiting ant then turns around and tandem running starts.”



**Figure 13.** Phases of tandem running in *Hypoponera* (Re-drawn from Agbogba 1984). Confrontation with reciprocal antennation (A); Tandem set-off (B); Tandem running (C).

## Chapter 2: Methods

### SPECIMEN ACQUISITION

Specimens used in this work came from the following institutions and personal collections (abbreviations from Brandão 2000 and Arnett et al. 1993):

<b>ALWC</b>	Alex L. Wild Personal Collection, Urbana, IL, USA
<b>AMNH</b>	American Museum of Natural History, New York, NY, USA.
<b>ABSC</b>	Archbold Biological Station, Lake Placid, FL, USA.
<b>BMNH</b>	British Museum of Natural History, London, UK.
<b>CASC</b>	California Academy of Science, San Francisco, CA, USA.
<b>CWEM</b>	William and Emma Mackay Collection, El Paso, TX, USA.
<b>CUIC</b>	Department of Entomology, Cornell University, Ithaca, NY, USA.
<b>DEIC</b>	Senckenberg Deutsches Entomologisches Institut, Müncheberg, GERMANY.
<b>FMNH</b>	Field Museum of Natural History, Chicago, IL, USA.
<b>FSCA</b>	Florida State Collection of Arthropods, Gainesville, FL, USA
<b>LACM</b>	Los Angeles County Museum of Natural History, Los Angeles, CA, USA.
<b>LSAM</b>	Louisiana State University Arthropod Museum, Baton Rouge, LA, USA.
<b>MCSN</b>	Museo Civico di Storia Naturale “Giacomo Doria”, Genoa, ITALY.
<b>MCZC</b>	Museum of Comparative Zoology, Cambridge, MA, USA.
<b>MEMU</b>	Mississippi State University, Mississippi State, MS, USA.
<b>MHNG</b>	Musée d’Histoire Naturelle, Geneva, SWITZERLAND.
<b>MKOK</b>	Mike Kaspari, Dept. of Zoology. University of Oklahoma, Norman, OK, USA.
<b>NHMB</b>	Naturhistorisches Museum, Basel, SWITZERLAND.
<b>NHMW</b>	Naturhistorisches Museum, Wien, AUSTRIA.
<b>OSUC</b>	Ohio State University, C. A. Triplehorn Insect Collection, Columbus, OH, USA.

<b>PSWC</b>	Phil S. Ward Personal Collection, Davis, CA, USA.
<b>STDC</b>	Shawn T. Dash Personal Collection, currently held at El Paso, TX, USA.
<b>USNM</b>	United States National Museum of Natural History, Washington, D.C., USA.

A number of collaborators (listed in the acknowledgments) have provided additional material.

Fieldwork for additional specimens involved pitfall traps, sifting extractions, baits and directed hand collecting, following the protocol of Agosti et al. (2000).

#### **SPECIMEN PREPARATION AND DEPOSITION**

For each fresh sample, ants were sorted from debris, prepared and identified. Sorted specimens were placed in four-dram vials with full locality (country, state, nearest town, GPS coordinates), date, collector, collecting method and available ecological information. When more than ten individuals were present, six were mounted and labeled. New material is deposited in STDC and CWEM. Holotypes of new species were deposited at the loaner institution or the MCZC as appropriate. When sufficient specimens were available, paratype exemplars were retained in STDC or CWEM.

#### **SPECIES CONCEPT**

The species definition applied in this revision is the Biological species definition, i.e., “groups of interbreeding natural populations that are reproductively isolated from other such populations” (Mayr 1942, Mayr and Ashlock 1991), and are expected to share a suite of morphological characters. Although examination of reproductive isolation was not directly assessed, species limits were inferred indirectly from morphological and biogeographical data. Disparity of continuous character states suggests an absence of gene flow, therefore such breaks when observed in sympatric “species” indicate non-interbreeding (without gene flow) lineages or valid species. Though sympatry is a clear test of species boundaries, sympatry is not always observable. In such cases, character state variation is determined and when unique or limited overlap of character states are noted between taxa, species separation is justified (Wild 2007a). Where clear differentiation is not possible within the context of preexisting species, those specimens are treated as conspecifics of other known species. This conservative approach has been employed to limit nomenclatural problems due to taxon determination with ambiguous data. I have

attempted to resolve all subspecific taxa, presenting a concise and clear taxonomy. A number of taxa (33%) of the New World *Hypoponera* are represented as trinomens, an historical artifact of earlier taxonomic practices. I have taken an approach similar to that outlined by Winston (1999) and Doyen and Slobodchikoff (1974) regarding synonymies. If a subspecific taxon is phenetically the same and within biogeographical (preferably with specimens demonstrating sympatry) and ecological limits, then it is sunk within the nominate species. When there is phenetic distinction between nominate taxon and a described subspecies then it is raised to species rank. In those cases where phenetics overlap, biogeographical and natural history information are lacking or are nebulous, those taxa are described as having uncertain status and need further analysis. Specimens of type status have been labeled with designating labels for holotype, lectotype, and paralectotype.

#### **ANALYTICAL METHODOLOGIES**

Designation of novel species is often based on differences in morphological characters; therefore understanding the presence, extent and plasticity of morphometric variation is required for informed delimitations. Type material was examined and compared with original descriptions and purportedly new species. Descriptions were updated with more detailed information. Original and published observations were compiled to provide a comprehensive accounting of all species.

Measurements were taken with a Wild stereomicroscope at 51x within 0.01 mm using an ocular mounted micrometer; all measurements are in millimeters. Measurements were made on all available type material. Attempts were made to include measured individuals from across the ranges of each species; a representative worker from a colony series was measured from extents of range. In descriptions, measurements include the mean with range given in parentheses. For observations on two or fewer specimens no mean is provided and where multiple measurements were equivalent no range is given. When the number of measured specimens exceeds two a range is present as well as an average. When the measurements for features are the same for the specimens measured that single value is reported. Scatter plots were generated in Microsoft Excel to provide a comparison between some species. These plots illustrate morphometric parameter relationships as delimiting features or demonstrate morphometric overlap and discontinuous meristic character states. Morphometric

parameters were not corrected for body size, as body size may be a diagnostic character for the separation of species. Furthermore, a comparison between body regions such as the length of the mesosoma compared to the width of the head would express relationships of proportion regardless of body size. All external images were made through a camera lucida attached to a Nikon® SMZ1500 dissecting microscope. Multiple images were acquired and montages compiled using CombineZP® freeware, and subsequently touched up using Adobe® Photoshop®. Morphological terminology for measurements and indices follow Ward (1993, 2001) with modifications described below.

Species profiles were formulated to assist identifications and provide natural history particularities. A diagnosis is provided for each taxon with the most reliable characters, or character suites, and a comparison of species. A metrics section provides those terms most commonly utilized and diagnostic. Type measurements are presented in square brackets. Descriptions start at the mandibles and move posteriorly with diagnostic notes on pilosity, pubescence and sculpturing grouped with the feature on which they appear. Discussion follows, addressing additional data for species identity, notes on taxonomic history and general comments on character variation. Finally, natural history and distribution are presented. Material examined follows label data although format may be edited for style and consistency. The label data for primary type specimens are quoted, top to bottom label.

To reveal relationships among morphologically similar taxa, bivariate scatter plots were used to visualize groups. Morphological analysis was conducted based primarily on characters of workers with limited reference to females and/or males. As ergatoid males and females are not often collected and winged reproductives frequently lack associations with workers, their utility is currently limited. However, informative characters have been used for males of a few ponerine genera (Trager and Johnson 1988, Deyrup and Cover 2004), although males have historically been used only for army ants (Watkins 1976, 1985). An absence of autapomorphic characters have limited the alpha taxonomy and retarded the phylogenetic study of *Hypoponera*.

An Appendix (B) was created and is structured to follow the species-groups defined in the dissertation and species are listed alphabetically within species-groups. The function of this appendix is

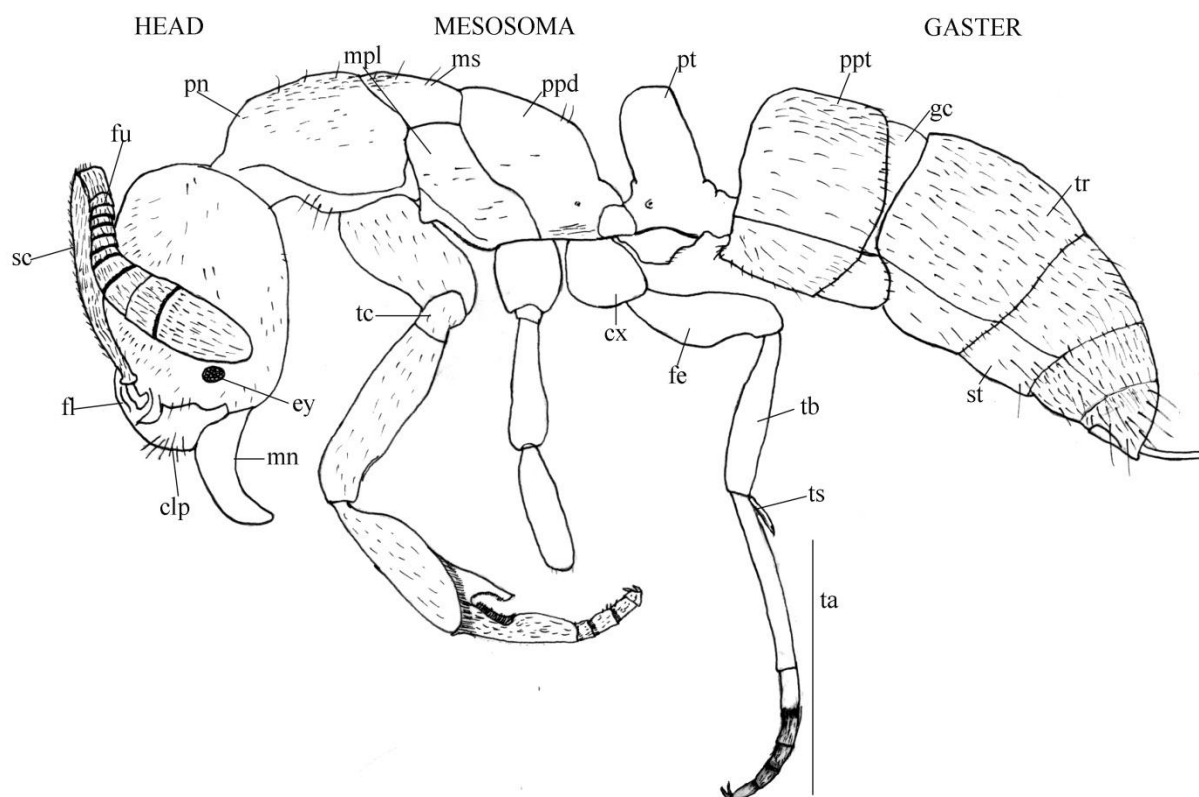
to serve as a reference, and have all the species consolidated in one place to facilitate comparison of species groups or species within groups and serve as a record of type material.

## TERMINOLOGY

The following are morphological, morphometric and caste terminology employed throughout this work. Terms for cuticular sculpturing follow those of Harris (1979).

### Morphological terminology

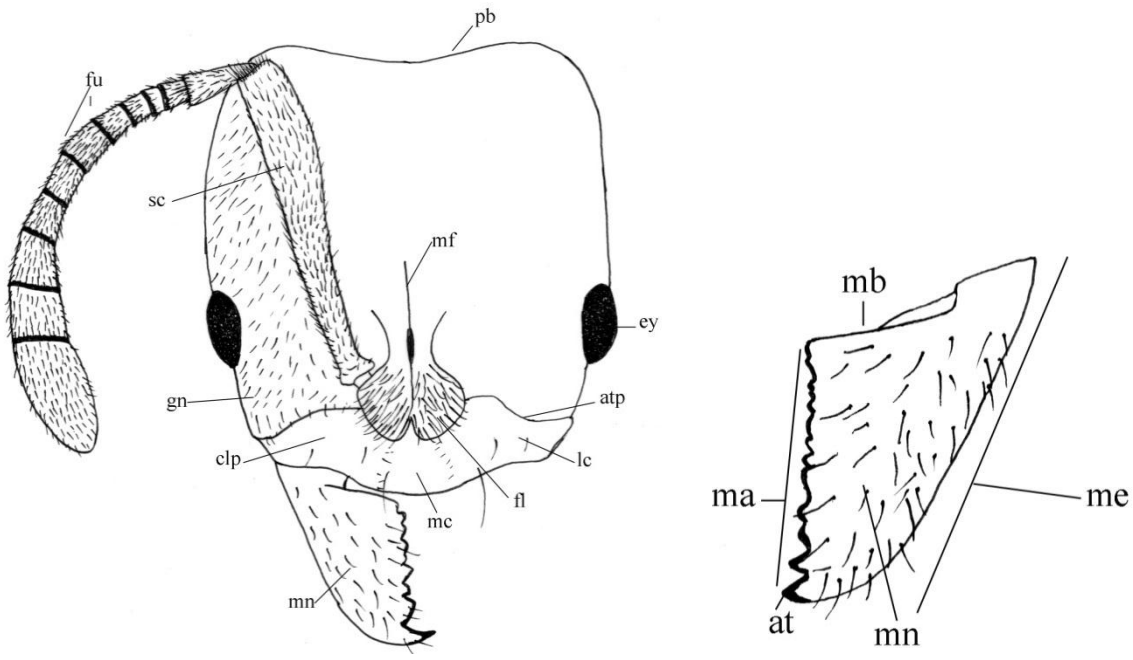
The following figures denote important morphological characters used in the identification of *Hypoponera*. General entomological and myrmecological terms are found in the glossary.



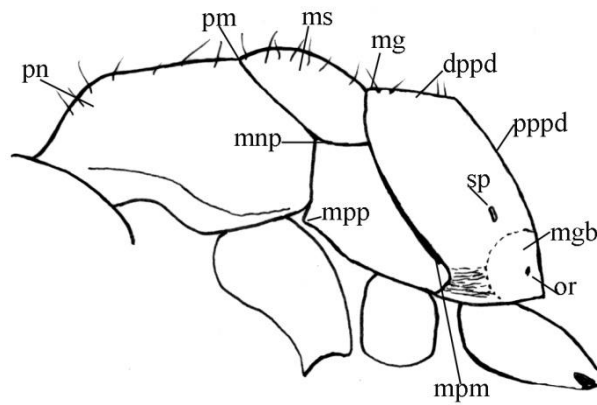
**Figure 14.** Lateral view of a typical *Hypoponera* worker, showing morphological features.

Abbreviations: *clp*- clypeus, *cx*- coxa, *ey*- compound eye, *fe*- femur, *fl*- frontal lobes, *fu*- funiculus, *gc*- gastric constriction, *mn*- mandible, *mpl*- mesopleuron, *ms*- mesonotum, *pn*, pronotum, *ppd*- propodeum, *ppt*- postpetiole, *pt*- petiole, *sc*- scape, *st*- sternite, *ta*- tarsus, *tb*- tibia, *tc*- trochanter, *tr*- tergite, *ts*- tibial spur.

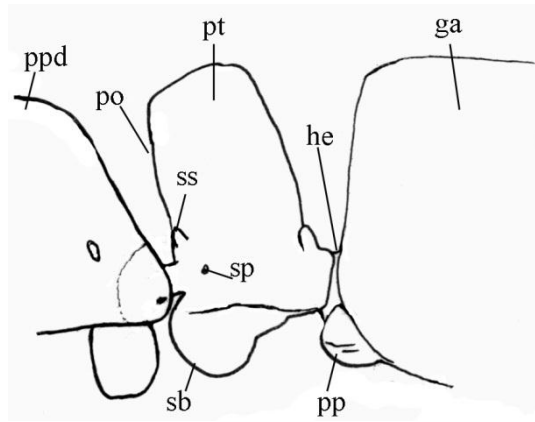




**Figure 15.** Frontal view of the head of *Hypoponera opacior* (Ergatogyne) with disarticulated mandible. Abbreviations: *at*- apical tooth, *atp*- anterior tentorial pit, *clp*- clypeus, *ey*- compound eye, *fl*- frontal lobe, *fu*- funiculus, *gn*- gena, *lc*- lateral portion of clypeus, *ma*- masticatory margin, *mb*- basal margin of mandible, *me*- external margin of mandible, *mc*- median portion of clypeus, *mf*- median furrow = frontal sulcus, *mn*- mandibles, *pb*- posterior border of head, *sc*-scape.



**Figure 16.** Lateral view of mesosoma of typical *Hypoponera* worker. Abbreviations: *Dppd*- dorsal face of propodeum, *mg*- mesometanotal suture, *mgb*- metapleural gland bulla, *mnp*- mesonotal-pleural suture, *mpm*- metapleural carina, *mpp*- mesopleural process, *ms*- mesonotum, *or*- orifice of metapleural gland, *pm*- promesonotal suture, *pn*- pronotum, *pppd*- posterior face of propodeum, *sp*- spiracle.



**Figure 17.** Lateral view of petiole of typical *Hypoponera*. Abbreviations: *ga*- gaster, *he*- helcium, *po*- petiolar node, *pp*- postpetiolar process, *ppd*- propodeum, *pt*- petiole, *sb*- subpetiolar process, *sp*- spiracle, *ss*- spiracular process.

**Anterior tentorial pits (atp)** = clypeal fossa – a pair of impressions located at the ventral lateral margin of the clypeus, marking the lateral extremes of the frontoclypeal suture above the anterior articulation of the mandibles (*sensu* Bolton 1994).

**Clypeus (clp)**- a sclerite of the head located between the frons and labrum, above the mandibles.

**Frontal lobe (fl)** - plate-like extensions of the frontal carinae above the insertion of the antennae.

**Funiculus (fu)** - the antenna distal to the first segment or scape.

**Humeral angles** - anterolateral corners of the pronotum, in the region of the “shoulder”.

**Gaster (ga)** - the section of the abdomen posterior to the petiole (and the postpetiole when present).

**Gena (gn)** - part of the head ventral to the compound eyes.

**Masticatory margin (ma)** - surface of mandible with teeth.

**Mesonotum (ms)** - the dorsum of the second segment of the mesosoma.

**Mesopleuron (mpl)** - the side of the mesothorax.

**Mesometanotal suture (mg)** - 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 is the functional thorax, but it cannot be called thorax since it is a compound structure including the first abdominal segment.

**Metapleuron** - the ventral region of the propodeum where it fuses with the metathorax.

**Petiolar node** (po) - the dorsal section of the petiole.

**Petiole** (pt) - the single segment of the pedicel or the anterior segment in subfamilies that have two segments in the pedicel.

**Promesonotal suture** (pm) - suture located between the pronotum and the mesonotum.

**Pronotum** (pn) - The dorsum sclerite of the first segment of the mesosoma.

**Propodeum** (ppd) - The posterior segment of the mesosoma, which is the first segment of the abdomen fused and functionally part of the thorax in ants (and other Hymenoptera: Apocrita). Two parts extremely important for the identification of ants are: the basal face (or dorsal surface), and the declining face (or the posterior, usually vertical surface).

**Scape** (sc) - The first segment of the antenna, which is elongated.

**Morphometric parameters** (Figures 18–24)

Head, frontal view (Fig. 18)

**TL** Total length<sup>1</sup> - measured in lateral view from the anterior edge of clypeus to the posterior edge of terminal gastric segment.

**HW<sub>1</sub>** Head width- maximum width of head in frontal view, at the frontoclypeal margin.

**HW<sub>2</sub>** Head width- maximum width of head, excluding the eyes.

**HW<sub>3</sub>** Head width- maximum width of head before lateral edge rounds into posterior border.

**HL** Head length- dorsoventral midline length of head in anterior view, from dorsal margin of head to ventral margin of clypeus.

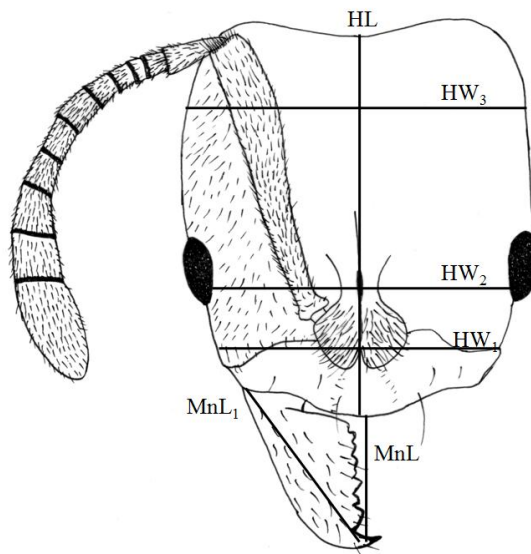
**CI** Cephalic index-  $(HW_2/HL) \cdot 100$  - margin to the anterior edge of the clypeus.

**HS** Head size-  $HW_2 + HL/2$

**MnL** Mandible length- in full face view, measured from the midline of the anterior edge of the clypeus to the base of the apical tooth.

**MnL<sub>1</sub>** Mandible length- in full face view, measured from mandible insertion diagonally to base of apical tooth.

<sup>1</sup>Total length is a relative size index useful in the general sorting of species but may be misleading. Total lengths should be regarded as estimates because the segments of the gaster may telescope within each other, leading to an underestimation of total body length. Codes using size have been classified based on a system employed by Wheeler and Wheeler (1986) with some modifications as follows: Tiny (TL 1.0–2.5 mm), Small (TL 2.6–3.5 mm), Medium (TL 3.6–4.5mm), Large (4.6–6.5 mm).



**Figure 18.** Frontal view of composite *Hypoponera* head. HL-head length, HW<sub>1-3</sub>-Head width across varying section of the head, MnL, MnL<sub>1</sub>-mandibular lengths.

Head, lateral view (Fig. 19)

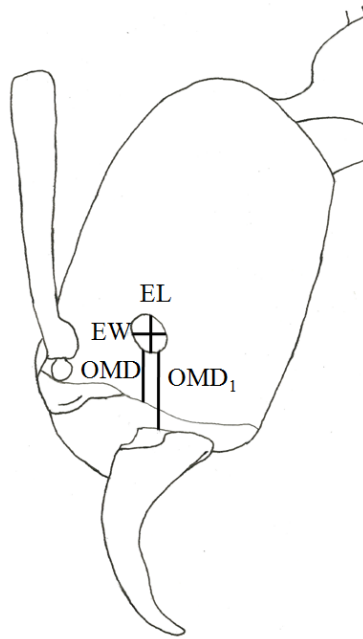
**EL** Eye length- maximum length of compound eye in dorsoventral axis.

**EW** Eye width- maximum width of compound eye in lateral axis.

**OI** Ocular index-  $(EW \times 100) / HW_2$  - maximum diameter of eye expressed as a percentage of head width.

**OMD** Oculomandibular distance- distance from the posterior edge of clypeus to the lower margin of the eye, in lateral view.

**OMD<sub>1</sub>** Oculomandibular distance- distance from the posterior edge of mandible to the lower margin of the eye, in lateral view.



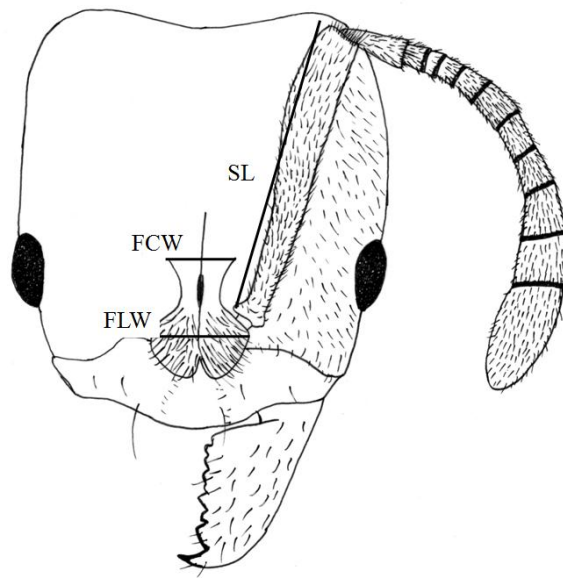
**Figure 19.** Lateral view of stylized *Hypoponera* head. EL-eye length, EW-eye width, OMD-ocular mandibular distance measured to posterior border of mandible.

Head, frontal view (Fig. 20)

**SL** Scape length- length of the first antennal segment minus the basal condyle.

**SI** Scape index-  $(SL * 100) / HW$ .

**SE** Scape posterior extension- distance that the scape surpasses or does not surpass the occipital margin.

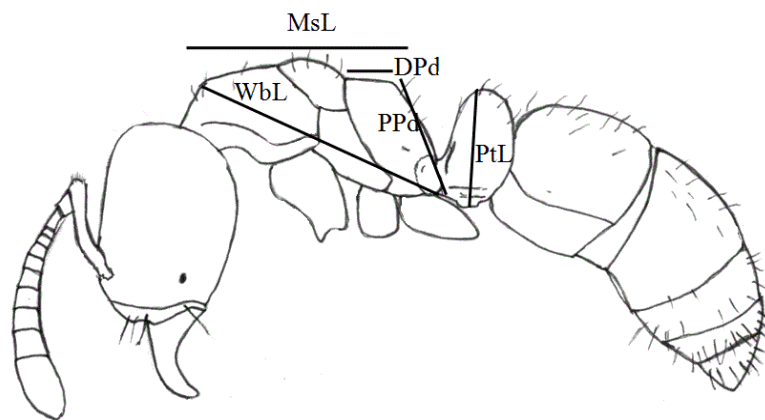


**Figure 20.** Stylized head of *Hypoponera* in frontal view. SL-scape length, FCW-frontal carinae width, FLW-frontal lobe width.

Body, lateral view (Fig. 21)

**ML** Mesosomal length- total length from pronotum to posterior edge of propodeum.

**WbL** Weber length- in lateral view from anterior humeral edge of pronotum to lower metapleuron.



**Figure 21.** Stylized *Hypoponera* in lateral view. MsL-mesosoma length, WbL-Weber length, DPd-dorsal face of propodeum, PPd-posterior face of propodeum, PtL-petiole node length.

Body, dorsal view (Fig. 22)

**PnW** Pronotal width- viewed dorsally, measured from side to side.

**PtL** Pronotal length- length from anterior edge pronotal collar to posterior edge of pronotum.

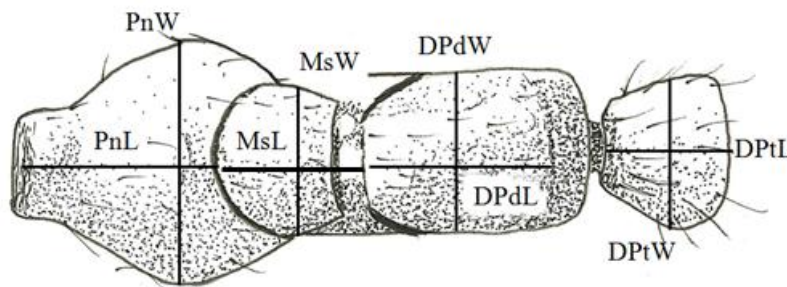
**PNL** Petiolar node width- width taken from the anterior and posterior faces of the petiolar node.

**MsW** Mesonotum width- viewed dorsally, measured from side to side.

**MsL** Mesonotum length-viewed dorsally, measured from anterior edge of mesonotum to junction of anterior edge of propodeum (mesometanotal suture).

**DPdW** Dorsal propodeum width- viewed dorsally, measured from lateral edge to lateral edge.

**DPdL** Dorsal propodeum length- viewed dorsally, measured from anterior edge of propodeum to junction of posterior edge of propodeum and posterior face of propodeum.



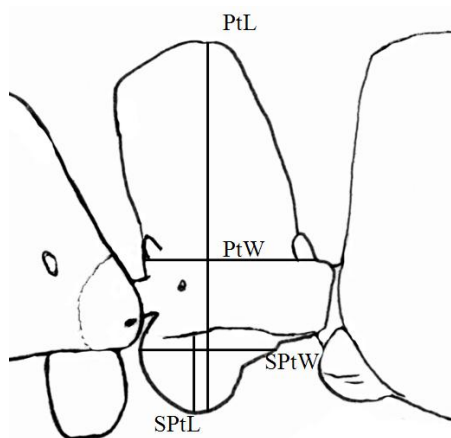
**Figure 22.** Dorsal view of mesosoma and petiole of *Hypoponera*. PnL-pronotum length, PnW-pronotum width, MsL-mesonotum length, MsW-mesonotum width, DPdW-Dorsal propodeum width, DPdL-Dorsal propodeum length, DPtW-Dorsal petiolar node width, DPtL-dorsal petiolar node length.

Petiole, lateral view (Fig. 23)

**MP** Depth of metanotal groove- bottom of the groove to a line drawn across the dorsal surface of the mesonotum and propodeum in lateral view.

**DF** Length of dorsal face of propodeum- measured in lateral view from “metanotal groove” to the point on the surface of propodeum which is maximally distant from diagonal propodeal line.

- PF** Length of posterior face of propodeum- measured in lateral view from propodeal lobe to the point on the surface of the propodeum that is maximally distant from the diagonal propodeal line.
- PI** Propodeal index-  $DF/PF$ .
- PNH** Petiole height- maximum height of petiole in lateral view including subpetiolar process.
- PtNL** Petiole length- height of petiole from apex to base of petiolar node (excluding subpetiolar process).
- PtNW** Petiole width- width of petiolar node at base just above the peduncle.
- SPtL** Subpetiolar height- maximum height of subpetiolar process measured from based of subpetiolar process to base of petiolar node.
- SPtW** Subpetiolar width- width of subpetiolar process measured from anterior face to posterior face.
- PtI** Petiole lateral index-  $(PNH*100)/PNL$ .
- SPtI** Subpetiolar index-  $(SPtH*100)/PNH$ .
- DPtL** Dorsal petiole length- measured from the anterior to posterior face of petiole.
- DPtW** Dorsal petiole width- maximum width of petiolar node in dorsal view, measured side to side.
- PeNI** Petiole dorsal index-  $(PtW/PnW)*100$
- PDI** Petiolar dorsal index-  $(DPtW*100)/DPtL$ .



**Figure 23.** Lateral view of petiole of *Hypoponera*. PtW-petiolar node width, SPtW-subpetiolar process width, SPtL-subpetiolar process length.



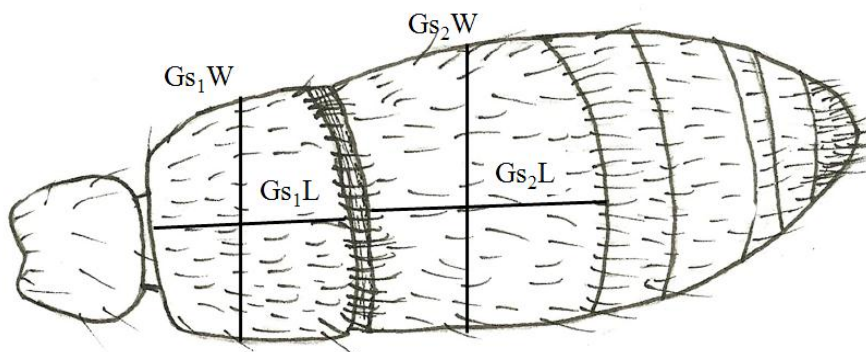
Gaster, dorsal view (Fig. 24)

**GS1L** Gastric tergite 1 length- measured from anterior edge to posterior edge before constriction.

**GS1W** Gastric tergite 1 width- measured from lateral edge to lateral edge at midline of segment.

**GS2L** Gastric tergite 2 length- measured from anterior edge to posterior edge before constriction.

**GS2W** Gastric tergite 2 width- measured from lateral edge to lateral edge at midline of segment.



**Figure 24.** Dorsal view of petiole and gaster. GS1W-gastric segment 1 width, GS2L-gastric segment 1 length, GS2W-gastric segment 2 width, GS2L-gastric segment 2 length.

## Chapter 3: Systematic Treatment

### THE GENUS *HYPOPONERA*

*Ponera* (*Hypoponera*) described as subgenus by Santschi, 1938. Type-species: *Ponera abeillei* André, 1881: 61, by original designation. Combination in Ponerini by Danisthorpe 1943. Raised to genus by Taylor 1962. Maintained status in Ponerinae and Ponerini by Bolton 2003.



**Figure 25.** *Hypoponera foreli* (worker). Frontal view (A) and lateral view (B). Photographs courtesy of A. and <http://www.antweb.org>.

### Generic Description

#### Worker (Fig. 25)

**Diagnosis.** Species of New World *Hypoponera* range in size from a total length of 0.4 mm (ex: *H. parva*) to 5.0 mm (ex: *H. iheringi*). The coloration ranges from pale yellow (ex: *H. parva*) to black (ex: *H. nitidula*). Pilosity of *Hypoponera* is variable, some species are nearly glabrous whereas other species are covered with dense appressed pubescence (ex: *H. impartergum*). The sculpturing of the body is also variable, this variation is limited in the majority of species to punctulate microsculpturing or conflated micropunctures; with some species nearly glabrous (ex: *H. nitidula* and *H. punctatissima*). In contrast, some species have more complex rugopunctate and foveate sculpturing (ex: *H. vernacula*). The mandibles are triangular with normally 1–4 apical teeth; the remainder of the masticatory margin with various numbers of denticles or teeth. The size of the eyes is variable, ranging from 1 to 40–60 facets.

The antennae consist of 12 segments. The scapes are variable in length, varying from reaching the midline of the head to surpassing the posterior border by the length of the first 3 funicular segments. The funicular segments of some species form a distinct or loose 5-segmented club, whereas in other species the segments gradually increase in length and width, not forming a club. The shape of the petiolar node is variable; it may be short and quadrate as in *H. punctatissima* and *H. corruptela* or tall and subtriangular as in *H. foreli* and *H. creola*. Taylor (1967) characterized the subpetiolar process as a “simple lobe.” However, a few species of *Hypoponera* have a fenestra and some carinae present (ex: *H. coveri* and *H. subsarissa*). The gaster is of typical poneriform morphology.

*Hypoponera* is similar in overall appearance to other ponerines, especially species in the genera *Ponera* and *Pachycondyla* (including *Cryptopone*). Of the taxa noted, *Ponera* may be considered the most similar to *Hypoponera* in gross morphology. Both taxa can be separated by those character states included in Table 2. The defining characters separating *Hypoponera* and *Ponera* are focused on the subpetiolar process. Taylor (1967) characterized the subpetiolar process as simple in *Hypoponera* as it lacks a fenestra and posteriorly directed teeth; which are present in *Ponera*. However, a few species of *Hypoponera* have a fenestra (ex: *H. zwaluwenburgi*, and *H. perplexa*), in addition in a few species (ex: *H. famini* and *H. distinguenda*) there is a small shallow depression in the position where the fenestra is found, but this area is not translucent. In *H. coveri*, there is a carina on the posterior face of the subpetiolar process which may appear as teeth in lateral view. Careful examination of the subpetiolar process for a true fenestra in conjunction with two posteriorly directed teeth will separate *Ponera* from *Hypoponera*. The meso- and meta-tibiae have a single pectinate spur in *Hypoponera*. This character state separates *Hypoponera* from *Pachycondyla* (including *Cryptopone*); as these latter genera possess two spurs on each of the meso/meta legs.

**Description.** Total length ranging from 0.4 mm (ex: *H. parva*) to 6.5 mm (ex: *H. leveillei*). Color variable ranging from pale yellow in *H. parva* to black in *H. nitidula*. Head variable in shape, rectangular-elongate to quadrate; lateral margins parallel, or convex giving the head a rounded appearance; anterior and posterior border equal or subequal. Mandibles triangular; masticatory margin with 3–4 enlarged apical teeth, remainder of masticatory border denticulate, or with distinct teeth along

entire masticatory edge (ex: *H. leveillei* and *H. clinei*) or entire margin denticulate, teeth and denticles variable in number; outer border of mandibles with concavity (ex: *H. inexorata* and *H. fallax*) or lacking concavity (dominant character state); color of mandible frequently lighter than head; head with puncticulate sculpturing, often shiny or reflective; decumbent hairs arising from punctae. Papal formula: maxillary 1: labial 1 or 2, maxillary palps small. Clypeus simple, majority of species with medial portion lobate (swollen and projecting anteriorly); anterior margin evenly convex, in few species median notch present; tentorial pits apparent, area around pits depressed. Frontal lobes small, expanded, barely concealing antennal insertions. Antennae 12-segmented; scapes increase in width apically (variable, some species with about equal width), variable in length, may or may not surpass posterior margin of head; funiculus longer than scape, terminal four or five funicular segments gradually enlarged into slight club, some species with distinct club or lacking club; scape with appressed pubescence and stout decumbent pilosity, integument with fine punctae, funiculus typically with dense stout appressed pubescence and decumbent pilosity. Median furrow distinct. Eyes variable in size, comprised typically of 1–17 ommatidia, up to 60 ommatidia, facets may be fused, partially fused or distinct; ocelli absent. Mesosoma profile variable, evenly convex (ex. *H. opaciceps*) to nearly evenly flat (ex. *H. punctatissima*) to having mesosomal indentation (ex. *H. foreli*) at sutures. Suture development variable, notal and pleural sutures presences and distinctiveness variable among species. Pronotum longer than wide; with narrow neck, striae and minute carinae present; anterior edge rounded in dorsal view, posterior edge with medial concavity. Promesonotal suture present, impressed, distinctly incised, or even. Mesonotum even with pronotum, to convex, flat or inclined posteriorly; mesonotal-pleural suture (=transverse groove) variable, distinct to absent. Mesometanotal suture variable, absent, faint to forming a distinct groove; anterior margin of mesometanotal junction with striae. Propodeal dorsum even with promesonotum, typically inclined posteriorly, in dorsal view sides converging tectiform to distinct broad dorsum; dorsal face meeting posterior face in angle or smooth rounded convexity. Metapleural gland opening oval to elliptical, opening directed posterolaterally. Petiole node shape variable, from short, rather quadrate (*H. punctatissima*) to tall, scale-like (*H. nitidula*), subspiracular process variably developed. Subpetiolar process lobate, variable from short lobe to elongate flange (*H. capilosa*, *H.*

*stoica*) to a square process (*H. punctatissima*). Fenestra or small circular depression, a profenestra, may be present; variable development of carinae on process in few species (never paired posterolateral teeth). Legs unremarkable and of typical form; meso- and meta-thoracic legs with one pectinate spur. Gaster of typical poneromorph form with constriction between gastral segments one and two, constriction variable in demarcation.

### Female (Gyne) (Fig. 26)

**Diagnosis.** Females of *Hypoponera* can be separated from other similar appearing genera of poneromorph subfamilies by the single spurs on the meso-meta tibiae, and the lack of fenestra and posteriorly directed teeth on the subpetiole. Of the gynes I have examined, none have been found with a fenestra or a profenestral depression.



**Figure 26.** Gyne of an undetermined *Hypoponera*. Frontal view of head capsule (A). Lateral habitus (B). Photographs courtesy of Dimby Raharinjanahary and <http://www.antweb.org>.

**Description.** Similar to workers. Mandibles, palps, antennae like that of workers. Compound eyes well-developed; typically 10–27 facets, normally more numerous than in workers, ocelli present. Mesosoma with well demarcated pleural sutures in some species, lacking sutures or with only one suture in others. The meso- and meta- thoracic pleurae with well-developed transverse sulci dividing pleural regions but character varies. Mesosoma with pterous-development typical of winged ants including well-developed scutellum, scutum, parateron, and tegula. Pronotalscutellar suture distinct. Hind wing lacking anal lobe

(Taylor, 1967). Propodeum often separated from mesothorax by distinct suture. Petiole similar to that of workers. Gaster not notably enlarged, similar to worker.

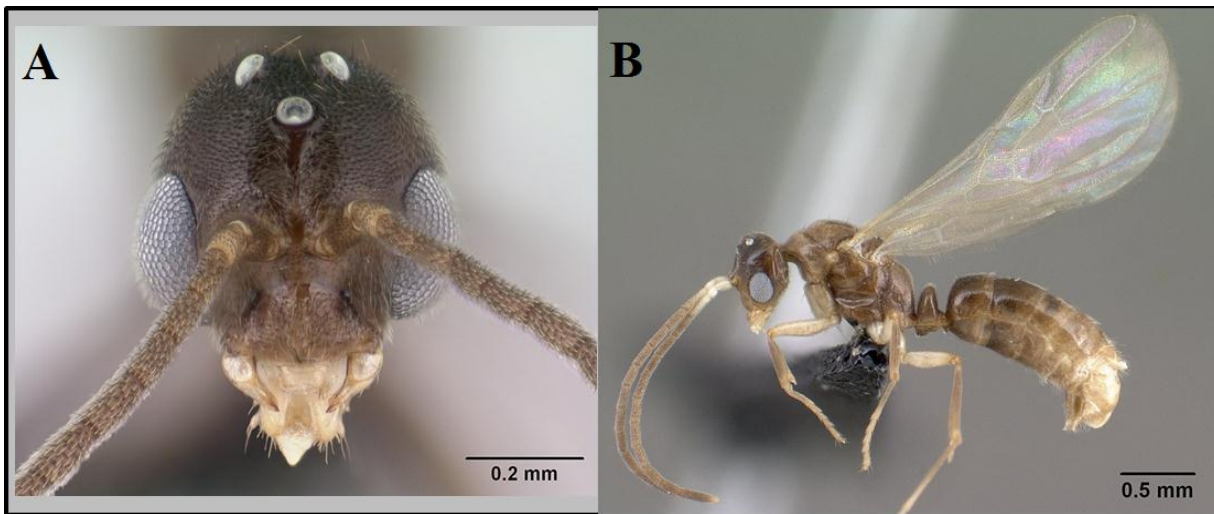
### **Female Ergatogyne**

**Diagnosis.** Females of *Hypoponera* can be separated from other similar appearing genera of poneromorph subfamilies by the single spurs on the meso/meta tibiae, and the lack of fenestra and posteriorly directed teeth on the subpetiole. Designation of an ergatogyne is often difficult. Some forms have distinct ocelli and more developed mesosoma than that found in the workers of the same nest series, whereas in other forms only careful study of the ommatidia number (distinctly more facets than workers) or dissections will reveal ergatogynes. If one suspects an ergatogyne, a detailed study of the worker eyes is required.

**Description.** Similar to workers in overall appearance. Depending on species ergatogyne may be as large as gyne, same size as worker or intermediate between gyne and worker (eg. *H. bondroiti*). Compound eyes are large with more ommatidia than in worker caste, ocelli may be present or absent. Permanently apterous, mesosoma simple as in workers with none of sutures or notal development found in gyne-females, larger in some species than workers. Sutures like those of workers, lacking any sclerites that accompany wing attachment.

### **Male (Fig. 27)**

**Diagnosis.** Males of *Hypoponera* could be confused with members of the genus *Ponera* and *Pachycondyla*. Gynes can be separated based on the number of tibial spurs and development of the subpetiolar process. In *Pachycondyla* the meso- and metatibiae have two spurs, in contrast *Hypoponera* has only one spur. *Hypoponera* has a distinct spine on the apical tergum on abdominal segment VIII, whereas *Ponera* lacks such a spine (Taylor 1967, Yashimara and Fisher 2007).



**Figure 27.** Undetermined *Hypoponera* male. Frontal view of head (A). Lateral view of male (B). Photographs courtesy of Dimby Raharinjanahary and <http://www.antweb.org>.

**Description.** Head reduced. Mandibles reduced or vestigial with no denticles. Clypeus comprising one third of head; midline of clypeus bulbous, protruding in lateral view (*H. opacior* and *H. opaciceps*). Compound eyes large, typically consisting of 20–60 facets, with prominent ocelli. Maxillary palps with one reduced segment, labial palps with one to four segments (Taylor 1967). Mandibles reduced. Antennae with 13 segments not clubbed, scape short, antennal scrobe absent. Head round, nearly as wide as long, vertex rounded. Mesosoma with pterous-development typical of winged ants. Wing venation like that of females, lacking jugal lobe. Abdominal tergum VIII without ventrally directed spine (Yashimara and Fisher 2007). Taylor (1967) described the genital components as the gonoforceps lacking a posterodorsal process (present in males of *Ponera*) and the subgenital plate spatulate.

#### **Male (Ergatoid)**

**Diagnosis.** These are worker-like in overall appearance, however the terminalia are exposed. The head is of an odd shape.

**Description.** Head not reduced, worker-like; in some species head larger than workers of same species. Mandibles not reduced and worker like. Antennal segmentation variable, some species with 12 whereas others with 13 segments. Mesosoma worker-like with no notal development, wings absent. Gonoforceps exposed. Yamauchi et al. (1996) noted two types of ergatoid males within a Japanese species. Major



males were the largest members of the colonies, often with well-developed and enlarged heads. Minor males have head of typical worker-like form, body smaller than major males.

**Ergataner Male** (Fig. 28)

**Diagnosis.** The ergataner male is unique in overall appearance and pale in coloration. The head and mesosoma are glabrous. The head is large and gibbous, not typical in form, the posterior portion is rounded and expanded. The eyes are small and reduced and the ocelli are absent. The profile of the mesosoma is uneven, with distinct incised promesonotal and mesometanotal grooves. The gaster lacks the typical constriction between the first and second gastric segments. The terminus of the gaster has the genitalia exposed.



**Figure 28.** Ergataner of *H. pampana* (photo used with permission of A. Wild).

**Description.** Based on *H. pampana*. 2.0 mm in total length. Entire body glabrous, nearly lacking hairs, except for anterior edge of clypeus and scattered on dorsum of gaster. Head gibbous. Mandibles reduced, edentate stubs. Eye reduced, consisting of one ommatidium; ocelli absent. Scapes comparatively short, longer than broad, similar in size and shape to segments 2 and 3. Antennae segmented. Mesosoma gibbous. Pronotum rounded, prominent indentation between promesonotum; mesonotum domed, prominent indentation between mesonotum and propodeum. Dorsal and posterior



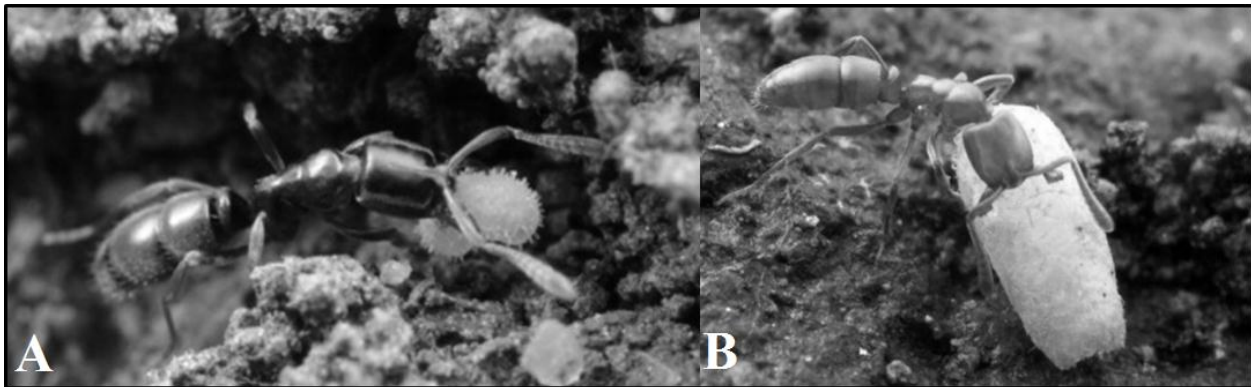
face of propodeum evenly convex in profile. Petiole reduced, not like that of workers or females. Gaster lacking constriction between segments 1 and 2. Genital organs exposed.

**Larvae** (Fig. 29A)

**Description.** The larvae are pogonomymecoid. Antennae minute (Wheeler and Wheeler 1989). Wheeler and Wheeler (1976) define this larval type as “diameter greatest near middle of abdomen, decreasing, gradually towards head and more rapidly towards posterior end. Thorax more slender than abdomen and forming a neck, which is curved ventrally.” The dorsum of the abdominal segments four and five have two pairs of “doorknob- shaped” glutinous tubercles (Wheeler and Wheeler 1976, Taylor 1967).

**Pupae** (Fig. 29B)

**Description.** Pupae are enclosed in cocoons. Taylor (1967) notes this is the normal condition with the exception of *H. monticola* (Mann, 1921). Naked pupae are a rare condition within the Ponerinae.



**Figure 29.** *Hypoponera* spp. Larvae of *Hypoponera* with noticeable doorknob tubercles (A), and *Hypoponera* carrying cocoons (B). (photographs used with permission of A. Wild).

## SPECIES GROUPS

I have designated groups of morphologically similar taxa in order to address issues of taxonomy and create systematic hypotheses. I define a morphological species group as an artificial (not based on phylogenetic evidence) group that unites species together based on a suite of shared characters that are more distinctive to that group than to any other such group. Not all species have been assigned to species groups. Photographic documentation of these species groups is provided in Appendix A.

These groupings are not referred to as “complexes” for two important reasons; one the term (complex) often implies groupings in which the taxonomy is confusing or difficult. As this may not be the case, the term is not employed. Additionally the term “complex” may also suggest clade membership and these groupings have not undergone phylogenetic analysis. However, the importance of such species groups is clear when constructing taxonomic keys, identification guides, organizing species profiles, and proposing systematic hypotheses. Additionally, since they have no taxonomic place in the hierarchy these groups cannot influence taxonomy. Species groups formed utilizing phenetic methodologies have difficulty being applied to *Hypoponera* and creating species groups based on shared characters suites is nearly impossible to apply since character states are continuous among species. I have, however, loosely defined broad species groups to aid in a general approach to the genus.

### ***distinguenda-group***

This species group is the archetype of *Hypoponera*. The workers are medium to large-sized species of *Hypoponera* (TL 3.9–4.3 mm, WbL 1.0 mm) that are variable in color but mostly red-brown, brown or light tan. The mandibles have distinct teeth or well-developed denticles. The eyes are comprised of well-defined facets that vary in number (15–30+) and are located close to the posterior border of the head. The scapes slightly surpass the posterior border of the head, but by a length of only the first or half of the first funicular segment. The funiculus does not form a distinct club. The head is quadrate in frontal view with the sides convex. The posterior margin of the head lacks a concavity, being flat or convex. The mesometanotal suture is defined and is slightly incised or forming a distinct shallow groove. The dorsopropodeum is at the same level as the mesonotum. The petiolar node is scale-like, with a quadrate subpetiolar process, this subpetiolar process often has a profenestra (depression). These

species are similar to some members of the *foreli*-group (ex. *H. idelettae* and *H. leninei*). Membership for this group is: *H. capilosa*, *H. coveri*, *H. distinguenda*, *H. perplexa* and *H. schmalzi*.

### ***foeda*-group**

This group is variable and perhaps is the “kitchen drawer” of roughly phenetically similar species. Species in this group are tiny to medium-sized ants (TL 2.0–3.0 mm), that are pale-yellow to yellow, or yellow-orange in coloration. The mandibles are denticulate with some species having apical teeth. A few species have a concave outer mandibular border (ex. *H. foeda*, *H. fallax*, *H. inexpedita*, *H. inexorata*, and *H. stoica*. *Hypoponera inexpedita* and *H. stoica* have a slight concavity). The eyes are small and consist of one ommatidium, however a few species have 3–5 fused facets. The eyes are close to the posterior margin of the clypeus for the majority of species. The lengths of the scapes are variable, ranging from falling short to surpassing the posterior margin of the head. In frontal view the head is quadrate to elongate and the sides of the head are convex to parallel (giving an elongate appearance). The mesometanotal suture is mostly reduced or faint, in some species, however, the suture is incised to form a shallow groove (in *H. inexpedita* and *H. inexorata*), and the dorsopropodeum is even with the mesonotum. The petiolar node is subtriangular in lateral view with the anterior and posterior faces converging or parallel. The subpetiolar process is quadrate and lacks a fenestra or profenestra. Membership for this group is: *H. agilis*, *H. antoniensis*, *H. fallax*, *H. famini*, *H. foeda*, *H. inexorata*, *H. inexpedita*, *H. saroltae*, *H. stoica*, and *H. transiens*.

### ***foreli*-group**

These are medium-sized species of *Hypoponera* (TL 4.0–5.0 mm, WbL 1.30–1.70 mm). Their coloration varies from yellow-tan to dark brown or black. The ocular mandibular distance is large (OMD 0.15–0.21 mm); this distance when indexed with head length ranges from 15–19. The scapes are long (SL 0.77–1.0 mm, SI 80–84) and surpass the posterior margin of the head by a length at least equal to the first funicular segment and in some species by a distance of the first two funicular segments. The head is elongate to quadrate (rectangular) (CI 67–84, HL 0.95–1.1 mm) to ovate in frontal view and the sides are parallel or slightly convex. Kempf (1962) noted a humpbacked appearance to the mesosoma. In profile the mesosoma is slender, and uneven. The promesonotal suture is present and distinct; the

mesonotum frequently slopes or is inclined posteriorly. The mesometanotal junction is distinct and incised, forming a groove. The mesonotum and propodeum are uneven, that is the propodeal dorsum is below the level of the mesonotum. The mesonotum in dorsal view is oval-subcircular. The petiole is variable from thin and scale-like to a thick and quadrate node. Membership for this group is: *H. apateae*, *H. foreli*, *H. idelettae*, *H. leninei*, *H. impartergum*, *H. nemsisea*, *H. nitidula*, *H. subsarissa*, and *H. vernacula*.

### ***leveillei*-group**

This group is comprised of species more *Pachycondyla*-like than other species of New World *Hypoponera*. The body is robust and these are large-sized species (TL 5.0–6.0 mm) that are black, dark brown or brown in color. The mandibles have well-developed teeth or, if teeth are not present for the entire margin, half of the masticatory margin has teeth followed by well-developed denticles. The eyes are comprised of distinct ommatidia yet are small in size, and the eyes are positioned far from the posterior margin of the clypeus. The scapes surpass the posterior margin of the head. The scapes are distinctly wider at the apex than at the base, more so than in any other group. The head is quadrate and robust, the sides are convex, and the posterior margin of the head is wider than the anterior region. The mesometanotal suture is incised, forming a shallow groove. The dorsopropodeum is below the surface of the mesonotum (except in *H. clinei*). The petiolar node in lateral view is thick and scale-like and the subspiracular process is tooth-like. The subpetiolar process is quadrate, with a profenestra present (at least in *H. leveillei*). Membership for this group is: *H. clinei*, *H. iheringi*, and *H. leveillei*.

### ***opaciceps*-group**

The species included in this group are deeply and distinctly foveo-punctate or punctate. They are small to large-sized ants that are variable in color but nearly always dark brown to black. The mandibles have distinct teeth. The anterior margin of the clypeus has a small medial notch. The eyes are variable in size from small to large (4–30+ distinct facets). The head in frontal view is quadrate. The mesometanotal suture is slightly incised but shallow and the dorsopropodeum is on an even level with the mesonotum. The petiolar node in lateral and dorsal views is thick and quadrate. Though these species are placed

together there are incongruent character states and the species are likely not closely related. Membership for this group is: *H. opaciceps* and *H. corruptela*.

#### ***parva*-group**

The worker is a tiny-sized (TL 1.0–2.3 mm) pale-yellow to yellow species of *Hypoponera*. The mandibles are denticulate. The eyes are small and reduced, often appearing as one facet (ommatidia may be fused). The scapes are short and do not surpass the posterior margin of the head (except in *H. aliena*). The funicular segments form a distinct club. The head is quadrate in frontal view, with punctulate sculpturing. The mesometanotal suture is slightly incised to form a shallow groove but the dorsopropodeum is not below the level of the mesonotum. The petiolar node is subtriangular to rectangular in lateral view and the anterior and posterior faces are variable in the amount of convergence. The subpetiolar process is anteriorly lobate and is lacking a fenestra or profenestra. The body is overall reflective to dull. Membership for this group is: *H. aliena*, *H. clavatula*, *H. parva*, and *H. promontorium*.

#### ***punctatissima*-group**

These are small species, and the sexual intercastes are very common. The body is yellow, yellow-orange to orange-tan in coloration. The mandibles are denticulate. The eyes are small consisting of only a few facets (3–5), however, ergatogynes may have five-times as many. The scapes do not surpass the posterior margin of the head. The funicular segments form a distinct club. In frontal view the head is elongated. The mesosoma is even in profile but incised at the promesonotal and mesometanotal sutures, although this incised area is reduced in some specimens. The lateral regions of the mesosoma are reflective with limited sculpturing. In lateral view, the petiolar node is short and quadrate with the anterior and posterior faces not converging. Membership for this group is: *H. punctatissima*.

#### ***trigona*-group**

This is perhaps the most commonly encountered species group outside the *distinguenda*-group. The species in this group are small to medium sized ants, mostly dark brown to black in coloration. The mandibles are variable in dentition. The eyes are small and comprised of 3–6 facets which may be distinct, partially fused or completely fused. The eyes are located near the posterior margin of the

clypeus. The scapes reach or surpass the posterior margin of the head. The head when viewed in full face is quadrate, with the sides convex. The mesometanotal suture is incised and forms a very shallow groove. The dorsopropodeum is even with the mesonotum (except in *H. subsarissa* where the dorsopropodeum is distinctly below the level of the mesonotum). The petiolar node when viewed laterally is thin and squamiform with the subpetiolar process quadrate to lobate. Membership for this group is: *H. creola*, *H. opacior*, *H. pampana*, *H. trigona*, and *H. viri*.

## REVISED TAXONOMIC STATUS OF *HYPOPONERA*

### SYNONYMIC LIST OF EXTANT NEW WORLD SPECIES

*Hypoponera agilis* (Borgmeier, 1934)

*Hypoponera aliena* (F. Smith, 1858)

*Hypoponera antoniensis* (Forel, 1912) **stat. nov.**

*Hypoponera apateae* **sp. nov.**

*Hypoponera capilosa* **sp. nov.**

*Hypoponera clavatula* (Emery, 1906)

= *fiebrigi* (Forel, 1908) **syn. nov.**

= *neglecta* (Santschi, 1923b) **syn. nov.**

*Hypoponera clinei* **sp. nov.**

*Hypoponera corruptela* **sp. nov.**

*Hypoponera coveri* **sp. nov.**

*Hypoponera creola* (Menozzi, 1931)

*Hypoponera distinguenda* (Emery, 1890)

= *argentina* (Santschi, 1922)

= *distinguenda dispar* (Santschi, 1924) **syn. nov.**

= *distinguenda histrio* (Forel, 1912) **syn. nov.**

= *wilsoni* (Santschi, 1924)

*Hypoponera faceta* (Menozzi, 1931) **incertae sedis**

*Hypoponera fallax* (Forel, 1909) **stat. nov.**

*Hypoponera famini* (Forel, 1912) **stat. nov.**

*Hypoponera fenestralis* (Gallardo, 1918) **incertae sedis**

*Hypoponera foeda* (Forel, 1883)

= *gracilicornis* (Menozzi, 1931) **syn. nov.**

*Hypoponera foreli* (Mayr, 1887)

*Hypoponera gleadowi* (Forel, 1895)

= *oblongiceps* (M. Smith, 1939)

*Hypoponera idelettae* (Santschi, 1923a)

*Hypoponera iheringi* (Forel, 1908)

*Hypoponera ignigera* (Menozzi, 1927) **incertae sedis**

*Hypoponera impartergum* **sp. nov.**

*Hypoponera inexorata* (Wheeler, 1903)

*Hypoponera inexpedita* (Forel, 1911) **stat. nov.**

*Hypoponera leninei* (Santschi, 1924)

*Hypoponera leveillei* (Emery, 1890) **comb. nov.**

*Hypoponera menozzii* (Santschi, 1932) **incertae sedis**

*Hypoponera nemsisea* **sp. nov.**

*Hypoponera nitidula* (Emery, 1890)

*Hypoponera opaciceps* (Mayr, 1887)

= *opaciceps gagei* (Forel, 1908) **syn. nov.**

= *opaciceps postangustata* (Forel, 1914) **syn. nov.**

*Hypoponera opacior* (Forel, 1893)

= *opaciceps jamaicensis* (Aguayo, 1932) **syn. nov.**

= *opacior chilensis* (Forel, 1914) **junior syn.**

*Hypoponera pampana* (Santschi, 1925) **stat nov.**

= *opaciceps cubana* (Santschi, 1930) **syn. nov.**

*Hypoponera parva* (Forel, 1909)



= *reichenspergeri* (Santschi, 1923b) **syn. nov.**

*Hypoponera perplexa* (Mann, 1922)

*Hypoponera promontorium* **sp. nov.**

*Hypoponera punctatissima* (Roger, 1859)

= *beebei* (Wheeler, 1924) **syn. nov.**

= *ergatandria* (Forel, 1893) **syn. nov.**

*Hypoponera saroltae* (Forel, 1912) **stat. nov.**

*Hypoponera schmalzi* (Emery, 1896)

= *schmalzi fugitans* (Forel, 1912)

*Hypoponera schmalzi paulina* (Forel, 1913) **incertae sedis**

*Hypoponera stoica* (Santschi, 1912)

*Hypoponera subsarissa* **sp. nov.**

*Hypoponera transiens* (Santschi, 1925) **stat. nov.**

*Hypoponera trigona* (Mayr, 1887)

= *distinguenda vana* (Forel, 1909) **syn. nov.**

= *trigona cauta* (Forel, 1912) **syn. nov.**

= *collegiana* (Santschi, 1924) **syn. nov.**

= *collegiana paranensis* (Santschi, 1924) **syn. nov.**

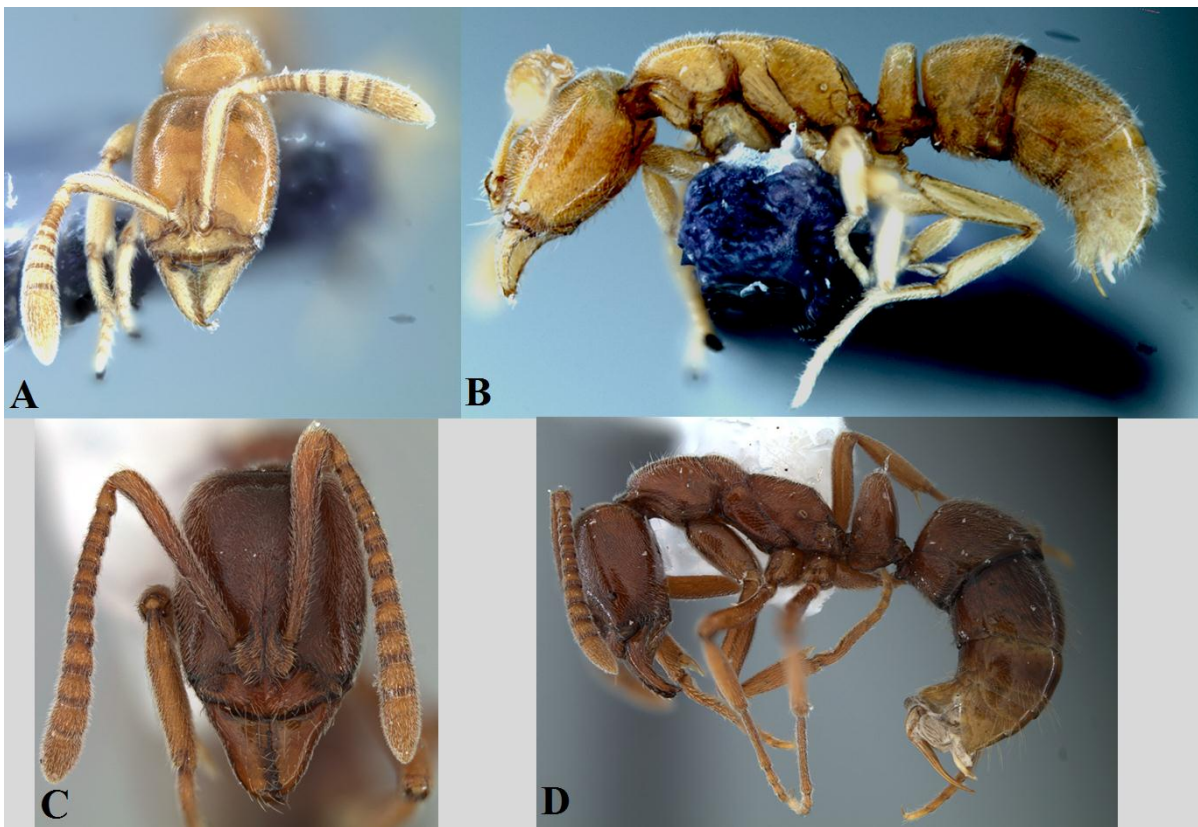
*Hypoponera vernacula* (Kempf, 1962)

*Hypoponera viri* (Santschi, 1923a)

# KEY TO THE NEW WORLD *HYPOPONERA* WORKERS

**1** Tiny to small sized ants (WbL 0.40–0.67 mm); pale-yellow to yellow in coloration; antennae with distinct club, terminal antennae segments greater in length than funicular segments 2–7; eye reduced appearing as one facet, with fused ommatidia; subpetiolar process with asymmetrical anterior lobe (Fig. 30A-B)...2

**1'** Small to large sized ants (WbL 0.70–1.70 mm); variable in coloration; antennae with distinct club, gradual club or lacking club; eyes variable; subpetiolar process variable, not normally with asymmetrical anterior lobe (Fig. 30C-D)...5



**Figure 30.** *Hypoponera aliena* (A–B), and *H. impartergum* (C–D). Couplet 1 (A–B), Couplet 2 (C–D).

**2** Lateral portions of propodeum and metapleuron distinctly converging dorsally, dorsopropodeum extremely tectiform (Fig. 31A), forming a thin dorsal surface...*promontorium* sp. nov.

**2'** Lateral portion of propodeum and metapleuron gradually converging dorsally, dorsopropodeum with a distinct dorsal surface (Fig.31B)...3



**Figure 31.** *Hypoponera promontorium* (A) and *Hypoponera parva* (B). Photo B courtesy of A. and <http://www.antweb.org>.

**3** Scaes reaching posterior border of head (SI 81); dorsopropodeum shorter than posteropropodeum...*aliena*

**3'** Scaes failing to reach posterior border of head (SI 58–68); dorsopropodeum longer or same length as posteropropodeum...4

**4** Weber length 0.65–0.67 mm; lateral area of propodeum with dense punctae, appearing dull; meso-and-metapleuron with distinct striae...*clavatula*

**4'** Weber length 0.48 mm; lateral area of propodeum with fine punctae, appearing reflective not dull; promeso-and-metapleuron lacking striae...*parva*

**5** Large sized ants; head robust with the posterior margin longer than anterior margin...6

**5'** Small to medium sized ants; posterior margin of head may be slightly longer but not distinctly longer than anterior margin ...8

**6** In profile petiolar node distinctly scale-like, anterior and posterior faces converging apically, apex thin, less wide than base...*clinei*

**6'** In profile petiolar node subtriangular to quadrate, anterior and posterior faces slightly converging, apex about same width as base...7

**7** Large species (HL 1.3 (1.3–1.4); HW<sub>2</sub> 1.1 (1.0–1.1); WbL 1.9 (1.88–1.95); sculpturing on head fine, impressions fine, small; mandibles with teeth along entire masticatory margin; subpetiolar process quadrate with small anterior depression...*leveillei*

**7'** Not as large (HL 1.1; HW<sub>2</sub> 0.86 (0.82–0.91); WbL 1.50 (1.40–1.50); sculpturing on head with distinct impressions deeper than above; mandibles with teeth apically to midpoint, remainder of masticatory margin denticulate; subpetiolar process lobate, lacking anterior depression...*iheringi*

**8** Mesosoma in profile with distinct mesometanotal junction, dorsopropodeum below level of mesonotum; scapes long (SI 80–84) surpassing posterior margin of head by length equal to at least length of first funicular segment; head elongate and rectangular (CI 67–84; HL 0.95–1.1)...9

**8'** Not with exact combination of characters above...14

**9** Petiole node stout, rectangular (PtW 0.30–0.32 mm; PI 47–50), anterior and posterior faces nearly parallel, apex flat; sides of pronotum roughly sculptured; dark brown in coloration (Brazil) ...*vernacula*

**9'** Petiole node distinctly slender (PtW 0.21–0.29 mm; PI 30–43), anterior and posterior faces converging apically, apex rounded, if node appearing thick; side of pronotum smooth and glossy, yellow to light brown in coloration...10

**10** Scape surpassing posterior border by at least first two funicular segments; eyes apparent, large comprised of 12–16 distinct facets; petiole slender in profile (PtW 0.21 mm; PI 30; PNI 35), dorsally slender (DPtL 0.10–0.11 mm) (Peru, Bolivia, Paraguay and Argentina) ...*foreli*

**10'** Scape surpassing posterior border by first funicular segment; eye small, comprised of 1–7 facets; petiole in profile scale-like, not slender (PtW 0.24–0.28; PI 35–43; PeNI 49–56), dorsally petiole node ovate, not slender (0.13–0.17 mm)...11

**11** Mesosomal dorsum with abundant long (0.10–0.11 mm) suberect hairs ...12

11' Mesosomal dorsum with few short (0.01–0.05 mm) suberect to decumbent hairs...13

12 Outer border of mandible concave; head elongate, (HL 0.67–0.69 mm; CI 74); large sized ants (WbL 1.46–1.67 mm)...*impartergum*

12' Outer border of mandible straight, lacking concavity; head subquadrate (HL 0.53 mm; CI 39); medium sized ants (WbL 1.14 mm)...*nemsisea*

13 Petiolar node tall (PH 0.67 mm; PI 35); metanotal junction incised but not forming a deep groove ...*idelettae*

13' Petiolar node stout (PH 0.64 mm; PI 43); metanotal junction incised forming a distinct deep groove ...*apateae*

14 Petiolar node quadrate and thick, sides not converging to slightly converging...15

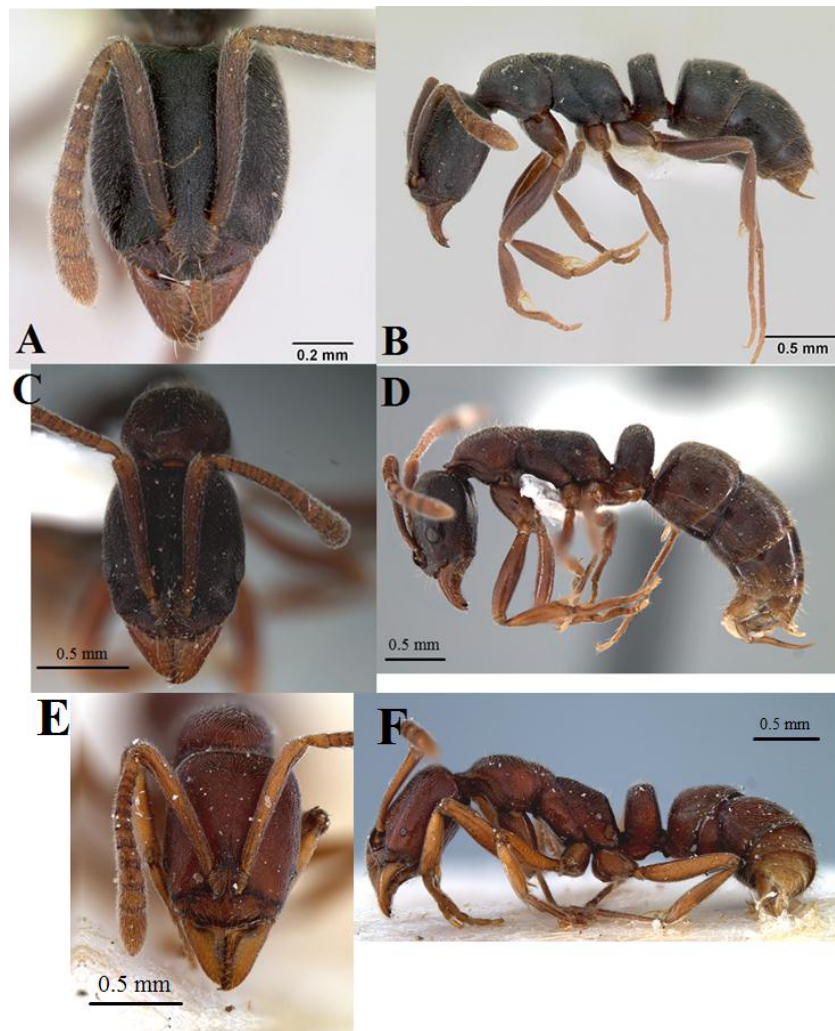
14' Petiolar node distinctly squamiform to cuboidal with anterior and posterior sides converging...27

15 Petiolar node short not reaching level of dorsopropodeum, rounded; pleural area reflective lacking dense punctate sculpturing...*punctatissima*

15' Petiolar node tall, reaching or surpassing level of dorsopropodeum, quadrate to subquadrate; pleural region and overall body with distinct punctate sculpturing.....16

16 Petiolar node subquadrate, anterior and posterior faces convex, apex rounded; larger species (Fig. 32D)...*corruptela*

16' Petiolar node quadrate, anterior and posterior faces parallel, apex flat; smaller species (Fig. 32B &F)...17



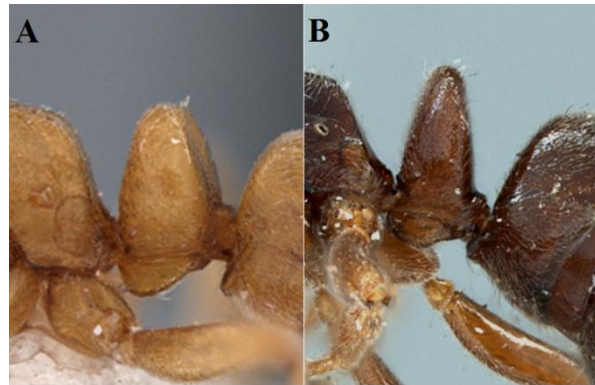
**Figure 32.** Frontal (A, C, E) and lateral (B, D, F) view of *H. opaciceps* (A-B), *H. corruptela* (C-D), and *H. leninei* (E-F). All photos are of primary type material.

**17** Head with lateral margins convex; posterior margin of head with concavity; scapes slightly surpassing posterior margin of head by length not more than half of first funicular segment (Fig. 32A)...*opaciceps*

**17'** Head with lateral margins parallel, at most slightly convex; posterior margin of head flat, not concave; scapes surpassing posterior margin of head by length of at least length of first funicular segment (Fig. 32E)...*leninei*

**18** Petiolar node subtriangular to cuboidal (Fig 33A); yellow to yellow-tan in coloration...19

**18'** Petiolar node squamiform (Fig. 33B); coloration variable...27



**Figure 33.** Lateral views of petiolar nodes, subtriangular (A) *H. transiens* and squamiform (B).

**19** Scares reaching or surpassing posterior border of head...20

**19'** Scares failing to reach posterior border of head...23

**20** Propodeum in dorsal view strongly tectiform; outer margin of mandibles with concavity...*fallax*

**20'** Propodeum in dorsal view not strongly tectiform, sides may converge; outer margin of mandibles lacking concavity...21

**21** Larger (WbL 1.06 mm, HW<sub>2</sub> 0.58–0.67mm); scares surpass posterior margin of head by length of the first funicular segment; antenna not forming club...*agilis*

**21'** Smaller (WbL 0.78–0.98 mm, HW<sub>2</sub> 0.43–0.51 mm); scares reaching but either even with or surpassing posterior margin of head by width of apex of scape; antenna forming weak club....22

**22** Lateral portion of propodeum puncto-rugulose; eye with 4 facets (OMD: 0.05 mm) ...*antoniensis*

**22'** Lateral portion of propodeum with small scattered punctae; eye small 1 facet (OMD 0.13 mm)...*stoica*

**23** Head long, squarish; lateral portions of head rounded (CI 76–81)...24

**23'** Head elongate, rectangular; lateral portions not expanded and rounded (CI 66–71)...26

**24** In postero-lateral view upper propodeum with dispersed rugae, rugae reaching lateral portions of propodeal dorsum; larger (WbL 1.20–1.80 mm)...*inexpedita*



**24'** In postero-lateral view upper propodeum with punctae, lacking rugae; smaller (WbL 0.75–0.85 mm)...25

**25** Eye comprised of 4–5 partially fused facets; mesonotal-pleural suture faint...*saroltae*

**25'** Eye very small, comprised of one small facet; mesonotal- pleural suture distinct...*transiens*

**26** Body dull, densely punctulate; head sublucid, punctae on head with little space between them, dense pubescence; mandible with distinct concavity; eyes small, 1 facet (OMD<sub>1</sub> 0.11)...*foeda*

**26'** Body shiny, reflective, punctate; punctae on head with separation same as punctae width or half punctae width, head not densely covered with pubescence; mandible with slight concavity; eyes with 4 facets (OMD<sub>1</sub> 0.03 mm)...*famini*

**27** Larger sized specimens (WbL 1.0–2.0 mm)....28

**27'** Medium sized specimens (WbL 0.73–0.90 mm)...34

**28** Long abundant (25–50) erect hairs on dorsum of mesosoma...29

**28'** Shorter less abundant (10–24) erect hairs on dorsum of mesosoma...32

**29** Outer margin of mandible with distinct concavity (Fig. 34)...*inexorata*

**29'** Outer margin of mandible straight, at most slight depression...30



**Figure 34.** Frontal view of *H. inexorata*, with concavity on outer margin of mandibles. Photographs courtesy of A. Noble and <http://www.antweb.org>.

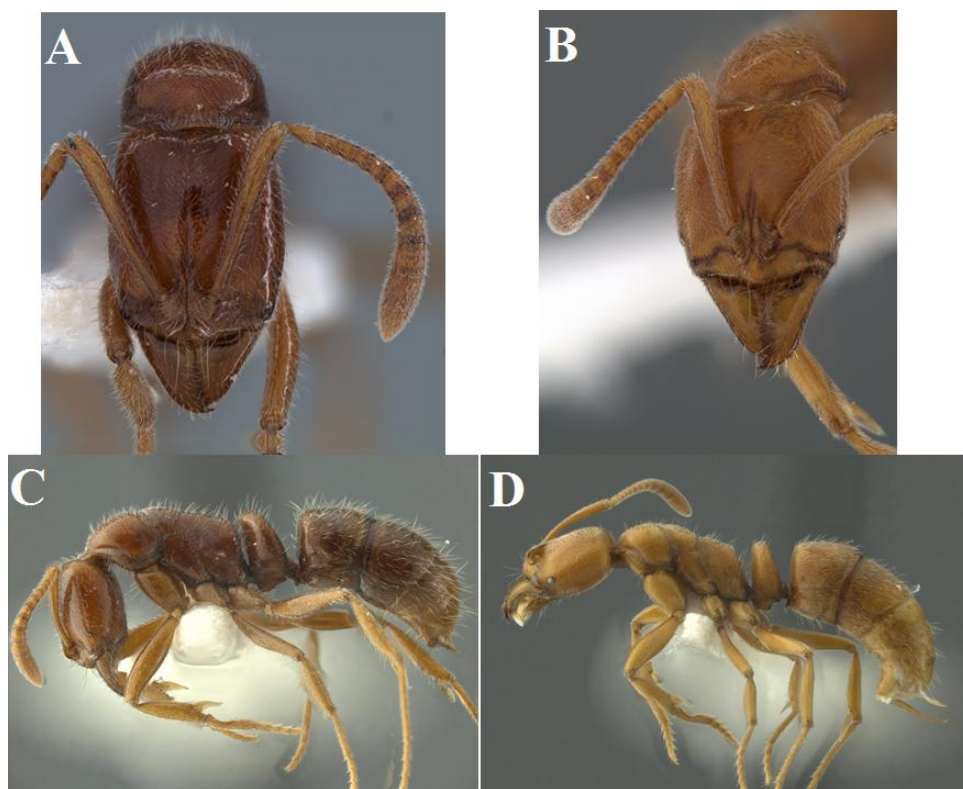
**30** Body nitid-reflective with black coloration and bluish reflections when viewed under fluorescent lights...*nitidula*



**30'** Not with the exact combination of character states as stated above...31

**31** Body covered in long flexuous white erect hairs, hairs numerous on head (9–21); body shiny; red-brown to orange-brown in coloration (Fig. 35C); head elongate; scapes surpassing posterior margin of head by length equal to half length of first funicular segments (Fig. 35A)...*capilosa*

**31'** Body with long erect, less flexuous hairs, erect hairs on head limited (2–6); body sublucid and yellow (Fig. 35D); head is quadrate; scapes surpass posterior margin by length equal to first and second (in some specimens third) funicular segments (Fig. 35B)...*coveri*



**Figure 35.** Comparison of *H. capilosa* (A and C) and *H. coveri* (B and D). Digital micrographs are of holotype and lectotype material respectfully.

**32** In lateral view mesosomal profile even, promesonotal and mesometanotal sutures not incised (Fig. 36A); few (1–7) short erect hairs present on dorsum of the mesosoma...*distinguenda*

**32'** In lateral view mesosomal profile uneven, promesonotal and mesometanotal sutures incised, dorsopropodeum below level of mesonotum (Fig. 36B); numerous (10–23) long erect hairs present on dorsum of mesosoma...33



**Figure 36.** Lateral view of *H. distinguenda* (A) and *H. perplexa* (B).

33 Mesonotum convex and inclined posteriorly, in profile dorsopropodeum convex...*perplexa*

33' Mesonotum flat, not convex nor inclined posteriorly, in profile dorsopropodeum flat inclined posteriorly...*schmalzi*

**34** Promesonotal junction not incised and not forming distinct mesonotal groove...35

**34'** Promesonotal junction forming incised groove...37

**35** Dorsum of mesosoma with numerous (15–24) erect hairs; propodeum with rugo-punctate sculpturing, punctae distinct, not shallow...*trigona*

**35'** Dorsum of mesosoma with few (2–10) erect hairs; propodeum with punctate sculpturing, punctae shallow...36

**36** Petiolar node thin, anterior and posterior faces distinctly converging apically, apex a third as wide as base (Fig. 37A) ...*viri*

**36'** Petiolar node scale-like, thicker than apex base, half as wide as base (Fig. 37B)...*opacior*



**Figure 37.** Comparison of petiolar node shapes for *H. viri* (A) and *H. opacior* (B). Digital micrographs are of type material.

**37** In lateral view anterior area of subpetiolar process with a distinct ventrally directed process (Fig.

38)...*subsarissa*

**37'** In lateral view anterior portion of subpetiolar process lacking any projection....38



**Figure 38.** Petiole of *H. subsarissa*. Digital micrographs are of type material.

**38** Mesonotum below pronotum, promesonotal and mesometanotal sutures forming distinct groove (Fig.

39A)... *creola*

**38'** Mesonotum not below pronotum, promesonotal and mesometanotal sutures incised but not forming deep groove (Fig. 39B)...*pampana*



**Figure 39.** Comparison of mesosoma profile for *H. creola* (A) and *H. pampana* (B). Digital micrographs are of type material.

## TAXONOMIC PROFILES

### *Hypoponera agilis* (Borgmeier, 1934) Fig. 40

*Ponera agilis* Borgmeier, 1934: 96, Paratypes, worker, REPUBLIC OF SURINAME:

Paramaribo Providence, Buenzli [3 specimens examined] (MCZC). Combination in *Hypoponera* Kempf, 1972: 121.

**Diagnosis.** The worker is a smaller, yellow to light yellow species of *Hypoponera* (TL 2.8–3.1 mm). The eyes are small with 1 or 2 partially fused facets appearing as one facet. The scapes surpass the posterior border of the head by a length equal to the first and in some specimens also half of the second funicular segments. A distinct club is absent and the funicular segments gradually expand. The head appears rectangular in frontal view, with the sides being nearly parallel. In lateral view the mesosoma has incised promesonotal and mesometanotal sutures. The propodeum when viewed dorsally is tectiform. The body sculpturing is reticulato-punctate, with fine and silky pubescence over the dorsum of the mesosoma becoming denser on the gaster. The petiolar node is scale-like and subtriangular in lateral view, with the anterior and posterior faces gradually converging toward the dorsum, and the apex is rounded.

### **Description.**

**Measurements (mm) of type workers (n=3<sup>1</sup>).** TL 2.95 (2.80–3.10), HL 0.75–0.78, HW<sub>2</sub> 0.58–0.67, CI 77–86, HS 66–73, EL 0.05–0.07, EW 0.05–0.07, OMD 0.18, SL 0.66–0.67, SI 82–90, ML 0.89 (0.85–0.96), WbL 1.06 (0.99–1.10), PnL 0.37 (0.32–0.43), PnW 0.44 (0.43–0.46), MsL 0.24 (0.21–0.26), MsW 0.32, DF 0.28 (0.25–0.32), PF 0.40 (0.36–0.43), PnH 0.46 (n=2), PtL 0.39 (0.37–0.42), PtW 0.22 (0.20–0.25), PtI 56 (53–59), PeNI 50 (46–58), SPtL 0.11 (n=1), SPtW 0.20 (n=1), DPtL 0.14, DPtW 0.27 (0.21–0.32), GS1L 0.40 (0.36–0.44), GS1W 0.52 (0.50–0.55), GS2L 0.47 (0.46–0.50), GS2W 0.52 (0.50–0.53).

<sup>1</sup> all of the head measurements are based on two workers, one type series specimen was missing a head.

Medium (TL 2.80–3.00 mm) in length. Coloration overall orange. Mandible reflective, lighter in color (yellow), large punctae present, hairs arise from pit; large apical tooth, followed by two small teeth, rest of masticatory margin with denticles; outer border lacking concavity. Clypeus yellow, similar to mandibles. Antennae yellow; scapes not greatly expanded apically, surpassing posterior border by

amount equal to the first, (and some) half of second funicular segments; funiculus gradually increasing in width, not forming distinct club; dense pilosity covering scape and funiculus. Eye small, 1–2 facets; eye far from posterior border of the clypeus (OMD 0.18 mm [n=2]). Posterior border of head slightly concave. Head rectangular, longer than wide (CI 77–86 [n=2]), punctate. Side of pronotum nitid; dorsum covered in grey appressed pubescence, scattered decumbent and subdecumbent pilosity present; promesonotal suture slightly incised. Mesonotum with appressed grey pubescence, scattered erect to decumbent pilosity present. Mesonotum inclined very slightly posteriorly from promesonotal suture. Mesonotal-pleural suture present, faint; pleural regions nitid, punctate. Anterior oblique suture present forming carinae but not as developed or high as in other species. Metamesonotal suture poorly developed but present. In dorsal view propodeum tectiform, in lateral view dorsopropodeum declining evenly, meeting posterior face in broad, rounded angle. Mesosoma reflective, dense, with appressed pubescence, scattered erect to decumbent pilosity present; dorsum and pleural regions punctate, dorsum with larger punctae than pleural areas. Petiolar node scale-like, slightly higher than first gastral segment, base wider than apex, apex moderately narrowed, convex; anterior face slightly convex, posterior face inclined. Spiracular process lobate, tooth-like. Subpetiolar process forming small rectangular lobe, anterior portion longer than posterior. Postpetiolar process lobe-like, not strongly flange-like. Gaster with fine dense pubescence, few scattered suberect hairs, posterior portion of segments with longer pilosity than rest of tergite.

**Etymology.** Latin *agilis* for nimble or active.

**Discussion.** The gyne and male are unknown. Borgmeier (1934) noted in his original description that the eyes were composed of 4–5 facets but when examining the specimens, the eyes appear to be one facet and only with high magnification can you see the facets, however I did not find 4 or 5 facets. Borgmeier (1934) compared this species to *H. ergatandria* now *H. punctatissima*; but outside of color this species does not resemble that species. *Hypoconera punctatissima* has a short, rounded, quadrate petiolar node but in contrast *H. agilis* has a squamiform node. *Hypoconera agilis* belongs to the *foeda* - species group.

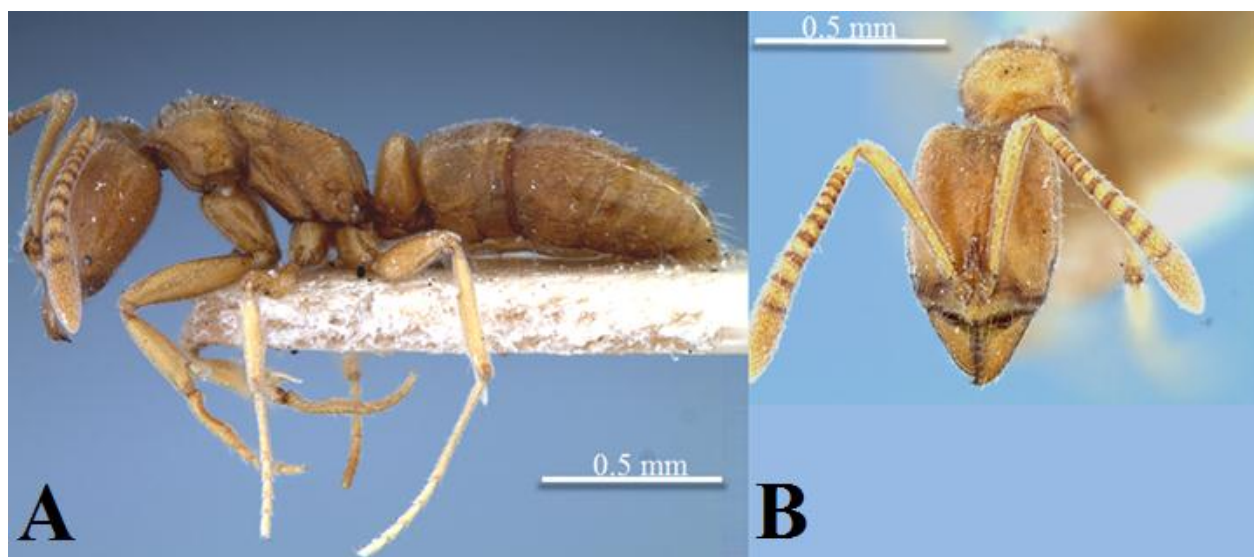
*Hypoponera agilis* may be confused with *H. stoica*, *H. antoniensis*, *H. inexorata*, *H. inexpedita*, and *H. saroltae*. All of these species are similar in coloration, size and general habitus. *Hypoponera agilis* is very similar to *H. stoica* and can be easily confused. Both of these species (*H. stoica* and *H. agilis*) can be distinguished by size of eyes and length of the scape. *Hypoponera stoica* has smaller eyes comprised of only one facet that is indistinct, pale yellow in coloration and blends into the color of head; in contrast *H. agilis* has two distinct facets and apparent eyes that are black in coloration. The scapes of *H. agilis* surpass the posterior margin of the head, whereas in *H. stoica* they reach but do not surpass the posterior border of the head. *Hypoponera antoniensis* is also similar in general appearance to *H. agilis*, however, *H. antoniensis* is a smaller species (TL 2.4 mm, WbL 0.78 mm, HW<sub>2</sub> 0.43 mm; *H. agilis* TL 2.8–3.0 mm, WbL 0.99–1.10 mm, HW<sub>2</sub> 0.58–0.67 mm) and possesses a weak club; *H. agilis* is larger and does not have a club. *Hypoponera inexorata* can be easily separated from *H. agilis* as *H. inexorata* has concave outer margin on the mandibles. *Hypoponera inexpedita* can be distinguished based on the length of the scapes; in *H. inexpedita* the scapes fail to reach the posterior border of the head, in contrast the scapes do surpass the posterior border of the head in *H. agilis*. *Hypoponera agilis* and *H. saroltae* are similar as well but may be separated as follows: in *H. saroltae* the scapes do not surpass the posterior border of head, the funiculus forms a gradual club and the propodeum is not distinctly tectiform, in contrast in *H. agilis* the scapes surpass the posterior border of the head, the antennae do not form a gradual or distinct club, and the propodeum is tectiform. See diagnosis of *H. inexorata*.

**Natural History.** Unknown.

**Distribution.** Known only from type locality in Suriname.

**Material examined.** Type material examined. REPUBLIC OF SURINAME: Paramaribo Providence, Buenzli (3 cotypes, I here designated 1 paratype and two lectotypes, specimen bares labels designating each as either a lectotype or paratype) [MCZC].





**Figure 40.** *Hypoponera agilis* lectotype. Lateral habitus (A). Head in frontal view (B).

***Hypoponera aliena*** (F. Smith, 1858) Fig. 41

*Ponera aliena* F. Smith, 1858: 99. Type worker, BRAZIL, (W. Swainson) [1 specimen examined] (BMNH). Combination in *Hypoponera* Kempf, 1972: 121.

**Diagnosis.** The postero-lateral portion of the head is rounded, the posterior portion is wider than the anterior portion, giving the head a heart-shaped appearance ( $HW_3$  0.53–0.57 mm,  $HW_1$  0.47 mm). The eyes are small, with only 1 facet. The mesonotum is higher than the propodeum and the mesometanotal suture forms a deep furrow. The petiole is nodiform and rectangular with anterior and posterior faces parallel, and not distinctly converging apically. The anterior portion of the subpetiolar process forms a quadrate lobe.

**Description.**

**Measurements (mm) of worker. (n=2)** TL 1.2, HL 0.53–0.57,  $HW_2$  0.57, CI 94.20–96.27, HS 0.57–0.59, EL 0.04, EW 0.04, OMD 0.09–0.11, SL 0.46, SI 81, ML 0.71–0.74, WbL 0.35–0.75, PnL 0.36, PnW 0.36–0.38, DF 0.25, PF 0.26–0.28, PtL 0.15–0.16, PtW 0.32–0.37, PeNI 89–97, SPtL 0.11–0.13, SPtW 0.14–0.18, DPtL 0.14, DPtW 0.28–0.30, GS1L 0.29–0.36, GS1W 0.43–0.53, GS2L 0.44–0.46, GS2W 0.49–0.57.



Body concolorous, yellow to yellow-orange. Mandibles yellow, lighter in color than head, shiny, triangular lacking sinuate outer margins; apical projection large, tooth-like, followed by two apical teeth, denticles on remainder of masticatory margin. Clypeus similar to head color; anterior edge straight. Eyes small, appearing as one ommatidium; lateral in position, barely visible in frontal view. Scapes yellow, lighter colored than head; barely surpassing posterior border; punctulate; covered with fine, appressed pubescence. Funiculus with distinct five segmented club; segments 2–7 gradually increasing in width, about equal in length; covered in short fine appressed pubescence; scattered decumbent pilosity present on segments; punctate. Head with anterior portion narrower ( $HW_1$  0.47 mm) than posterior portion, postero-lateral regions rounded, posterior border distinctly concave, head roughly quadrate (cordate) in frontal view; covered in fine dense pubescence (distance between hairs far less than length of hair); punctulate. Pronotal dorsum covered in dense appressed pubescence, erect scattered pilosity present; lateral region with less dense and fewer pubescence than dorsum; promesonotal suture apparent, slightly incised to straight in lateral view. Mesonotum flat to convex in lateral view, with appressed dense pubescence, scattered erect hairs present; mesonotal-pleural suture not apparent, very faint; pleural region nitid with sparse pubescence, faint restricted carinae sculpturing; mesometanotal suture apparent, forming distinct furrow, mesonotum above level of dorsum of propodeum. Propodeum tectiform, dorsum angled posteriorly, meeting posterior face in gradual rounded angle; covered in appressed pubescence, limited erect hairs; dorsal face equal in length to posterior face. Petiole nodiform, rectangular, base about equal in width to apex; anterior and posterior faces not distinctly converging apically; apex slightly rounded; spiracular spine present, small but apparent. Subpetiolar process with developed quadrate anterior region. Postpetiolar flange present, rounded. Gaster with dense appressed pubescence with numerous scattered thin, subdecumbent hairs.

**Etymology.** Latin for alien however Smith (1851) did not provide a reason for this statement.

**Discussion.** *Hypoponera aliena* belongs to the *parva*-species group. After a nebulous description, Smith (1858) states “This species scarcely differing from *Ponera contracta*” and “doubtless resembles very closely the *Ponera ruficornis* (Spinola, 1851), but he [Spinola] describes his insect as black, with red antennae; our species is entirely of brownish-yellow, and appears to be distinct.” Smith’s

interpretation is in error. Emery (1893a) and Brown (1975) pointed out the type specimen of *P. ruficornis* is comprised of the head and prothorax of *Dolichoderus* sp. and the remainder of the body is comprised of *Platythyrea*. Also *Hypoponera aliena* is smaller than *P. contracta* and possesses less sculpturing and is not easily confused with *P. contracta*.

For specimens of *H. aliena* from Brazil and Colombia there appears to be little variation among those specimens. Color is variable as is the development of carinae on the metapleuron. A notable exception to this lack of variation in a collection of specimens from Costa Rica, Guancaste Province, Rincon de la Veja, Las Pilas from 850 m to 1400 m. These specimens have larger eyes (EL 0.07 mm, EW 0.07 mm vs. EL 0.03 mm, EW 0.03 mm) which are apparent, rounded and made up of 7–8 fused facets, whereas *H. aliena* has only one ommatidium. The ocular mandibular distance is different for the Costa Rican series with the eyes closer to the mandibular insertions when compared to *H. aliena*. Within this Costa Rican series petiole shape varies however, petiolar shape is stable for the specimens of *H. aliena* from Brazil and Colombia from scale-like to more rectangular with the anterior and posterior faces not distinctly converging apically. Besides being located in a different region than *H. aliena* and having the aforementioned varying character states; the Costa Rican series is very similar in size, color, pilosity, and sculpturing to *H. aliena*.

*Hypoponera aliena* is similar to *H. promontorium*, *H. clavatula*, and *H. parva*. All of these species are yellowish and have antennae with a distinct club. *Hypoponera promontorium* is distinguished from *H. aliena* by the shape of the dorsopropodeum which is tectiform and forms a distinct ridge. Both *H. clavatula* and *H. parva* may be separated from *H. aliena* as *H. aliena* has longer scapes (SI 81) when compared to the two former species (SI 58–68) that reach the posterior margin of the head.

**Natural History.** Unknown.

**Distribution.** Brazil.

**Material examined.** Type material examined. BRAZIL, (W. Swainson) [1 specimen examined, here I designated this specimen the lectotype following article 74.1-74.3 of the ICZN specimen bares a label designating it as a lectotype] (BMNH).

*Hypoponera antoniensis* (Forel, 1912) stat. nov. Fig. 42

*Ponera fiebrigi* var. *antoniensis* Forel, 1912: 41. COLUMBIA, St. Antonio, Sierra Nevada da Santa Marta (1 specimen examined) [MHNG]. Combination in *Hypoponera*: Kempf, 1972: 122.

**Diagnosis.** *Hypoponera antoniensis* is a small-sized species (TL 2.27 mm, WbL 0.78 mm) that is yellow in coloration. The head is densely punctate and the punctae are closely set. The eyes are small, consist of only 1 facet and are close to the posterior margin of the clypeus. The position of the eye is lateral and barely visible in frontal view. In lateral view, the mesosoma has a slightly incised promesonotal suture and the mesometanotal suture forms a slight depression. Additionally, the dorsopropodeum is below the level of the posterior edge of the mesonotum. The petiolar node is thick but the anterior and posterior faces converge, giving it a subtriangular appearance.

**Description.**

**Measurements (mm) of worker. (n=1)** TL 2.27, HL 0.57, HW<sub>2</sub> 0.43, CI 75, HS 0.50, EL 0.03, EW 0.03, OMD 0.06, SL 0.46, SI 106, ML 1.0, WbL 0.78, PnL 0.32, PnW 0.32, MsL 0.18, MsW 0.21, DF 0.24, PF 0.21, PnH 0.32, PtL 0.26, PtW 0.16, PtI 47, PeNI 50, SPtL *obscured by glue*, SPtW *obscured by glue*, DPtL 0.10, DPtW 0.21, GS1L 0.32, GS1W deformed, GS2L 0.37, GS2W 0.39.

Tiny (TL 2.0–2.3 mm); color yellow, integument opaque. Mandibles with large apical tooth followed by 2 teeth becoming smaller denticles; outer border lacking concavity; yellow, lighter in coloration than head; shiny. Anterior medial edge of clypeus not notched, straight; medial lobe of typical form, punctulate sculpturing. Eyes small (EL 0.03 mm), 1 facet; ommatidium white-silver; barely visible in frontal view, eyes situated laterally, not breaking outline of side of head, close (OMD 0.06 mm) to clypeal border. Antennae pale yellow, lighter in coloration than head, opaque. Scapes extend past occipital margin by length equal to half of first funicular segment, base not as wide as apex; suberect and appressed pilosity present, punctate; funiculus with club (segments 2–6 and 7–9), gradually increasing, club segments longer than proceeding funicular segments; appressed. Head quadrate in frontal view (CI 75), lateral margins slightly convex; posterior width (HW<sub>3</sub> 0.46 mm) about equal to anterior of head (HW<sub>1</sub> 0.40 mm); posterior border of the head with distinct concavity. Head punctate, dense, punctae distance equal to diameter of pits; pilosity appressed, white-yellow in coloration.

Mesosomal profile even, propodeum slightly below level of mesonotum. Promesonotal suture not impressed, mesonotum even with pronotum. Pronotum humeral surface carinate. Mesonotum flat; mesonotal-pleural suture present, faint and feeble. Mesopleuron opaque, foveo-punctate on lower area, area by mesonotal-pleural suture carinate; mesometapleural carinae distinct. Mesometanotal groove distinct with dorsal foveo-punctae and laterally striate sculpturing. Propodeum gradually inclined posteriorly, dorsal face meeting posterior face at a broadly rounded junction, dorsal face the same as the posterior face (DF 0.23 mm, PF 0.23 mm); dorsum distinct in dorsal view; dorsum opaque, foveate, lateral portion opaque, puncto-rugate, anterior edge carinate; metapleuron opaque, finely carinate. Mesosoma dorsum opaque, slightly reflective with shallow punctae, puncticulate with short, numerous (20–26) erect and suberect hairs, appressed pubescence present. Petiolar node quadrate, broad (PeNI 50); tall, reaching level of propodeal dorsum (PNL 0.26 mm); anterior and posterior faces slightly converging towards apex, apex rounded. Spiracular process reduced, lobe-like, opaque punctate, with shallow depressions, foveate; subpetiolar process covered in glue; in dorsal view node broad, anterior edge convex, posterior edge straight, opaque, foveo-punctate, more dense than promesonotum. Gaster of typical form, brown, darker than body.

**Etymology.** Named for type locality of St. Antonio, Sierra Nevada de Santa Marta, Colombia.

**Discussion.** *Hypoponera antoniensis* belongs to the *foeda*-species group. The eye appears to be composed of only one facet, however, given the widespread reduction and fusion of ommatidia, this facet may consist of two (maybe three) fused facets.

*Hypoponera antoniensis* is similar to a number of potentially allied species. Species in this group are mostly yellow to tan. The majority have elongate heads with parallel sides. The heads of these species are densely punctate with yellow, appressed pubescence. Table 4 provides a comparison between each species and their diagnostic character states.

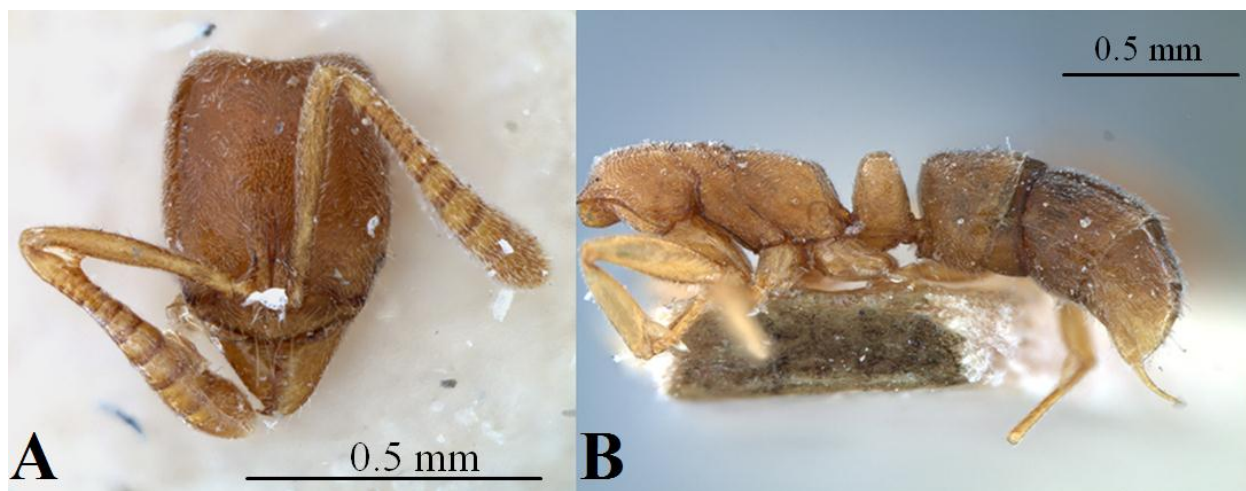
**Table 4.** Comparison of morphometric parameters for *foeda*-group taxa and similar species. All measurements in millimeters.

Taxon	Mandible Dist. Concave	HW2/HW3(mm)	HL (mm)	CI	Scapes Reaching border	Scapes short far(0) closer(1)	Number of facets of eye	OMD(mm)	Mesonotal-Piural	Mesometanotal suture	Ppd tectiform	Petiole Node Height (mm)	Weber Length (mm)	Overall size (mm)
<i>Hypoponera antoniesis</i>	(-)	0.49/0.50	0.61	80	(+)	-	1	0.05	(+) faint	(-)	(-)	0.32	0.74	2.05
<i>Hypoponera fallax</i>	(+)	0.52/0.49	0.67	73	(+)	-	4	0.07	(+)	(+)	(+)	0.43	0.96	2.52
<i>Hypoponera famini</i>	(+/-)	0.49/0.50	0.67	74	(-)	0	4 to 5	0.07	(+)	(-)	slightly	0.39	0.89	2.55
<i>Hypoponera foeda</i>	slightly	0.49/0.50	0.71	70	(-)	1	1	0.18	(+) faint	faint	(-)	0.46	0.96	2.6
<i>Hypoponera inexpedita</i>	slightly	0.63/0.64	0.76	82	(-)	1	3 to 4 fused	0.07	(+)	(+) impressed	(-)	0.47	1.30	2.6-2.8
<i>Hypoponera saroltae</i>	(-)	0.53/0.57	0.67	80	(-)	1	4	0.03	(+/-)	faint	(-)	0.43	0.85	2.69
<i>Hypoponera transiscens</i>	(-)	0.49/0.49	0.62	80	(-)	1	1	0.05	(-) very faint	faint	(-)	0.39	0.75	2.37
<i>Hypoponera stoica</i>	(+)	0.57/0.51	0.72	74	(+)	-	1	0.14	(+)	(+)	(-)	0.43	0.75	2.7

**Natural History.** Unknown.

**Distribution.** Known only from the type locality: St. Antonio, Sierra Nevada da Santa Marta, Colombia.

**Material examined.** Type material examined. COLUMBIA, St. Antonio, Sierra Nevada da Santa Marta [1 specimen examined, designated here as holotype by monotypy, specimen bares a label designating it as a holotype] (MHNG)



**Figure 42.** *Hypoponera antoniensis* holotype. Frontal view of head (A) and lateral habitus (B).

*Hypoponera apateae* Dash sp. nov. Fig. 43

**Diagnosis.** The worker is a medium sized, yellow-tan species (TL 3.90–4.50 mm). The head is rectangular (CI 74–83), and the scapes surpass the posterior border of the head by an amount equal to the length of the first funicular segment, and the funiculus does not form a distinct club. The eyes are small, comprised of 4 to 5 partially fused ommatidia. The cephalic sculpturing is fine, comprised of tiny shallow punctae. An impressed promesonotal suture is present with the mesonotum sloping posteriorly. The mesometanotal suture is incised, forming a shallow furrow between the posterior edge of the mesonotum and the anterior edge of the propodeum, and the depression is striate. The sculpturing on the pleural regions of the mesosoma is faint, the integument is reflective (under fluorescent lights) and shiny. The mesopleuron has small scattered punctae located mostly along the posterior edges. The propodeum and metapleuron have faint punctae and the metapleuron has longitudinal striae that fade

anteriorly from the metapleural bulla. The propodeum slopes posteriorly and a slight depression is formed on the dorsum, which is visible in lateral view. A scale-like yet stout (PeNI 50–56) petiolar node is present. The body is covered with fine thin appressed pubescence with short scattered decumbent pilosity present. The gyne and male are unknown.

### **Description.**

**Measurements (mm) of holotype. (n=1)** TL 4.2, HL 1.10, HW<sub>2</sub> 0.82, CI 74, HS 0.96, EL 0.04, EW 0.03, OMD 0.18, SL 1.01, SI 91, ML 1.68, WbL 1.56, PnL 0.50, PnW 0.67, MsL 0.46, MsW *obscured by glue*, DF 0.44, PF 0.46, PnH 0.64, PtL 0.53, PtW 0.28, PtI 43, PeNI 41, SPtL 0.11, SPtW 0.16, DPtL 0.14, DPtW 0.39, GS1L 0.76, GS1W 0.71, GS2L 0.71, GS2W 0.67.

**Measurements (mm) of workers. (n=5)** TL 4.10 (3.90–4.50), HL 1.10 (1.10–1.53), HW<sub>2</sub> 0.87 (0.82–0.92), CI 78 (74–83), HS 0.99 (0.96–1.04), EL 0.04 (0.04–0.05), EW 0.04 (0.03–0.05), OMD 0.18 (0.14–0.18), SL 0.96 (0.92–1.00), SI 86 (82–91), ML 1.34 (1.24–1.68), WbL 1.55 (1.45–1.67), PnL 0.57 (0.53–0.64), PnW 0.55 (1.45–1.67), MsL 0.43 (0.38–0.46), MsW 0.38 (0.36–0.43) [n=3], DF 0.43 (0.39–0.44), PF 0.50 (0.53–0.49), PnH 0.63 (0.60–0.67), PtL 0.51 (0.49–0.53), PtW 0.28, PtI 45 (42–47), PeNI 51 (50–56), SPtL 0.12 (0.11–0.14), SPtW 0.15 (0.14–0.17), DPtL 0.14 (0.13–0.14), DPtW 0.35 (0.31–0.35), GS1L 0.70 (0.64–0.76), GS1W 0.68 (0.60–0.74), GS2L 0.72 (0.67–0.76), GS2W 0.71 (0.64–0.78).

### **Worker description.**

Medium-sized (TL 3.90–4.50 mm) yellow-tan. Mandibles slightly lighter in color than head, reflective shiny, mandible triangular, outer border lacking concavity; surface of mandible with scattered hairs arising from small punctae; masticatory border with three large apical teeth, proximal teeth rounded (perhaps worn) but distinct. Clypeus color similar to that of mandibles, reflective, with abundant appressed pubescence, laterolypeus with minute fine striae, medial portion straight, not forming distinct lobe. Eye small, 4 to 5 partially fused ommatidia, under low magnification appearing as one facet, flat with integument, not visible in frontal view. Frontal lobes foveolate, laterally rugulose-foveolate, larger punctae around lateral margin, long (0.02 mm) appressed pubescence present. Scapes surpassing posterior border of head by one funicular segment; apex wider than base; punctate; scape covered in fine

decumbent pubescence; funicular segments gradually enlarged, but not forming distinct club, funiculus covered in dense fine appressed pubescence. Head somewhat elongate, rectangular in frontal view, sides parallel, not distinctly convex, anterior and posterior widths of head about equal, posterior border flat or slightly concave; reflective but not shiny, punctulate white-grey short dense pubescence present. Promesonotal suture distinct, incised; mesonotum above level of pronotum; ovate in dorsal view. Mesonotal suture apparent to faint; mesometapleural carina distinct; mesopleuron anteriorly and medially with very few scattered punctae, nitid; posterior edge with abundant small punctae from which fine setae arise. Mesometanotal junction depressed, forming a groove; propodeum tectiform, narrowed dorsally; anterior edge of propodeum below level of mesonotum, rugo-punctulate; dorsopropodeum gradually sloping posteriorly, meeting posteropropodeum in broadly rounded junction (lateral view), posteropropodeum rounded. Sides of propodeum and metapleuron with costulate sculpturing, more dense and abundant on metapleural bulla; longitudinal striae becoming less dense and visible anteriorly, lacking on anterior region. Dorsum of promesonotum punctulate, with abundant dense punctae; propodeum punctate, with short dense appressed pubescence and few short (0.01 mm) erect hairs present. Petiole node scale-like, thick short (PtW 0.28 mm, PnH 0.60–0.67 mm), anterior and posterior faces converging dorsally, apex less wide than base, subspiracular spine well-developed. Subpetiole lobe-like, anterior portion quadrate, dorsum of petiole thin, ovate. Dorsum of gastral tergites one and two with dense (less than a hair length between setae), appressed yellow pubescence, integument punctulate; gastral constriction with longitudinal faint striae.

**Etymology.** Named in honor of *Apate*, who in Greek mythology is the personification of deceit, she was one of the evil spirits released from Pandora's Box which refers to the difficulty in identification of *Hypoponera*.

**Discussion.** *Hypoponera apateae* belongs to the *foreli* -species group. *Hypoponera apateae* is similar in appearance to *H. foreli*, *H. impartergum* and *H. idelettae*. *Hypoponera apateae* can readily be distinguished from *H. foreli* as *H. foreli* has a larger eye with at least 12–16 distinct ommatidia instead of 4–5 partially fused ommatidia in *H. apateae*. Also *H. foreli* has a higher, thinner petiolar scale (*H. foreli*: PeNI 35–50, PI 42–47, PtW 0.21–0.28 mm; *H. apateae*: PeNI 50–56, PI 47–57, PtW 0.28 mm).



*Hypoponera impartergum* can be distinguished from *H. apateae* as the former has longer more flexuous suberect pilosity found over the dorsum of mesosoma and gaster, which is lacking in *H. apateae*. Additionally, the outer border of the mandible of *H. impartergum* is concave, whereas in *H. apateae* the outer border lacks concavity. *Hypoponera apateae* and *H. impartergum* can also be distinguished by the petiolar scale, which is taller (PtL 0.67–0.78 mm) in *H. impartergum* than in *H. apateae* (PtL 0.60–0.67 mm). *Hypoponera idelettae* and *H. apateae* are very similar in overall appearance, but the two taxa may be separated using the following characters: shape of the head, petiolar shape, mesometanotal groove and color. The lateral margins of the head (in frontal view) in *H. apateae* are nearly parallel; converging posteriorly. In contrast, the lateral margins of the head in *H. idelettae* are slightly convex. *Hypoponera idelettae* has a taller thinner, distinctly more scale-like petiolar node compared to the shorter and stouter node of *H. apateae*. *Hypoponera apateae* can be further distinguished from *H. idelettae* by the mesometanotal groove being deeply incised, forming a small furrow; in *H. idelettae* this “groove” is distinct but does not form a furrow. *Hypoponera apateae* is yellow-tan in coloration whereas *H. idelettae* is red-brown to dark brown in coloration.

**Natural History.** The type series was collected in a dense tropical rain forest (600 meters elevation) in a subterranean trap baited with Vienna sausage, left in place for 14 hours. It was raining most of the time and the soil surface was very wet, with the soil consisting of a light brown sandy loam, with good drainage and with a moderate amount of organic matter.

**Distribution.** Known only from the type locality in Venezuela.

**Material Examined.** Type material examined.

Holotype VENEZUELA: Bolívar. Canaima 16-x-1988, W. Mackay # 11188-5 (specimen bares a label designating it as a holotype MCZC)

Paratypes VENEZUELA: Bolívar. Canaima 16-x-1988, W. Mackay # 11188-5. (10 paratype workers specimens bare labels designating them as paratypes AMNH, CASC, CWEM, and STDC)



**Figure 43.** *Hypoponera apateae* paratype. Frontal view of the head (A). Habitus of *H. apateae* (B).

***Hypoponera capilosa*** Dash sp. nov. Figs. 21 and 44.

**Diagnosis.** *Hypoponera capilosa* is a medium-sized species of *Hypoponera* (TL 3.9 mm). The body is red-orange with limited sculpturing on the body, which is mostly nitid and reflective. There are small punctae on the head and the dorsal surface of the mesosoma and gaster. Obviously long (0.11–0.14 mm) flexuous hairs cover the dorsum of the body in profile. The eyes are small and comprised of only one facet. The shape of the petiole is scale-like; however the posterior face is convex and curves apically whereas the anterior edge is straight (Fig. 33). The subpetiolar process is short (PnH 0.14 mm) and reduced with the anterior portion subquadrate.

**Description.**

**Measurements (mm) of holotype. (n=1)** TL 3.90, HL 0.92, HW<sub>2</sub> 0.67, CI 73, HS 0.80, EL 0.03, EW 0.03, OMD 0.11, SL 0.71, SI 106, ML 1.17, WbL 1.31, PnL 0.57, PnW 0.53, MsL 0.32, MsW 0.43, DF 0.40, PF 0.57, HF 0.88, PnH 0.71, PtL 0.60, PtW 0.28, PtI 118, PeNI 53, SPtL 0.14, SPtW 0.18, DPtL 0.11, DPtW 0.46, GS1L 0.50, GS1W 0.60, GS2L 0.57, GS2W 0.67.

Workers medium sized (TL 3.9 mm), red-orange in color; body nitid, reflective. Mandibles with large apical tooth followed by 3 teeth, remainder of masticatory border with reduced denticles; outer border lacking concavity; red-yellow, lighter in coloration than head, shiny. Anterior medial edge of clypeus straight, medial lobe of typical form. Eyes small (EL 0.03 mm, EW 0.03 mm), 1 distinct facet; ommatidium silver; barely visible in frontal view, eyes situated laterally, not breaking outline of side of head, close (OMD 0.11 mm, OMD<sub>1</sub> 0.18 mm) to clypeal border. Frontal lobes with dense appressed

yellow pubescence and long erect yellow pilosity; punctae present where setae arise. Scapes extend past occipital margin by length equal to half length of first funicular segment, base not as wide; suberect and long stout erect pilosity present, punctate, punctae where hairs arise; funiculus with indistinct club, segments gradually increasing distally; numerous stout suberect hairs present. Head rectangular in frontal view (CI 73), lateral margins parallel; posterior width (HW<sub>3</sub> 0.71 mm) slightly wider than anterior of head (HW<sub>1</sub> 0.64 mm). Head punctate, punctae not dense, interpunctae distance greater than diameter of punctae, hairs arising from punctae; hairs abundant, appressed pubescence present, distance between setae wider than at least half length of hair, lateral edges of head with longer erect flexuous pilosity, posterior margin of head with longer and more numerous hairs than sides of head, white-yellow in coloration. Mesosomal profile nearly even, broken by incised promesonotal and mesometanotal groove. Promesonotal suture impressed, mesonotum even with pronotum. Mesonotum slightly rounded in profile; anterior edge with microsculpturing; mesonotal-pleural suture present, distinct. Mesopleuron nitid, reflective with few scattered shallow depressions. Mesometanotal suture incised. Propodeum inclined posteriorly, flat, dorsal face of propodeum meeting posterior face of propodeum at a distinct rounded angle, dorsal face of propodeum shorter than posterior face of propodeum (DF 0.40 mm, PF 0.57 mm); in dorsal view sides converging apically, not tectiform, with distinct dorsum; dorsum nitid, puncticulate, punctae with long erect hairs arising, posterior edge of propodeum with short carinae; lateral portion reflective, nitid, glabrous; metapleuron reflective, carinate from bulla to mesometapleural carina, fading anteriorly, not reaching propodeal pleural region. Legs lighter in color than body, with abundant appressed stout pubescence and scattered erect pilosity longer than appressed hairs. Mesosomal dorsum nitid, puncticulate, punctae with long (0.11–0.14 mm) flexuous erect pilosity. Petiolar node squamiform, broad (PeNI 53); tall, surpassing dorsopropodeum (PNL 0.60 mm); anterior face straight, parallel to posterior face of propodeum, posterior face of node convex, leaning apically, apex rounded more posteriorly, posterolateral edge of node with short carinae. Spiracular process tooth-like, shiny with faint carinae; subpetiolar process with fenestra; process reduced lobe (SPtL 0.14 mm), anterior portion lobate, rounded (SPtW 0.18 mm); in dorsal view node thin, about as wide propodeum, nitid puncticulate, punctae more dense than propodeal dorsum, long flexuous erect pilosity present.

Gaster of typical form, constriction without crossribs, shiny, nitid, puncticulate, pilosity long, yellow, flexuous, arising from punctae, denser than on dorsum of mesosoma.

**Etymology.** Name suggested by W. L. Brown Jr.: Latin *capi* and *pilosa* referencing the long erect pilosity on the head and body.

**Discussion.** *Hypoponera capilosa*, belongs to the *distinguenda*-species group. *Hypoponera capilosa* may be confused with *H. distinguenda*, *H. perplexa* and *H. coveri*; however character states of eyes, pilosity and mesosoma will separate these species. Both *H. perplexa* and *H. distinguenda* are very similar to *H. capilosa* but both of these species lack the numerous (30 + on mesosoma) long, erect hairs found in *H. capilosa* and have only limited (4–10 on mesosoma) erect hairs. These species can also be separated as *H. capilosa* is mostly nitid, reflective and shiny but in contrast *H. distinguenda* and *H. perplexa* are dull and, while they may reflect fluorescent light, they are not shiny or nitid. *Hypoponera distinguenda* can also be separated from *H. capilosa* because the eye is comprised of a number of partially fused facets, whereas *H. capilosa* has only one facet. Additionally, *H. capilosa* can be separated from *H. perplexa* using the mesonotal-pleural suture, which is distinct in *H. capilosa* but faint in *H. perplexa*. *Hypoponera capilosa* and *H. coveri* are similar in basic color and both have long erect pilosity. *Hypoponera coveri*, however, has larger eyes with 14–16 facets whereas *H. capilosa* has only 1 facet. *Hypoponera coveri* is not as nitid or reflective as *H. capilosa*. Both of these species can be separated on the basis of the mesosomal shape, in *H. coveri* the propodeum is below the surface of the mesonotum but in *H. capilosa* the mesosoma is even and the propodeal dorsum is level with the mesonotum. The petiole in *H. coveri* is more scale-like or triangular, with both anterior and posterior faces converging apically. In contrast, the petiole of *H. capilosa* is scale-like but the anterior face of the petiole is straight and the posterior face is curved toward the apex.

Holotype is deposited in the MCZC. This species is similar to *H. distinguenda*.

**Natural History.** Collected from forest litter by S. and J. Peck.

**Distribution.** Known only from type locality.

**Material examined.** Type material examined.

Holotype COLOMBIA, 7 km N. Leticia, 10-25-II-1972, forest litter, S. & J. Peck [MCZC].



**Figure 44.** *Hypoponera capilosa* holotype. Frontal view of head (A) and lateral habitus of body (B).

***Hypoponera clavatula*** (Emery, 1906) Fig. 45

*Ponera clavatula* Emery, 1906: 116. worker, ARGENTINA: Posadas Misiones [2 specimens examined] (MCSN). Queen Santschi, 1929: 276 [not examined]. Combination in *Hypoponera* Kempf 1972: 121.

*Ponera fiebrigi* Forel, 1908: 343. Worker, queen male, PARAGUAY: Misiones, San

Bernardino, Fiebrig. [1 worker 1, queen 2, and male 2 specimens examined] (MHNG).

Combination in *Hypoponera* Kempf 1972: 122. Syn. nov.

*Ponera neglecta* Santschi, 1923b: 1257. Workers BRASIL: Santa Catharina, Blumenau, A.

Reichensperger leg [2 specimens examined] (NHMB), E'tat de Rio, A. Reichensperger leg [1 examined] (MCZC). Combination in *Hypoponera* Kempf 1972: 123. Syn. nov.

**Diagnosis.** *Hypoponera clavatula* workers are tiny (TL 1.90–2.2 mm) and yellow-tan in color. The eyes appear as one ommatidium but actually consist of 5–6 fused facets. The eyes are close to the posterior margin of the clypeus (OMD 0.04 mm). The scape is short and does not reach the posterior margin of the head; and the funicular segments form a distinct club. In lateral view the mesosomal profile is even but the promesonotal and mesometanotal sutures are incised. The lateral regions of the mesopleuron and metapleuron have distinct carinae. The petiolar node is subtriangular in shape and appears thickly scale-

like. The subpetiolar process has an anterior quadrate lobe, but this process lacks a depression or fenestra.

### **Description.**

**Measurements (mm) of paratype worker. (n=1)** TL 1.90, HL 0.56, HW<sub>2</sub> 0.39, CI 70, HS 0.48, EL 0.03, EW 0.03, OMD 0.04, SL 0.42, SI 107, ML 0.57, WbL 0.71, PnL 0.28, PnW 0.32, MsL 0.18, MsW 0.21, DF 0.22, PF 0.21, PnH *obscured by glue*, PtL 0.25, PtW 0.11, PtI 44, PeNI 34, SPtL *obscured by glue*, SPtW *obscured by glue*, DPtL 0.07, DPtW 0.11, GS1L 0.32, GS1W 0.32, GS2L 0.35, GS2W 0.39.

**Measurements (mm) of worker. (n=2)** TL 1.90–2.20, HL 0.56–0.58, HW<sub>2</sub> 0.39, CI 67–70, HS 0.48–0.49, EL 0.03, EW 0.03, OMD 0.04, SL 0.40–0.42, SI 102–107, ML 0.57–0.64, WbL 0.57–0.64, PnL 0.28–0.35, PnW 0.32, MsL 0.18, MsW 0.21, DF 0.21–0.22, PF 0.21–0.24, PnH 0.32, PtL 0.25, PtW 0.11–0.14, PtI 44–56, PeNI 34–43, SPtL 0.10, SPtW 0.07, DPtL 0.07–0.10, DPtW 0.21, GS1L 0.28–0.32, GS1W 0.15–0.32, GS2L 0.35, GS2W 0.39–0.40.

Small (TL 1.90–2.20 mm, WbL 0.57–0.64 mm) head and gaster light brown-tan, mesosoma lighter yellow-tan. Legs and antennae lighter than body. Mandible long, triangular. Eyes consisting of one ommatidium. Antennal scape not surpassing posterior boarder of head. Funiculus about equal in length to scape. Segments 3–7 nearly equal in size and shape, segments 8–11 increasing in width and length forming a loose club. Posterior portion of head distinctly concave. The head, antennae covered in dense short erect to suberect pubescence. Integument under pubescence glossy. Promesonotal suture developed with numerous short erect pubescence present, less so than on head. Mesosoma shiny, mesosoma equal, flat in profile, indentations at promesonotal and metamesonotal sutures. Mesonotal suture indistinct. No sutures present on mesopleuron. Dorsopropodeum weakly sloping posteriorly, junction of dorsal and posterior faces meet at a rounded angle. Posterior face truncate, nearly perpendicular (slightly angled anterodorsally) to petiole. Petiole stout, nearly as wide at base as apex, lateral face slightly converging apically, dorsum rounded. Petiolar node subquadrate in dorsal view, anterior face rounded, posterior face flat. Entire petiolar node covered with appressed and scattered pilosity. Subpetiolar process with quadrate anterior lobe. Gaster covered with appressed pubescence, scattered erect hairs cover posterior

portions of first and second segments, density and position increase on terminal segments. Gaster constriction distinct.

**Etymology.** Latin *clavula* diminutive for club, in reference to the antennal club.

**Discussion.** *Hypoponera clavatula* belongs to the *parva*-species group. Forel (1908) noted discontinuity in character states between *H. fiebrigi* and *H. clavatula*, i.e. *H. clavatula* is somewhat longer, and is blind with a robust mesosoma whereas *H. fiebrigi* has distinct facets and a much narrower mesosoma, and there is a difference in the shape of the mesonotum. Emery (1906) compared *H. clavatula* with *H. trigona*. I have examined the types of *H. clavatula* and *H. fiebrigi* and there are some differences but they are variable. The eyes of the types of *H. clavatula* have facets that are fused whereas those of *H. fiebrigi* vary from slightly fused to distinct. Overall, both species are similar in measurements and meristic character states. The types of *H. clavatula* and *H. neglecta* look nearly identical except *H. neglecta* are a darker yellow-tan color than *H. clavatula*. *Hypoponera clavatula* may be confused with *H. aliena*, *H. parva*, and *H. promontorium*. *Hypoponera aliena* may be distinguished from *H. clavatula* as the scapes are longer and reach the posterior border of the head, and the mesometanotal junction forms a distinct groove in *H. aliena*. *Hypoponera parva* can be separated from *H. clavatula* by being smaller (WbL 0.48–0.50 mm in *H. parva* compared to WbL 0.57–0.64 mm in *H. clavatula*), a paler yellow, and lacking striae on the meso-and-metapleuron. Although superficially similar, *H. promontorium* can be easily distinguished from *H. clavatula* based on the shape of the propodeal dorsum. In *H. clavatula* there is a distinct dorsum but in contrast the dorsum is ridge-like and the propodeum is distinctly tectiform in *H. promontorium*.

**Natural History.** Unknown.

**Distribution.** Paraguay, Brazil, and Argentina.

**Material examined.** Type material examined.

[ARGENTINA]: Posadas Misiones [2 specimens examined on one pin, here I designated top specimen the lectotype, and the bottom specimen the paralectotype following article 74.1-74.3 of the ICZN, specimen bares a label with information designating the lectotype and paralectotype] (MCSN).

PARAGUAY: Misiones, San, Bernardino, Fiebrig

BRASIL: Santa Catharina, Blumenau, A., Reichensperger leg; E'tat de Rio, A. Reichensperger leg



**Figure 45.** *Hypoponera clavatula* lectotype. Frontal view of head (A) and lateral view of body (B).

*Hypoponera clinei* Dash sp. nov. Fig. 46

**Diagnosis.** *Hypoponera clinei* is a medium species of *Hypoponera* (TL 4.2 mm, WbL 1.63 mm). *Hypoponera clinei* varies in coloration from red-brown to black. The mandibles have two apical teeth followed a number of small denticles. The anterior margin of the clypeus has a medial notch. The eyes are small and comprised of 5–8 distinct or slightly fused facets. The eyes are positioned dorsolaterally, however they are noticeable and break the lateral outline of the head. The funicular segments do not form a club. The scapes surpass the posterior margin of the head only slightly, by a length not greater than the first funicular segment. In frontal view the head is quadrate, the lateral margins are rounded and the posterior margin is wider than the anterior margin (Fig. 46A). The head has fine short white pubescence. The mesonotal-pleural suture is distinct, whereas the mesometanotal junction is faint and forms a groove. The anterior and posterior faces of the petiole converge, giving the petiole a distinct scale-like node. The subpetiolar process is short and quadrate but lacks a distinct anterior lobate area. The subpetiolar process has a small depression.

**Description.**

**Measurements (mm) of holotype worker. (n=1)** TL 4.20, HL 1.12, HW<sub>2</sub> 0.91, CI 74, HS 1.00, EL 0.07, EW 0.07, OMD 0.17, SL 0.98, SI 107, ML 1.33, WbL 1.63, PnL 0.79, PnW 0.63, MsL 0.38, MsW



0.45, DF 0.43, PF 0.52, PnH 0.73, PtL 0.63, PtW 0.31, PtI 49, PeNI 49, SPtL 0.10, SPtW 0.28, DPtL 0.10, DPtW 0.45, GS1L 0.66, GS1W 0.73, GS2L 0.59, GS2W 0.66.

Large (TL 4.20 mm); color red-brown to black, integument appears dull. Mandibles (MnL 1.33 mm) with large apical tooth followed by 2 teeth, rest of margin denticulate; outer border lacking concavity; red-brown differing in coloration from head, sublucid. Anterior medial edge of clypeus straight; medial lobe gradually lobate, covered in dense appressed white-gray pubescence. Eyes small (EL 0.07 mm), 5–8 distinct to partially fused facets; ommatidia black; not visible in frontal view, eyes situated dorsolaterally, not breaking outline of side of head, far (OMD 0.17 mm) from clypeal border. Antennae yellow-red, lighter in coloration than head, sublucid. Scapes extend past occipital margin by a length equal to length of first funicular segment, base not as wide as apex; funiculus without distinct club, gradually increasing. Head quadrate in frontal view (CI 74), lateral margins distinctly rounded; posterior width (HW<sub>3</sub> 1.0 mm) wider than anterior of head (HW<sub>1</sub> 0.80 mm); posterior border of head with distinct concavity. Head foveo-punctate, with shallow foveate sculpturing, dense depressions, depth subequal to diameter, distance between hairs subequal to length; pilosity appressed, suberect, white-gray in coloration. Mesosomal profile uneven, propodeum distinctly below level of mesonotum. Promesonotal suture impressed, mesonotum even with pronotum. Lateral angle of pronotum with larger depressions, foveo-punctate. Mesonotum convex, slightly declining posteriorly; mesonotal-pleural suture present, faint. Anterior edge of mesonotum with denser sculpturing than rest of dorsum. Mesopleuron sublucid; apically densely foveate, sculpturing becoming dilute ventrally; mesometapleural carinae faint. Mesometanotal suture distinct, incised. Propodeum distinctly inclined posteriorly, dorsal face meeting posterior face at a rounded angle, in dorsal view sides converging; dorsum reflective; lateral portion sublucid, reflective under fluorescent light, puncticulate; metapleuron sublucid, carinate becoming dilute apically, anteriorly. Mesosomal dorsum sublucid, reflective, dorsum with less foveate sculpturing with few (3–5) short erect hairs absent on some specimens, appressed pubescence present. Petiolar node squamiform, broad (PeNI 49); tall, reaching level of propodeal dorsum (PnL 0.79 mm); anterior and posterior faces distinctly converging towards apex, apex rounded. Spiracular process greatly reduced, sublucid, foveo-punctate; anterior face with stout dorsally-directed decumbent hairs. Subpetiolar process

with profenestra (depression or pit); subpetiolar process reduced (SPtL 0.10 mm), anterior portion flat, even with posterior; in dorsal view node thin, sublucid foveo-punctuate with 3–7 erect hairs. Gaster of typical form, constriction without crossribs, sublucid with white-gray appressed pubescence.

**Etymology.** Named after Andrew Cline, a coleopterist who has given the author his weight in ants.

**Discussion.** *Hypoconera clinei* is a large species that may potentially be confused with some smaller species of *Pachycondyla*. *Hypoconera clinei* may also be confused with *H. leveillei* and *H. iheringi*. Separation of *H. clinei* from *H. leveillei* and *H. iheringi* is straightforward, in both *H. leveillei* and *H. iheringi* the petiolar node is more quadrate, with the anterior and posterior faces not distinctly converging apically (Fig. 46). See discussion of *H. leveillei*.

*Hypoconera clinei* belongs to the *leveillei*-species group. This species seems to match Longino's *Hypoconera* JTL-006. Longino – CR 1100–1200 m. Volcan Garba, Penas Blancas Valley. Panama 500–1000 m. Bocas del Toro. Some specimens from Bolivia lack a distinct mesometanotal groove and there are some differences in sculpturing, so these specimens may represent a separate species but no majority disparity in character states has been noticed. Robert Anderson collected numerous species in Costa Rica and Panama and all of these specimens were noted to be from the leaf litter of montane cloud forest.

**Natural History.** Robert Anderson collected numerous species in Costa Rica and Panama, all of these specimens were noted to be from the leaf litter of montane cloud forest. Longino (2010) noted specimens in Costa Rica and Panama being collected from 1100–1200 and 500–1000 meters (respectively).

**Distribution.** Nicaragua, Costa Rica south into southern Panama.

**Material examined.** Type material examined.

Holotype PANAMA: Chiripui, Bocas de Toro, Cont. Div. 09-vi-1995, R. Anderson, wet montane cloud forest litter. (MCZC).

Paratypes PANAMA: Chiripui, Bocas de Toro, Cont. Div. 09-vi-1995, R. Anderson, wet montane cloud forest litter. [13 specimens AMNH, CASC, CWEM, FMNH, MKOK, STDC, and USNM].

Non-type material examined.

COSTA RICA: Guanacaste, Pitilla Field Station 1000m, 14-II-96, Montane Forest Trans. LitterTrans. R. Anderson, #17679 [CWEM] (15 workers examined). NICARAGUA: Matagalpa, Hotel Selva Negra 1285m, 12° 59' 56.7"N 85° 54'33.4"W, 9-vii-2003 tropical cloud forest, rocky loam soil, nest hanging in twig, W. & E. Mackay [CWEM] (2 workers examined). PANAMA: Darien, centre Pirre., 1450m, 6-vi-1996, Litter extr. Cloud for. R. Anderson, #17900 [CWEM] (22 workers examined); Chinqui, Fortuna, Hydrological Trail #17785, 09-vi-95, wet montane forest litter, R. Anderson, [CWEM] (10 workers examined).



**Figure 46.** *Hypoponera clinei* nontype specimen. Frontal view of the head (A). Habitus of *H. clinei* (B). Photographs courtesy of J. Longino and C. Richart.  
<http://academic.evergreen.edu/projects/ants/AntsofCostaRica.html>.

***Hypoponera corruptela* Dash sp. nov. Figs. 18C-D and 47**

Holotype Specimen: Brazil São Paulo, Estação Biol. Boraceia, Mun. Salesopolis, 24-28-v-1971, wet montane forest 850 m, WL and DE Brown.

**Diagnosis.** The worker is a medium sized (TL 4.50 mm) black, dull and opaque specimen which is not reflective under fluorescent lighting. The eyes are large with about 40 distinct ommatidia. The scapes surpass the posterior margin of the head by an amount equal to the length of the first two funicular segments. The posterior margin of the head is rounded. The head and mesosoma are distinctly sculptured with deep pits. The mesosoma is even in profile, the promesonotal suture and mesometanotal junctions are incised. The dorsopropodeum is opaque and rugo-punctulate and the lateropropodeum is

opaque with deep rugo-foveate sculpturing becoming costulate posteriorly. The petiole is thick and not squamiform and the petiolar node is distinctly punctate.

### **Description.**

**Measurements (mm) of holotype worker. (n=1)** TL 4.50, HL 0.99, HW<sub>2</sub> 0.71, CI 71, HS 0.85, EL 0.18, EW 0.12, OMD 0.18, SL 0.88, SI 82, ML 1.28, WbL 1.45, PnL 0.53, PnW 0.60, MsL 0.32, MsW 0.43, DF 0.46, PF 0.41, PnH 0.64, PtL 0.56, PtW 0.32, PtI 128, PeNI 53, SPtL 0.11, SPtW 0.28, DPtL 0.46, DPtW 0.21, GS1L 0.53, GS1W 0.74, GS2L 0.60, GS2W 0.82.

Medium sized (TL 4.50 mm); black, opaque. Mandibles with large apical tooth followed by 6 rounded (possibly worn) teeth; outer border lacking concavity, red-orange in coloration, lighter than head, opaque. Anterior medial margin of clypeus slightly notched, medial lobe flat. Eyes medium sized (EL 0.18 mm), 36–40 distinct ommatidia; black; visible in frontal view, eyes situated dorsolaterally, not breaking outline of side of head, far from clypeal border (OMD 0.18 mm). Frontal lobes with dense appressed pubescence, rugo-punctate. Scapes extend past posterior margin of head by amount equal in length to first two funicular segments; with mixed decumbent and appressed hairs, punctate, space between punctae about equal to their diameter; funiculus without distinct club, segments gradually increasing in width and length apically; small dense punctae present, edges of punctae in contact; appressed yellow pubescence present. Head rounded in frontal view (CI 71), lateral margins slightly convex; posterior width (HW<sub>3</sub> 0.71 mm) about equal to anterior width of head (HW<sub>1</sub> 0.67 mm); posterior edge of head rounded, lacking concavity. Head foveo-punctate with dense subequal punctae, edges of punctae touching, increasing in density medially; appressed short white-gray pubescence present. Mesosomal profile even. Promesonotal suture impressed; mesonotum even with level of pronotum. Mesonotum flat, slightly inclined posteriorly; mesometapleural suture present, incised. Mesopleuron opaque, puncto-costate; posterior edge costulate. Mesometanotal groove distinct, incised. Propodeum inclined posteriorly, dorsopropodeum meeting posteropropodeum at distinct rounded junction, dorsopropodeum longer than posteropropodeum (DF 0.46 mm, PF 0.41mm); in dorsal view with distinct surface (not tectiform); dorsopropodeum opaque, rugo-punctulate, lateropropodeum opaque, with deep rugo-foveate sculpturing becoming costulate posteriorly; metapleuron opaque,

carinate. Mesosomal dorsum opaque, punctate, becoming puncticulate on mesonotum with long (0.11 mm) erect hairs as well as abundant fine white appressed pubescence present. Petiolar node not squamiform, rectangular, broad (PtI 52, DPtL 0.46 mm); short not reaching level of dorsopropodeum (PnL 0.52 mm); anterior and posterior faces slightly converging toward apex; apex rounded; spiracular process distinct, tooth-like. Petiole opaque, rugo-punctate; subpetiolar process with anterior profenestra; process distinctly lobate (SPtL 0.11 mm), evenly reaching posterior face; in dorsal view node broad, about as wide as propodeum. Gaster of typical form, opaque, shallow punctae present.

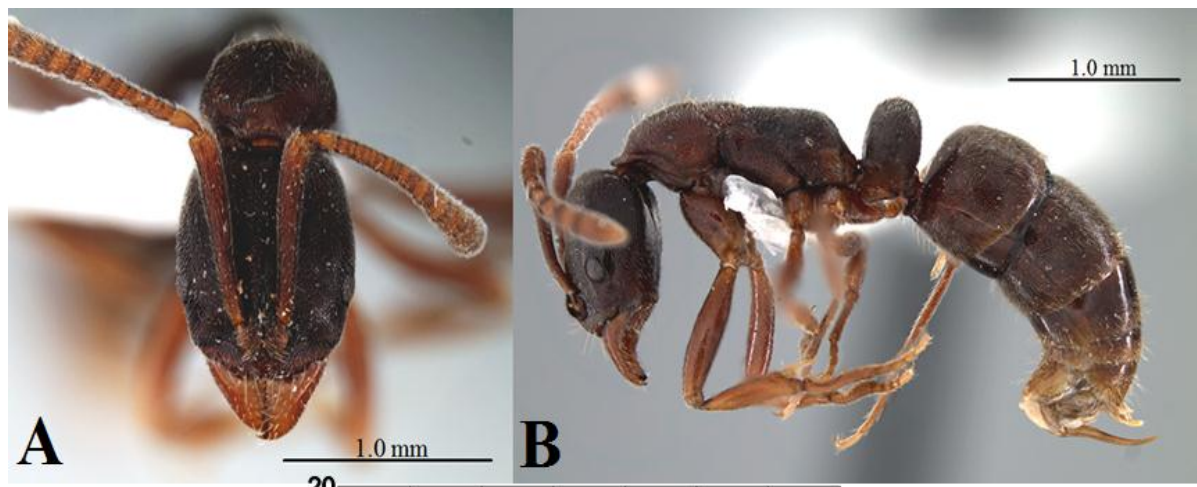
**Etymology.** *Corruptela*, Latin for seducer, one who leads astray, in reference to the species' attractive appearance as well as for the taxonomic enticement of the genus.

**Discussion.** *Hypoponera corruptela* belongs to the *opaciceps*-species group. The gyne and male are unknown. *Hypoponera corruptela* is most similar to *H. vernacula* but differs by the shape of the mesosomal profile. In *H. corruptela* the dorsopropodeum is about the same height as the mesonotum and the mesometanotal junction does not form a distinct depression. In contrast the profile of *H. vernacula* is uneven, with the level of the dorsopropodeum below that of the mesonotum, with a distinct mesometanotal groove. Additionally, the petiole is more stout and wider in *H. corruptela* (PtW 0.32 mm) than in *H. vernacula* (PtW 0.28 mm). *Hypoponera corruptela* can be distinguished from *H. leninei* as the former species is darker in coloration, has more developed eyes (~40 ommatidia in *H. corruptela* and only 8–11 in *H. leninei*), and longer scapes (SL 0.88 mm in *H. corruptela* and SL 0.74–0.78 mm in *H. leninei*). One other character state that will separate the two species is the mesometanotal junction. In *H. corruptela* this junction is apparent but not incised and the propodeum is not below the level of the mesonotum, however in *H. leninei* the junction is incised and the propodeum is below the level of the mesonotum.

**Natural History.** Collected in wet montane forest at 850 m in São Paulo, Brazil.

**Distribution.** Known only from the type locality.

**Material Examined.** Holotype: Brazil São Paulo, Estação Biol. Boraceia, Mun. Salesópolis, 24-28-v-1971, wet montane forest 850 m, WL and DE Brown. (MCZC)



**Figure 47.** *Hypoponera corruptela* holotype. Frontal view of head (A) and lateral habitus (B).

*Hypoponera coveri* Dash sp. nov. Fig. 48

**Diagnosis.** *Hypoponera coveri* is distinguished from other *Hypoponera* by the following suite of characters: the integument is yellow to yellow-tan, reflective and shiny, and the eyes are medium-sized and comprised of 14–16 ommatidia. The scapes surpass the posterior edge of the head by an amount equal to the length of the first funicular segment. The mesosomal profile is uneven in lateral view and the propodeum is slightly below the level of the mesonotum. The dorsum of the mesosoma has long flexible pilosity. The petiolar node is thin and tall and the subpetiolar process has a fenestra. The subpetiolar process appears to have a posterior tooth in lateral view, however if examined posteriorly the tooth is actually a thin ridge or carina.

**Description.**

**Measurements (mm) of holotype worker. (n=1)** TL 2.60, HL 0.78, HW<sub>2</sub> 0.75, CI 96, HS 0.77, EL 0.07, EW 0.06, OMD 0.07, SL 0.67, SI 89, ML 0.96, WbL 1.17, PnL 0.46, PnW 0.50, MsL 0.30, MsW 0.36, DF 0.31, PF 0.46, PnH 0.59, PtL 0.50, PtW 0.21, PtI 42, PeNI 42, SPtL 0.13, SPtW 0.18, DPtL 0.14, DPtW 0.36, GS1L 0.46, GS1W 0.62, GS2L 0.53, GS2W 0.64.

**Measurements (mm) of worker. (n=4)** TL 2.9–3.5 (3.1) [3.5], HL 0.78, HW<sub>2</sub> 0.71–0.74 (0.72) [0.74], CI 90–91 (90.5), HS 0.74–0.77 (0.75), EL 0.07, EW 0.07, OMD 0.07, SL 0.64–0.67 (0.66) [0.67], SI 89–94 (92), ML 0.96, WbL 1.14–1.2 (1.16) [1.12], PnL 0.46–0.49 (0.46), PnW 0.46–0.50 (0.48), MsL

0.28, MsW 0.35, DF 0.28–0.31 (0.30), PF 0.39–0.46 (0.41), HF 0.71–0.74 (0.72), PnH 0.57, PtL 0.46, PtW 0.21–0.22 (0.21), PtI 42–53 (47), PeNI 37–48 (44), SPtL 0.01, SPtW 0.14–0.17 (0.16), DPtL 0.14, DPtW 0.30–0.35 (0.32), GS1L 0.46, GS1W 0.61, GS2L 0.46–0.53 (0.49), GS2W 0.60–0.63 (0.62).

Yellow to yellow-tan in coloration, integument appearing reflective in fluorescent light, shiny. Mandibles (MnL 0.32 mm) with large apical tooth, tooth more pronounced than in other species (apical tooth length 0.12 mm) followed by three subapical teeth with 5–7 denticles; outer border lacking concavity; pale-yellow, lighter in coloration than head, shiny. Anterior medial edge of clypeus straight, medial lobe of typical form. Eyes medium (EL 0.07 mm), 14–16 slightly fused facets, ommatidia silver; visible in frontal view, eyes situated laterally, breaking outline of side of head, close (OMD 0.07 mm) to clypeal border. Frontal lobes (FLW 0.18) with dense appressed pilosity, punctate. Scapes extend past occipital margin by amount equal to first funicular segment, base not as wide as apex, decumbent appressed pilosity, shallow punctae; funiculus without distinct club, segments gradually increasing in length and width; segments with whitish appressed pubescence with suberect hairs, integument punctulate. Head quadrate in frontal view (CI 90), lateral margins slightly convex, posterior width (HW<sub>3</sub> 0.70 mm) slightly wider than anterior of head (HW<sub>1</sub> 0.64 mm). Head punctate, dense, punctae shallow, subequal to diameter, becoming more dense medially, punctae sides touching; pilosity appressed white-gray in coloration. Mesosomal profile uneven, propodeum slightly below level of mesonotum. Promesonotal suture slightly impressed, mesonotum even with pronotum. Mesonotum flat, inclined posteriorly; mesonotal-pleural suture present, distinct. Mesopleuron shiny nitid punctulate, punctae with hair arising; mesometapleural carinae distinct. Mesometanotal suture distinct, incised. Propodeum inclined posteriorly, dorsal face meeting posterior face at rounded angle, dorsal face shorter than posterior face (DF 0.30 mm, PF 0.41 mm); with long flexuous hairs along margin of posterior face. Dorsum distinct in dorsal view; dorsum shiny, nitid, punctulate, punctae deeper than on head, distance between punctae subequal, becoming less dense posteriorly; lateral portion shiny, punctate apically becoming puncticulate inferiorly; metapleuron reflective, superiorly puncticulate becoming carinate on inferior pleural surface, short carinae along mesometapropodeal junction. Mesosoma dorsum shiny, nitid with faint punctae; long (0.11 mm) erect flexuous pilosity, 30–40 hairs, short numerous appressed

pubescence present. Petiolar node squamiform, thin (PeNI 37–48, DPeI 25); tall, reaching level of propodeal dorsum (PnL 0.46 mm); anterior and posterior faces converging towards apex, apex rounded. Spiracular process distinct, tooth-like; petiole shiny, punctae wider apically becoming punctulate-rugose; subpetiolar process with fenestra; process forming distinct lobe (SPtL 0.11 mm), anterior portion lobate, rounded becoming truncate at posterior edge, laterally posterior edge of process with thin projection, posterior face of process with projection being a horizontal carina; in dorsal view node thin, not as wide as propodeum, shiny, punctulate, dorsum with 6–10 long flexuous hairs. Legs pale yellow. Gaster of typical form, opaque punctulate, foveate, punctae small with hairs arising from them, spacing between punctae equal to two to more punctae, pubescence dense, spacing between hairs less than length.

**Etymology.** Named for the naturalist, myrmecologist and collector of the type specimens, Stefan Cover.

**Discussion.** This species is similar to *H. perplexa* as both species have scapes surpassing the posterior margin of the head, they are similar in size (*H. perplexa* WbL 1.46 mm; *H. coveri* WbL 1.16 mm) and they have a similar general appearance. The two species can be separated because *H. perplexa* is red-brown in coloration whereas *H. coveri* is yellow to yellow-tan in coloration. The eyes in *H. coveri* have numerous (14–16) ommatidia compared to only three in *H. perplexa*. *Hypoponera coveri* and *H. perplexa* also differ in mesosomal and petiole character states. In *H. perplexa* the propodeum is not distinctly below the mesonotum but the mesometanotal suture is incised. The dorsum of the mesosoma also only possesses one to four short, erect hairs (0.07 mm) which are not as long (0.11 mm) or as numerous (30–40) as in *H. coveri*. Additionally, in *H. perplexa* the petiole is broader (PtW 0.24 mm) than in *H. coveri* (PtW 0.21 mm) and the posterior face has a distinct inclination near the apex whereas in *H. coveri* the petiolar sides are parallel for the entire length. The subpetiolar process in *H. perplexa* has a profenestra but this structure is not well-developed or as transparent as a true fenestra and the posterior face lacks a carina as is found in *H. coveri*. *Hypoponera coveri* and *H. capilosa* are similar in basic color and both have long erect pilosity. *Hypoponera coveri* however has larger eyes with 14–16 facets whereas *H. capilosa* has only 1 facet. *Hypoponera coveri* is not as nitid or reflective as *H. capilosa*. Both of these species can also be separated on the basis of the mesosomal shape, in *H. coveri*



the propodeum is below the level of the mesonotum but in *H. capilosa* the mesosoma is even and the propodeal dorsum is not below the mesonotum. The petiole in *H. coveri* is more scale-like or triangular, with both anterior and posterior faces converging apically. In contrast, the petiole of *H. capilosa* is scale-like but the anterior face of the petiole is straight and the posterior face is curved toward the apex.

*Hypoponera coveri* belongs to the *distinguenda*-species group. When viewing the subpetiolar process in lateral view there appears to be small posteriorly directed teeth. This character, as well as the fenestra, suggests this species should be placed within the genus *Ponera*. However, careful examination ventrally reveals a small carina and not teeth.

**Natural History.** Collected by slowly cutting away at clay soil (Cover per. comm.) In Firme Forest at an elevation of 200 m.

**Distribution.** Known only from type locality of Cuzco Amazonico near Puerto Maldonado, Peru.

**Material examined.** Type material examined.

Holotype PERU. Tambopata Prov. Cuzco Amazonico, 15 km NE Puerto Maldonado, 14–06–1989, S. P. Cover and J. K. Tobin. (MCZC)

Paratypes PERU. Tambopata Prov. Cuzco Amazonico, 15 km NE Puerto Maldonado, 14–06–1989, S. P. Cover and J. K. Tobin. (MCZC, CASC, USNM CWEM, and the STDC)



**Figure 48.** *Hypoponera coveri* holotype. Frontal view (A) and lateral habitus was taken by G. Alpert (B).

***Hypoponera creola* (Menozzi, 1931) Fig. 49**

*Ponera creola* Menozzi, 1931: 263, Fig. 3. workers: COSTA RICA: San Jose, (Tristan) [1 specimen examined] (MCZC). Combination in *Hypoponera* Kempf, 1972: 121.

**Diagnosis.** *Hypoponera creola* is light brown to reddish brown in coloration. The eyes are medium-sized with 5–10 ommatidia. The scapes surpass the posterior border of the head by an amount equal to half the length of the first funicular segment. The body is foveate-punctulate, and covered with dense short appressed pubescence that is more abundant on the head and gaster. The mesosoma is uneven in profile and the promesonotal suture is incised with the mesonotum below the level of the pronotum. The mesometanotal suture is also incised, forming a distinct groove with the propodeum below the level of the mesonotum. The dorsal face slopes into the propodeum. The petiole is distinctly scale-like with the anterior and posterior faces strongly converging toward the apex.

**Description.**

**Measurements (mm) of paratype worker (n=1).** TL 2.84, HL 0.67, HW<sub>2</sub> 0.60, CI 89, HS 0.64, EL 0.14, EW 0.10, OMD 0.14, SL 0.57, SI 95, ML 0.75, WbL 0.92, PnL 0.21, PnW 0.43, MsL 0.28, MsW 0.36, DF 0.25, PF 0.32, PnH 0.37, PtL 0.21, PtW 0.37, PtI 175, PeNI 87, SPtL 0.11, SPtW 0.18, DPtL 0.13, DPtW 0.28, GS1L 0.35, GS1W 0.53, GS2L 0.46, GS2W 0.57.

Medium sized (TL 2.84 mm) species, light brown to reddish brown in coloration. Mandibles light yellow, differing from body color. Mandibles triangular, nitid, with numerous scattered long decumbent hairs; apical tooth distinct followed by small denticles. Clypeus lighter colored than rest of head. Eyes medium-sized, 28–33 partially fused ommatidia. Scapes surpass posterior border of head by half length of first funicular segments. Scape expanding in width distally. Funicular segments 2–6 about equal in width, segments 7–10 gradually increasing in width and length, forming a gradual club. Scape and funiculus covered by short decumbent and appressed pubescence. Head covered with short grey, fine appressed, dense pubescence; scattered short (0.029 mm) erect pubescence present. Head with deep, dense foveate-punctulate sculpturing, yet reflective in fluorescent light. Ventral surface of head nitid, punctae with numerous erect scattered hairs. Posterior border of head medially concave. Pronotum nitid, punctulate, more punctae present at posterior edge, dense appressed pubescence present, scattered short

(0.029 mm) pilosity present on lateral margins. Promesonotal suture distinct and impressed; mesonotum slightly below level of pronotum; dense punctae present on anterior edge of mesonotum. Anterior oblique suture poorly developed. Mesometanotal suture present, impressed, forming groove, much deeper than promesonotal suture. Propodeum tectiform; dorsal face lower than mesonotum; distinctly inclined posteriorly, gradually meeting posterior face at rounded angle; posterior face gradually sloping posteroventrally. Petiole distinctly scale-like, very thin and high in lateral view; ovate in dorsal view. Subpetiolar process with anterior rectangular flange, prominent. Postpetiolar process absent or forming weak bump. Gaster of typical form; constriction distinct, covered by short, fine, appressed pubescence, with scattered longer, thicker suberect-decumbent pubescence.

**Etymology.** *Nescio*, perhaps Latin *creo* means to make, in Greek *kreos* is in reference to flesh.

**Discussion.** *Hypoponera creola* is most likely to be confused with the following species: *H. opacior*, *H. pampana*, and *H. trigona*. These species can be separated by the following comparative character states: profile of the mesosoma and sculpturing of the dorsal and sides of the propodeum. *Hypoponera creola* and *H. pampana* both have uneven profiles in lateral view, meaning that the promesonotal suture is incised and the mesometanotal junction forms a groove (groove more developed in *H. creola*); in contrast the mesonotum and dorsum of the propodeum are straight and there is not a groove formed in *H. opacior* and *H. trigona*. The development of the promesonotal suture is variable in *H. trigona* and *H. opacior* and never forms a deep groove as in *H. creola*. The mesonotum is at the level of the pronotum in *H. opacior* and *H. trigona*, not distinctly below the level of the pronotum as in *H. creola*. In *H. trigona* the dorsum and lateral portion of the propodeum has rugo-punctate sculpturing whereas in *H. pampana* and *H. creola* the punctae are smaller and do not form a rugo-punctate sculpturing pattern. The dorsum of the mesosoma in *H. trigona* has numerous (10–23) erect hairs, whereas in *H. creola*, *H. pampana* and *H. opacior* there are limited erect hairs over the dorsum of the mesosoma. *Hypoponera creola* and *H. pampana* are very similar and represent a potential taxonomic difficulty. *Hypoponera creola* has the mesonotum distinctly below the level of the pronotum whereas in *H. opacior* the mesonotum is not distinctly below level of pronotum. The dorsal face of the propodeum slopes gradually into the posterior face of the propodeum in *H. creola*, in contrast the dorsal and posterior faces of the

propodeum meet at a broadly rounded angle in *H. pampana*. Both species can also be distinguished based on sculpturing of the mesopleuron. In *H. creola* there is limited and dilute carinate sculpturing but in *H. pampana* the carinate sculpturing is distinct and numerous. Examination of the petiole will also separate *H. creola* and *H. pampana* because in *H. creola* the petiole forms a distinctly thin, scale-like node whereas in *H. pampana* the petiole has a scale-like node, but that node is not as thin as in *H. creola*.

*Hypoconera creola* belongs to the *trigona*-species group. Longino notes a worker at the MCZC, with label "S. Jose, Costa Rica, Tristan," and a lower label "*Hypoconera creola* Men. T. S. det. W. L. Brown." Thus Brown considered this specimen part of the type series of *creola*. I have based my description on this specimen. The eye in this specimen is comprised of 23–33 ommatidia, whereas specimens collected by P. S. Ward have 5–10 ommatidia; potentially representing ergatogynes.

**Natural History.** Longino (1999) notes that Phil Ward collected some specimens using Winkler samples of sifted litter at an elevation of 500 meters in Carara Biological Reserve. This appears to be a rare beast with only a limited number of collected specimens despite frequent and intensive collecting in Costa Rica so this species must be cryptic and/or rare.

**Distribution.** In Costa Rica known from San Jose, La Palma, and Carara (Longino 2010).

**Material examined.** Type material examined.

Lectotype. COSTA RICA: San Jose, (Tristan) [1 specimen here I designated this specimen the lectotype following article 74.1-74.3 of the ICZN, specimen bears a label designating it as a lectotype] (MCZC).



**Figure 49.** *Hypoponera creola* lectotype in frontal view (A) and lateral habitus (B).

***Hypoponera distinguenda*** (Emery, 1890) Fig. 50

*Ponera distinguenda*, Emery, 1890: 61, worker, Holotype VENEZUELA, San Esteban (MCSN),

Paratypes PARAGUAY, Prov. Matto Groiso, P. Gerinain 1886 [5 specimens examined].

Santschi, 1929: 277, queen described. Combination in *Hypoponera* Kempf 1972: 121.

*Ponera distinguenda* var. *histrion* Forel, 1912: 40 worker BRAZIL (MHNG) [6 specimens examined].

Combination in *Hypoponera*: Kempf, 1972: 122.

*Ponera distinguenda* var. *argentina* Santschi, 1922: 242 worker ARGENTINA. (NHMB) [1 specimen examined] Combination in *Hypoponera*: Kempf, 1972a: 121. Raised to species: Santschi, 1925a: 8; Santschi, 1925b: 154.

*Ponera distinguenda* var. *dispar* Santschi, 1925: 8 (w.) BRAZIL (NHMB) [2 specimens examined].

Combination in *Hypoponera*: Kempf, 1972: 122.

*Ponera wilsoni* Santschi, 1925: 10 workers BRAZIL. (NHMB) [1 specimens examined]. Combination in *Hypoponera*: Kempf, 1972: 124.

**Diagnosis.** *Hypoponera distinguenda* is one of the most plain of the *Hypoponera* and likely represents the archetype of the genus. This species is medium-sized and is variable in coloration. The mandibles have small teeth or denticles along the margin. The outer margin of the mandibles may be lacking or possessing a concavity. The eyes are small with 2–4 distinct facets and are located dorsolaterally. The

scapes reach and slightly surpass the posterior margin of the head. The sculpturing consisting of shallow depressions or pits. In lateral view the mesosoma is uneven with the promesonotal and the mesometanotal sutures being incised. The petiolar node is scale-like with the subpetiolar process being quadrate in shape when viewed laterally; this process frequently has a profenestra or depression.

### **Description.**

**Measurements (mm) of holotype worker (n=1).** TL 3.95, WL 1.0, HL 0.85, HW<sub>2</sub> 0.63, CI 74, HS 74, EL 0.07, EW 0.07, OMD 0.17, SL 0.98, SI ML 1.0, PnL *head bent back and over*, PnW 0.45, MsL 0.24, MsW 0.36, DF 0.28, PF 0.42, PtH 0.59, PtNL 0.52, PtNW 0.24, PtI 46, DPtL 0.14, DPtW 0.42, SPtL 0.10, SPtW 0.14, GS1L 0.46, GS1W 0.56, GS2L 0.52, GS2W 0.63.

Orange brown to reddish brown in color. Mandibles triangular, yellow, nitid, external margin variably concave; teeth small, denticles along entire mandible length. Eyes small, 2-4 ommatidia. Scape lighter colored than body, surpassing posterior border by amount equal length or half length of first funicular segment; funicular segments gradually increase in size, not forming distinct club; covered in short thick decumbent pubescence; scape less densely covered than funiculus. Head elongate, longer than wide (CI 74), posterior border straight; covered in short thin appressed pubescence, punctulate. Mesonotal-pleural suture present; metanotal suture absent, metanotal groove apparent, slightly incised. Dorsopropodeum even (flat), meeting posterior face at rounded angle, gradually sloping into petiolar region, metapleural carina present. Dorsum of mesosoma with dense appressed pubescence and scattered short suberect pilosity, pleural regions nitid. Petiole thick, rectangular in lateral view, dorsum rounded apically, spiracular process apparent; subpetiolar process length equal to node, rounded, short. Dorsum of petiole with scattered long subdecumbent hairs. Gaster of typical form; postpetiolar process well-developed forming flange; gastric segments covered with dense appressed posterior directed hairs, numerous erect, suberect hairs.

**Etymology.** Latin *distinguo* for distinguish or to separate.

**Discussion.** *Hypoconera distinguenda* is very similar to *H. perplexa*, *H. schmalzi*, *H. coveri* and *H. capilosa*. To separate *H. distinguenda* and *H. perplexa* some care must be taken. *Hypoconera perplexa* has the mesonotum convex, in contrast in *H. distinguenda* the mesonotum is flat. The anterior margin of

the head is nearly as wide as the posterior margin in *H. perplexa* whereas *H. distinguenda* the anterior margin of the head is less wide than the posterior edge. There is also less overall sculpturing on the metapleuron and lateral dorsopropodeum. *Hypoponera coveri* can be distinguished from *H. distinguenda* by the distinct carinae on the posterior face of the subpetiolar process. *Hypoponera capilosa* can be separated from *H. distinguenda* by the long and abundant hairs present of the head and mesosoma of *H. capilosa*.

*Hypoponera distinguenda* belongs to the *distinguenda*-species group. *Hypoponera distinguenda* has been previously represented by four subspecific taxa: *Hypoponera distinguenda vana* (Forel, 1909), *Hypoponera distinguenda inexpedita* (Forel, 1911), *Hypoponera distinguenda histrio* (Forel, 1912), and *Hypoponera distinguenda dispar* (Santschi, 1925). Forel (1909) designated *H. d. vana* as the specimens that are smaller than the type, and darker black in coloration. Nevertheless, Forel conceded the fact that his specimen was very similar to the type but because *H. d. vana* is from Guatemala and the type of *H. distinguenda* is from Paraguay (Forel 1909) he thought they were different species. Forel's (1909) observation of a difference in size is an important diagnostic character but color is variable among ants, although I have not examined any black *H. distinguenda* (the majority of specimens are yellow-brown to red-brown in color). In addition I have noted *H. d. vana* as having shorter scapes, which do not reach the posterior border of the head, whereas in *H. distinguenda* the scapes surpass the posterior border by an amount equal to the length of the first funicular segment. *Hypoponera distinguenda inexpedita* was described by Forel (1911) based on its smaller size and smaller eyes. The smaller size (size difference) and eyes consisting of 1 or 2 facets are valuable characters for separation of the two taxa. In addition to these characters presented by Forel, the scapes do not surpass the posterior border with the terminal segments forming a slight club, the posterior border of head strongly concave. The petiole node is scale like, but shorter and the apex is more rounded, and it is yellow-orange in coloration. Forel (1912) designated a third "subspecies" *Hypoponera distinguenda histrio* based on it being larger than the type with larger eyes (9-10 facets compared to 1 or 2 in the *H. distinguenda*) and the scapes are shorter. IT is similar to *H. jheringi* (Forel, 1908) but smaller and less robust. *Hypoponera distinguenda histrio* is very similar to *H. argentina* however, *H. argentina* has a depressed metanotal groove. The final subspecies of

*H. distinguenda* is *Hypoponera distinguenda dispar*. Santschi (1925) provided a rather complete justification of his designation, noting that *dispar* is smaller than the type (3.5 mm compared to 4 mm), the petiole differs, the pilosity is richer, and the eyes are the same as the type but differing from *Hypoponera distinguenda histrio*. The coloration, overall shape, and sculpturing is the same as the type (Santschi 1925). I have noted that the mandibles with a number of “teeth” compare to the number of denticles in *Hypoponera distinguenda*; the scapes just reaching or slightly surpassing the posterior border, the head is rounded and more densely punctate. The mesometanotal groove is incised, and the petiolar node is smaller and rounded. In combination with the character states noted by Santschi and those provided here support the conclusion that *Hypoponera distinguenda dispar* is a distinct taxon. *Hypoponera distinguenda dispar* is similar to *H. schmalzi* however, *H. schmalzi* has larger eyes (11 ommatidia) whereas *Hypoponera distinguenda dispar* has ~2 ommatidia).

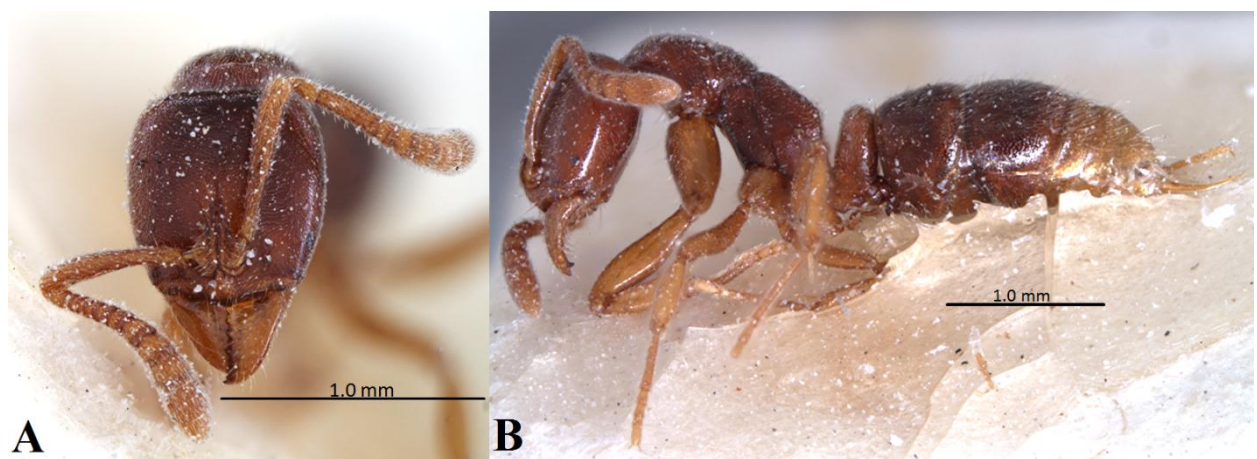
**Natural History.** Unknown.

**Distribution.** Costa Rica, Guatemala, Colombia, Venezuela, Brazil, Bolivia, and Paraguay (Kempf 1972, Bolton et al. 2007, Longino 2010).

**Material Examined.** Type material examined.

Holotype VENEZUELA, San Esteban (MCSN)

Paratypes PARAGUAY, Prov. Matto Groiso, P. Gerinain 1886 [5 specimens examined] (MCSN)



**Figure 50.** *Hypoponera distinguenda* paratype. Frontal view (A) and lateral habitus (B).



*Hypoponera faceta* (Menozzi, 1931) *incertae sedis* Fig.51

*Ponera faceta* Menozzi, 1931: worker, COSTA RICA, Irazu Volcano. [not examined]. Combination in *Hypoponera* Kempf 1972: 122.

**Diagnosis.** I have reviewed Menozzi's (1931) description and gathered those characters which I currently judge to be informative. I present those characters here although they are nebulous and not diagnostic. *Hypoponera faceta* is a small (TL 2.8–3 mm) *Hypoponera* which is brown-red in coloration. The head has dense punctae and is lucid with numerous whitish hairs. The mandibles have small denticles. The eyes are small with 4–5 facets and are close to the posterior margin of the head (Menozzi [1931] notes they are closer to the margin than in *H. creola*). The scapes fail to reach the posterior margin. The antennal club is distinct (being larger than in *H. creola*). The petiolar node is thick and the dorsum is flat.

**Description.** The following description was translated from Menozzi's (1931) original.

“Total Length. 2.8–3 mm. Color ferruginous, antennae, mandibles and legs clearer. Shiny mesosoma and gaster with scattered punctae with the interspaces shiny, on the head the punctuation sharper but fine and with an underlying sculpturing which makes it almost opaque. Pubescence whitish, not very abundant, some erect hair on the mesosoma and gaster, frontal carinae are ciliate. Based on the structure of the mesosoma, it is closely related to *H. creola* and the head is not much different, just a little more narrow, with smaller eyes of 4–5 facets in their greatest diameter and distinctly closer to the anterior margin of the head. The mandibles have a denticulation similar to those of *H. creola*, the anterior margin of the clypeus is a little more arched. The scape does not reach the occipital margin by the maximum scape thickness. The segments of the funiculus are a little wider than those of *H. creola* and the club is enlarged, almost as much as that of *H. clavatula*. The frontal carinae are twice as long as the blades of *H. creola*. Propodeum with rectangular basal face, a fourth longer than wide; the posterior face is almost as long as the basal face, with rounded sides and joined with basal face in a distinct though obtuse angle. Scale much larger than that of *H. creola*, nearly as long at the base as in height, with the anterior and posterior faces parallel (flat). As it appears from the description and from the figure this new *Hypoponera* is distinct from *H. creola* by the smaller eyes, the scape of the antennae not reaching the

occipital border and by the petiole that is much larger. Known for incidence that the species of *Hypoponera* are difficult to separate and that in general specific characters that serve to differentiate one species from the other are length of the scape, from the size of the eyes and from their position, as well as the size and form of the petiole, the form of the propodeum and the head, from the punctae of the mandibles, from the stature etc. Now if some of these characters has an indisputable specific value, that differs from the others, for example, size of the eyes, size of the petiole, number of the teeth on the mandibles, stature and of some others, I confess that I am not able to make an exact concept of their value without possessing or having had in examination, an abundant material.”

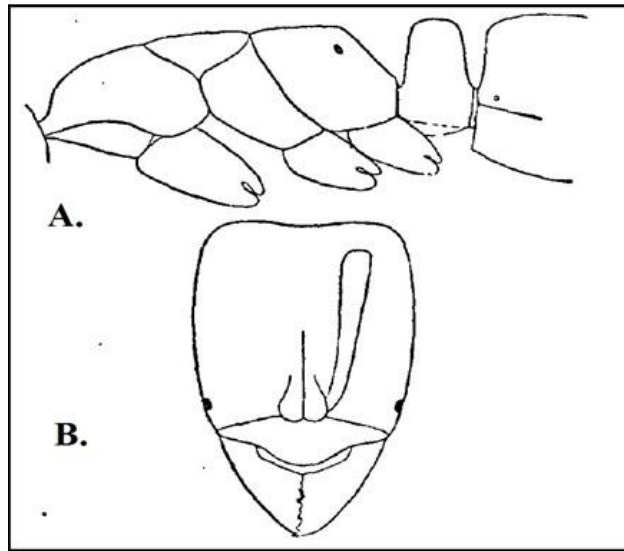
**Etymology.** In reference to facets or ommatidia, it is not clear why Menozzi would choose this as a name since *H. faceta* has only 4–5 facets which is a common range in *Hypoponera*.

**Discussion.** Figure 51 is taken from Menozzi’s (1931) manuscript, other images in that work are poor representations of the specimens he examined (ex. *H. creola* does not show any depression of the mesometanotal groove or promesonotal suture), as such this image should be viewed as a “suggestion” of the appearance of *H. faceta*.

**Natural History.** Unknown.

**Distribution.** Known only from the type locality. Five workers from the slope of the Irazu volcano which is located northeast of San Jose, Costa Rica.

**Material examined.** No material was available for examination.



**Figure 51.** *Hypoponera faceta*. Lateral view of mesosoma, petiole, and part of gastric segment one (A). Frontal view of head (B). Taken from Menozzi (1931).

***Hypoponera fallax*** (Forel, 1909) stat. nov. Fig. 52

*Ponera inexorata fallax* Forel, 1909: 245. worker. GUATEMALA [2 specimens examined] (MHNG). Combination in *Hypoponera* by Kempf 1972: 122.

**Diagnosis.** This is a small species between 2.5 and 2.6 mm in total length, and yellow-tan to yellow-orange in coloration. The head is elongate and covered with dense punctae. The outer border of the mandibles has a slight concavity. The eyes are small, consisting of a single facet, located near the clypeal margin (OMD 0.07 mm). The scapes reach the posterior border of head, and the funiculus forms a gradual club. The dorsal outline of the mesosoma is even, with the propodeum only slightly below the surface of the mesonotum. The propodeum is distinctly tectiform in dorsal view. The mesosoma is shiny and reflective and the dorsum is covered in punctae. The petiole forms a thick scale-like petiolar node.

**Description.**

**Measurements (mm) of worker. (n=2)** TL 2.5–2.6, HL 0.68–0.72, HW<sub>2</sub> 0.53–0.55, CI 73–76, HS 0.61–0.64, EL 0.35, EW 0.35, OMD 0.06–0.07, SL 0.45–0.53, SI 85–96, ML 0.78–0.81, WbL 0.96–0.97, PnL 0.31–0.39, PnW 0.39, MsL 0.21, DF 0.28–0.30, PF 0.32–0.34, PeNI 41–39, SPtL 0.78–0.80.

Small (TL 2.5–2.6 mm); color pale yellow to yellow-orange, appearing opaque. Mandibles with large apical tooth followed by three well-defined teeth, masticatory edge with three to four teeth or smaller denticles between teeth; outer border concave; lighter in coloration than head, opaque, reflective; fine appressed pubescence over surface. Anterior medial edge of clypeus straight, median lobe flat, lighter in coloration than head. Eyes small (EL 0.35 mm), one distinct facet, ommatidium silver; barely visible in frontal view, eyes situated laterally, not breaking outline (even) of side of head; close (OMD 0.06–0.07 mm, OMD<sub>1</sub> 0.10–0.11 mm) to clypeal border. Frontal lobes (FLW 0.14–0.17 mm) with dense appressed pilosity, punctate. Scapes reach or extend past occipital margin by amount equal to half of first funicular segment, base not as wide as apex; suberect to erect pilosity, puncticulate; funiculus not forming distinct club, segments gradually increasing in size; dense appressed pilosity with scattered suberect hairs. Head rectangular in frontal view (CI 77–78), lateral margins parallel; posterior width (HW<sub>3</sub> 0.43–0.53 mm) equal to anterior width of head. Head punctulate, with dense punctae, spacing subequal to diameter, punctae becoming denser medially; pilosity appressed, white-gray in coloration. Mesosomal profile even, propodeum only slightly below level of mesonotum. Pronotum with dense (becoming less dense laterally) punctae, spaces between punctae subequal to diameter, punctae shallow. Promesonotal suture not impressed, mesonotum even with pronotum. Mesonotum flat; mesonotal-pleural suture present, distinct. Mesopleuron shiny, punctate at posterior margin; mesometapleural carinae well-developed (MMC 0.22–0.28 mm), distinct. Mesometanotal suture poorly developed. Propodeum inclined posteriorly, dorsal face meeting posterior face at a distinct rounded angle, dorsal face slightly shorter than posterior face (DF 0.28–0.30 mm, PF 0.32–0.34 mm); tectiform in dorsal view; dorsum opaque, densely punctate, punctae becoming less dense laterally; lateral portion shiny opaque, punctate costate, punctae absent above metathoracic spiracle, below this level with longitudinal striae, metapleuron reflective opaque, punctate, rugocarinate; junction of mesopleuron and metapleuron with faint rugae or striae. Mesosomal dorsum reflective opaque, punctate with few erect and suberect hairs and dense appressed pilosity. Petiolar node squamiform, broad (PeNI 41–39, DPel 58–60); short, not reaching level of propodeal dorsum (PnL 0.43–0.46 mm); anterior and posterior faces slightly converging toward apex, apex flat. Spiracular process tooth-like, petiole shiny, punctate; subpetiolar process lacking

fenestra; process forming distinct lobe (SPtL 0.78–0.80 mm), anterior portion lobate; in dorsal view node broad, as wide as propodeum. Gaster of typical form, constriction distinct; reflective opaque, punctate, appressed pubescence longer, suberect pilosity on posterior edges of tergites.

**Etymology.** Deceitful, treacherous, false perhaps in reference to Forel's (1909) ideas of the species difference to *H. inexorata*.

**Discussion.** *Hypoponera fallax* is similar to *H. foeda*, *H. antoniensis*, *H. stoica*, *H. saroltae*, and *H. transiens* (Table 4). *Hypoponera saroltae*, *H. transiens*, *H. foeda* and *H. famini* can be distinguished from *H. fallax* by a shorter scape, as *H. fallax* has a scape that reaches the posterior border of the head. *Hypoponera fallax* can be distinguished from *H. antoniensis* and *H. stoica* because these species lack a tectiform propodeum. Table 4 provides a comparison between the diagnostic character states of each species.

*Hypoponera fallax* belongs to the *foeda* -species group. Forel (1909) hinted at a more significant difference between *Hypoponera inexorata* and *Hypoponera inexorata fallax* suggesting they may be very distinct species when he named it as a subspecies. Both species are extremely similar in overall morphology. Forel (1909) noted *H. inexorata fallax* to be smaller, with a less elongated mandible, a narrower head and a lower petiolar node along with some other differences. Additionally, he noted a major difference in the distributional ranges of the species: *H. inexorata* is located only in Texas and *H. inexorata fallax* is from Guatemala. The disjunct distribution (*H. inexorata* and *H. fallax*) of the species may not be as distinct as Forel thought in 1909 and with additional collections since then, the species may be sympatric (specimens of *H. inexorata* from Oaxaca, Mexico have been examined). Potential sympatry as well as a suite of diagnostic characters distinguish the taxa and result in *H. inexorata fallax* being raised to species. *Hypoponera fallax* is smaller than *H. inexorata* (WbL 0.43 mm, TL 2.4–2.6 mm, HW<sub>2</sub> 0.52 mm, HL 0.674 compared to WbL 1.05 mm, TL 2.8–3.4 mm, HW<sub>2</sub> 0.67 mm, HL 0.78 mm respectively). Cephalic differences will also separate *H. fallax* and *H. inexorata*: Forel's (1909) assessment of differences in head shape are diagnostic and not part of within taxon variation. *Hypoponera fallax* has an elongate, rectangular head (HW<sub>2</sub> 0.52 mm, HL 0.67 mm, CI 74) with the outer margins parallel; in contrast *H. inexorata* has a more squarish head (HW<sub>2</sub> 0.66 mm, HL 0.78 mm, CI 83)

with the outer margins convex and rounded. Additionally, differences in sculpturing are apparent: the surface of the head of *H. inexorata* has faint shallow punctae with 1–2 diameters between punctae, whereas the head sculpturing of *H. fallax* is very dense and the punctae are apparent and deep. The promesonotal and mesometanotal sutures are distinct in both species; however in *H. fallax* the sutures are not deeply incised but are distinctly incised in *H. inexorata*. The mesosomal profile is even and flat in *H. fallax*, for *H. inexorata* the dorsum of the pronotum, mesonotum and to a lesser degree the propodeum are slightly convex and rounded. The propodeum of *H. fallax* in dorsal view is distinctly tectiform, the apex and dorsum are very thin, and in lateral view the dorsal face of the propodeum is roughly the same length as the posterior face (DF 0.31 mm, PF 0.29 mm). The propodeal dimensions of *H. inexorata* differ from those of *H. fallax* in that the propodeum is not distinctly tectiform, the sides do converge dorsally but the apex is not as thin as in *H. fallax*, additionally, the dorsal face of the propodeum is shorter than the posterior face (DF 0.23 mm, PF 0.39 mm). Overall, *H. inexorata* is shinier with less dense, shallower punctae than *H. fallax*. *Hypoconera fallax* is reflective but is less shiny and duller.

**Natural History.** Unknown.

**Distribution.** Guatemala.

**Material examined.** Type material examined.

Lectotype GUATEMALA [2 specimens on two pins. I designated a specimen the lectotype and one as the paralectotype following article 74.1-74.3 of the ICZN, each specimen bears a label designating it as a lectotype and paralectotype] (MHNG).



**Figure 52.** *Hypoponera fallax* lectotype. Frontal view (A) and lateral habitus (B).

***Hypoponera famini* (Forel, 1912) stat. nov. Fig. 53**

*Ponera fiebrigi* var. *famini* Forel, 1912: 41. worker, COLOMBIA. Combination in *Hypoponera*, Kempf, 1972: 122.

**Diagnosis.** *Hypoponera famini* is a small (TL 2.6 mm, WbL 0.83 mm) species that is yellow-orange in coloration. The eyes are small and appear as one facet but higher magnification shows 5–6 fused facets. The eyes are positioned laterally on the head (more so than in other species). The scapes are short and do not reach the posterior margin of the head. The funiculus forms a weak gradual club. The mesosomal profile is even and the promesonotal suture is incised however the mesometanotal suture is not incised. The propodeum is not below the level of the mesonotum and when viewed dorsally the propodeum is not tectiform. The dorsum of the mesosoma has 10–14 erect hairs. The petiolar node is scale-like and the anterior and posterior faces slightly converge apically. The subpetiolar process is lobate anteriorly and lacks a fenestra or depression.

**Description.**

**Measurements (mm) of holotype worker. (n=1)** TL 2.6, HL 0.64, HW<sub>2</sub> 0.40, CI 62, HS 0.52, EL 0.03, EW 0.03, OMD 0.07, SL 0.46, SI 87, ML 0.67, WbL 0.83, PnL 0.39, PnW 0.35, MsL 0.17, MsW 0.25, DF 0.21, PF 0.33, PnH 0.39, PtL 0.31, PtW 0.17, PtI 54, PeNI 48, SPtL 0.08, SPtW 0.14, DPtL 0.11, DPtW 0.22, GS1L 0.35, GS1W 0.35, GS2L 0.35, GS2W 0.35.

Small (TL 2.6 mm); coloration yellow-orange, integument appears shiny to sublucid. Mandibles (MnL 0.22 mm) with large apical tooth followed by 2 teeth, remainder of masticatory border with reduced denticles; outer border concave; yellow, lighter in coloration than head; sublucid. Anterior medial edge of clypeus straight; medial lobe of typical form. Eyes small (EL 0.03 mm), 5 to 6 fused facets; ommatidia pale yellow; barely visible in frontal view, eyes situated laterally, not breaking outline of side of head, close (OMD 0.07 mm) to clypeal border. Antennae yellow, lighter in coloration than head, opaque. Scapes fail to reach occipital margin by length of first funicular segment; base not as wide as apex; funiculus with weak club, indistinct club segments gradually increasing, club segments longer than proceeding funicular segments. Head rectangular in frontal view (CI 62), lateral margins parallel; posterior width (HW<sub>3</sub> 0.50 mm) wider than anterior of head (HW<sub>1</sub> 0.39 mm); posterior border of head even, slight concavity. Head punctate, distance between punctae equal to diameters; pilosity appressed, white-yellow in coloration. Mesosomal profile even, propodeum not below level of mesonotum. Promesonotal suture slightly impressed, mesonotum even with pronotum. Mesonotum flat in profile; mesonotal-pleural suture present, distinct. Mesopleuron shiny, apical portion with elute punctae becoming nitid on lower region; mesometapleural carinae distinct. Mesometanotal suture faint, elute. Propodeum flat, not distinctly inclined posteriorly, dorsal face meeting posterior face at a distinct angle; tectiform in dorsal view; dorsum shiny, punctate; lateral portion shiny, dispersed punctae more dense and larger on propodeal dorsum compared to rest of mesosomal dorsum; metapleuron sublucid, finely carinate. Mesosoma dorsum sublucid becoming shiny on propodeum, dispersed punctate sculpturing with few (6–9) erect, appressed hairs present. Petiolar node squamiform, broad (PeNI 48), tall; reaching level of propodeal dorsum (PNL 0.31 mm); anterior and posterior faces parallel, converging near apex, apex rounded, sublucid. Spiracular process lobe-like, shiny; subpetiolar process with reduced fenestra (small depression or profenestra); process forming distinct lobe, anterior portion lobate, broad in dorsal view, propodeum opaque, reflective. Gaster of typical form, sublucid, with appressed pubescence.

**Etymology.** Eponymous.



**Discussion.** This species is very similar to *H. foeda* but the head has fewer punctae and is more quadrate rather than elongate as in *H. foeda*. Table 4 provides a comparison between each species and their diagnostic character states. *Hypoponera famini* belongs to the *foeda* -species group.

**Natural History.** Unknown.

**Distribution.** Known only from type locality.

**Material examined.** Type material examined.

Holotype [COLOMBIA] hacienda de l'Esperanza, Dibulla, pied de la Sierra Neveda de Santa Marta, Colomibe [Holotype (by monotypy) worker, specimen bares a label designating it as a holotype] (MHNG)



**Figure 53.** *Hypoponera famini* holotype. Frontal view (A) and lateral habitus (B).

***Hypoponera fenestralis* (Gallardo, 1918) *incertae sedis* Fig. 54**

*Ponera fenestralis* Gallardo 1918: 82, fig 20, female alate, ARGENTINA, Buenos Aires, Sierra de la Ventana [not examined]. Combination in *Hypoponera* Kempf 1972: 122.

**Diagnosis.** See discussion.

**Description.** Translated and modified from Gallardo (1918).

“I (Gallardo) describe a female specimen with this name that I collected in the Sierra de la Ventana in January 1913 which is contained in the collection of the museum under the number 10,583. It could be the female *H. clavatula* Emery by its general coloration and shape of their antennae, judging from the

description, but the different locality leads me to describe it under a different name. I know of no examples of *H. clavatula*, so consider it to be adventuresome to judge their similarities by the description alone.”

**Gyne** TL 3 mm. brownish yellow, with the legs and antennae somewhat clearer. Head without mandible longer than wide (5:4) with the sides slightly convex, occipital border nearly straight, very slightly indented. Shiny triangular jaws, with darkened denticles. Anterior border of clypeus convex. Of the frontal carinae, part has a thin line that reaches the anterior ocelli. The scape is reclined, reaches the occipital border, funiculus thickened towards the tip, with all its segments wider than long with the exception of the first and last. Dark eyes situated in front of the middle of the sides of the head, its anterior border is far from the front edge of clypeus, approximately the maximum diameter of the eye. Three ocelli poorly pigmented. The profile of the thorax and the petiole is shown in Figure 20 (In this dissertation Fig. 54) which saves describing them. Submatte-shiny with fine punctae on the head and on the back of the thorax and gaster, pleurae on mesosoma and gaster finely wrinkled. Fine yellow pubescence all over, with very few erect hairs on the clypeus and the dorsum of the thorax. Fine pubescence on the scape, most abundant on the funiculus. Iridescent wings hyaline, veins and pterostigma pale brownish yellow.”

**Etymology.** Latin *fenestra* meaning window, although the reference is unclear. Gallardo (1918) did not describe a fenestra on the subpetiolar process and the drawing has the subpetiolar process obscured by the metacoxa.

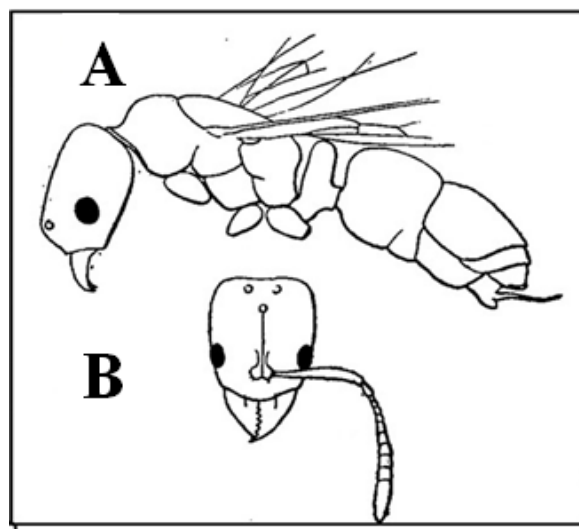
**Discussion.** *Hypoconera* workers are widely agreed to lack or have limited autapomorphic or distinguishing characters. Whereas this is not completely true, a thorough and focused dedication of time to the workers is required to determine species. Currently, the reproductive forms have not been addressed. Resulting from the disparity in characters between workers and reproductive-forms, a detailed and intensive morphological study is required to plot species limits for gynes, males, and reproductive-intercastes. Such intercastes, limited material, nominative taxa based on reproductives with no association to workers have wholly retarded an understanding of the alpha taxonomy regarding reproductive-forms. Therefore, a clear treatment of *H. fenestralis* is currently not possible and I have

elected to take a conservative approach and place the status as uncertain. Further study is required to resolve *H. fenestralis*' taxonomic placement.

**Natural History.** Unknown.

**Distribution.** Known only from type locality.

**Material Examined.** Not examined.



**Figure 54.** Type locality and habitus of *Hypoponera fenestralis*. Lateral habitus of *H. fenestralis* (B) Frontal view of head (C). Image taken from Gallardo (1962). Illustrations in Gallardo's (1962) manuscript lack sufficient details to determine species identity.

***Hypoponera foeda* (Forel, 1893) Fig. 56**

*Ponera foeda* Forel, 1893: 364. Worker, queen, WEST INDIES, St. Vincent. [3 specimens examined] (MHNG). Combination in *Hypoponera*, Kempf, 1972: 122.

**Diagnosis.** *Hypoponera foeda* is a small species that is yellow-orange in coloration. The outer margin of the mandibles has a concavity but this concavity is variable in its distinction. The eyes are small and appear to be only one facet but are actually 4–5 fused facets, the eyes are located dorsolaterally and close to the posterior border of the clypeus. The scapes are short and do not reach the posterior margin of the head, though they are close. The funicular segments form a weak or indistinct club. In frontal view the head is elongated with dense foveo-punctate sculpturing and the spacing between the depressions is less than the diameter of the depressions. The dorsum of the mesosoma in lateral view

appears even, meaning that the promesonotal and the mesometanotal sutures are not distinctly incised. The promesonotal suture may be weakly incised. The mesometanotal suture does not form a depression or a groove, but meets the level of the mesonotum equally. The mesopleuron is sublucid and the posterior margin has punctate sculpturing. In dorsal view, the propodeum is not strongly tectiform. The petiolar node is subtriangular in shape when viewed laterally. The anterior and posterior faces gradually converge dorsally. The petiolar node is high, reaching the level of the dorsopropodeum.

### **Description.**

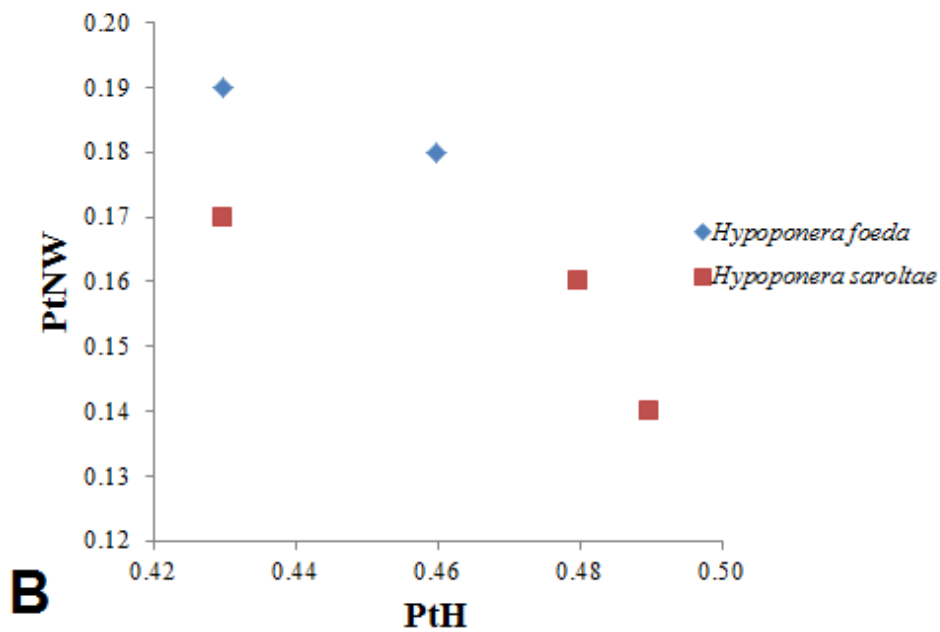
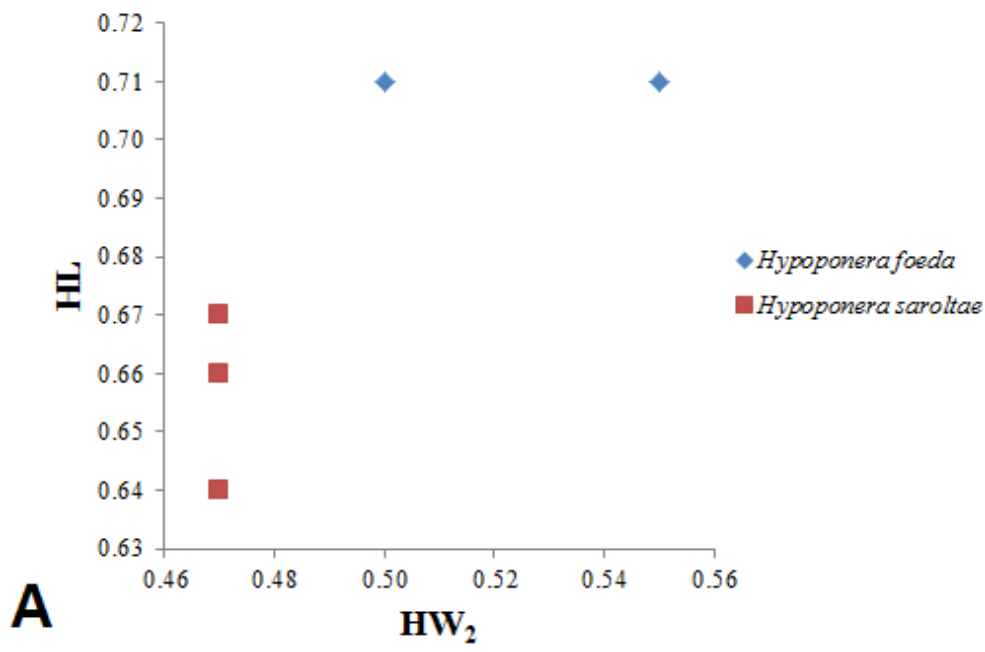
**Measurements (mm) of worker (n=2).** TL 2.60–3.10, HL 0.71, HW<sub>2</sub> 0.50–1.00, CI 70–77, HS 0.61–0.81, EL 0.35, EW 0.35, OMD 0.07–0.18, SL 0.46–0.49, SI 54–99, ML 0.80–0.82, WbL 0.92–0.96, PnL 0.36–0.39, PnW 0.43, MsL 0.25–0.32, MsW 0.25–0.31, DF 0.23–0.25, PF 0.35–0.37, PnH 0.43–0.46, PtL 0.36–0.38, PtW 0.25, PtI 47–52, PeNI 41–44, SPtL 0.11, SPtW 0.13–0.14, DPtL 0.14, DPtW 0.25, GS1L 0.35–0.39, GS1W 0.42–0.46, GS2L 0.36–0.39, GS2W 0.46.

Small (TL 2.60–3.10 mm); color yellow-orange, integument sublucid. Mandibles (MnL 0.36 mm) with large apical tooth followed by 4 to 5 large tooth-like denticles; outer border lacking concavity (there is variable development of the concavity); yellow-orange, same coloration as head; opaque. Anterior medial edge of clypeus straight; medial lobe of typical form, punctate. Eyes small (EL 0.35 mm) appearing as 1 facet under low magnification, comprised of 4–5 fused facets; ommatidia yellow; blending into head, barely visible in frontal view, eyes situated dorsolaterally, not breaking outline of side of head, close (OMD 0.07–0.18 mm) to clypeal border. Antennae yellow, lighter in coloration than head, opaque. Scapes fail to reach occipital margin by length equal to length of first funicular segment, base wider than apex; funiculus with weak club, club segments gradually increasing. Head rectangular, elongate in frontal view (CI 70–77), lateral margins parallel, margin equal to anterior edge, posterior width (HW<sub>3</sub> 0.50–0.53 mm) wider than anterior width of head (HW<sub>1</sub> 0.44 mm); posterior border of the head with slight concavity. Head densely foveo-punctate, punctae spacing subequal to diameter; pilosity appressed, scattered erect hairs, white-yellow in coloration. Mesosomal profile even. Promesonotal suture with slight impression, mesonotum even with pronotum. Mesonotum flat; mesonotal-pleural suture present, faint. Mesopleuron sublucid, posterior edge punctuate. Mesometanotal suture elute.

Propodeum inclined posteriorly, dorsal face meeting posterior face at rounded angle; dorsum distinct in dorsal view; dorsum sublucid; lateral portion sublucid with small, shallow depressions; metapleuron (covered in glue), opaque, finely carinate. Mesosoma dorsum opaque with few (2–6) long erect hairs, dense, shorter (0.01 mm) erect-suberect to depressed white-yellow hairs. Petiolar node scale-like, triangular, broad (PeNI 41–44, DPeI 56); tall, reaching level of propodeal dorsum (PnL 0.36–0.38 mm); anterior and posterior faces parallel, slightly converging towards apex, apex rounded, sublucid. Spiracular process lobe-like; subpetiolar process reduced (SPtL 0.11 mm), anterior portion weakly rounded, in dorsal view node broad, propodeum sublucid. Gaster of typical form punctate, numerous (30–42) erect long (0.04–0.05 mm) hairs, dense, spacing between pubescence half the length of hairs, appressed.

**Etymology.** Latin *foeda* for foul or cruel although the reason for this choice by Forel is not clear.

**Discussion.** *Hypoponera foeda* belongs to the *foeda* -species group. One type has slightly concave mandibles. Table 4 provides a comparison between similar species and diagnostic character states. *Hypoponera foeda* is very similar to *H. transiens* and *H. saroltae*. *Hypoponera transiens* can be separated from *H. foeda* as *H. transiens* is lacking a concavity on the outer margin of the mandible, the overall size is slightly smaller (TL 2.3–2.4 mm, WbL 0.75 mm v. TL 2.5–2.6 mm, WbL 0.96 mm for *H. foeda*), and the ommatidia are only slightly fused compared to completely fused ommatidia in *H. foeda*. There is some morphometric overlap between *H. foeda* and *H. saroltae* concerning head (Fig. 55A) and petiolar node (Fig. 55B) dimensions. *Hypoponera foeda* can however, be distinguished from *H. saroltae* based on the outer margin of the mandible which has a concavity and the eyes are closer to the posterior border of the clypeus (OMD 0.03 mm in *H. saroltae* and OMD 0.07–0.18 mm in *H. foeda*).



**Figure 55.** Morphometric comparison between *H. foeda* and *H. saroltae* with scatter plot. *Hypoponera foeda* with a more quadrate head than *H. saroltae* (A), HW<sub>2</sub>=head width metric 2, HL= head length. *Hypoponera foeda* slightly less wide petiole and height in comparison to *H. saroltae* (B), PtH=petiolar node height, PtNW=petiolar node width.

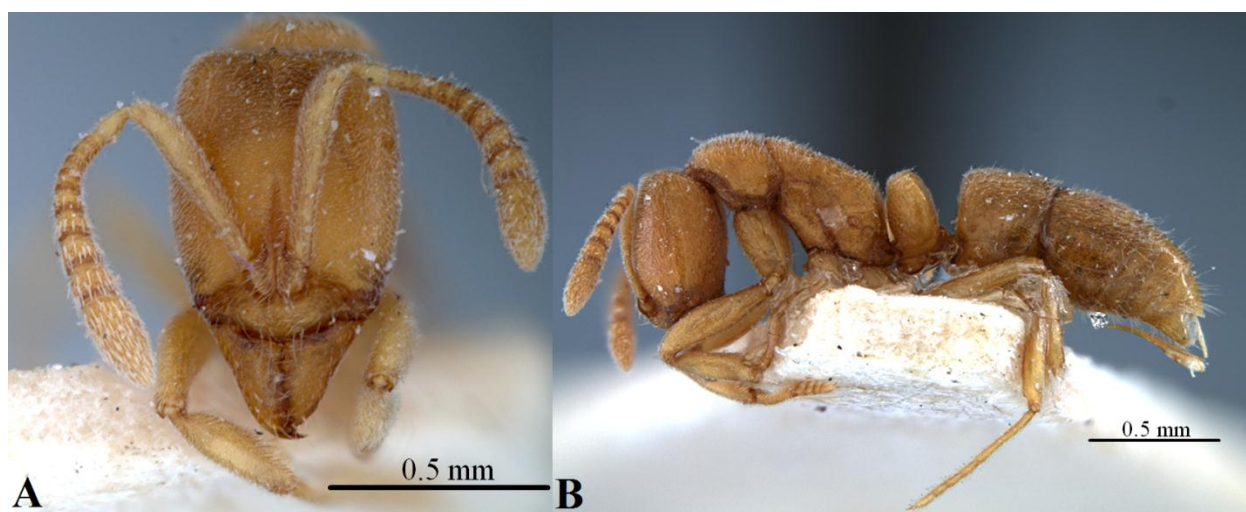
**Natural History.** Unknown.

**Distribution.** Known only from type locality.

**Material examined.** Type material examined.

Lectotype WEST INDIES, St. Vincent. [I designated this specimen the lectotype following article 74.1-74.3 of the ICZN, specimen bares a label designating it as a lectotype] (MHNG).

Paralectotype WEST INDIES, St. Vincent. [2 specimens separate pins. I designated each specimen the paralectotype following article 74.1-74.3 of the ICZN, specimen bares a label designating it as a paralectotype] (MHNG).



**Figure 56.** *Hypoponera foeda* lectotype. Frontal view (A) and lateral habitus (B).

***Hypoponera foreli*** (Mayr, 1887) Figs. 35 and 57

*Ponera foreli* Mayr, 1887: 534–536, worker and queen, BRAZIL, Santa Catarina [4 specimens examined] (NHMW). Kempf, 1962: 12 added to description, figs 12 & 17. Combination in *Hypoponera*, Kempf, 1972: 122.

**Diagnosis.** The worker of this species is large (TL 4.0–4.5 mm) and light brown to black in coloration. The body is slender in overall appearance and the mesosoma is uneven in profile, with a step at the mesometanotal suture. The mesonotum is dome-shaped in profile. The dorsopropodeum is below the level of the mesonotum and the pronotum and the mesometanotal groove is incised.

**Description.**

**Measurements (mm) of lectotype worker. (n=1)** TL 4.1, HL 1.03, HW<sub>2</sub> 0.74, CI 72, HS 0.89, EL 0.07, EW 0.07, OMD 0.14, SL 1.00, SI 74, ML 1.13, WbL 1.60, PnL 0.57, PnW 0.60, MsL 0.38, MsW 0.36, DF 0.46, PF 0.57, PnH 0.67, PtL 0.60, PtW 0.28, PtI 80, PeNI 47, SPtL 0.14, SPtW 0.18, DPtL 0.05, DPtW 0.46, GS1L 0.60, GS1W 0.75, GS2L 0.60, GS2W 0.75.

**Measurements (mm) of worker. (n=5)** TL 4.02 (3.76–4.10), HL 0.98 (0.92–1.05), HW<sub>2</sub> 0.69 (0.64–0.75), CI 71 (70–72), HS 0.82 (0.78–0.90), EL 0.08 (0.07–0.09), EW 0.06 (0.04–0.07), OMD 0.16 (0.14–0.18), SL 1.09 (0.96–1.38), SI 63 (67–54), ML 1.18 (1.13–1.28), WbL 1.50 (1.40–1.60), PnL 0.56 (0.50–0.60), PnW 0.58 (0.50–0.60), MsL 0.33 (0.25–0.39), MsW 0.35 (0.28–0.39), DF 0.43 (0.39–0.46), PF 0.50 (0.39–0.57), PnH 0.67 (0.60–0.75), PtL 0.54 (0.50–0.60), PtW 0.26 (0.21–0.28), PI 46 (42–47), PeNI 45 (35–50), SPtL 0.12 (0.11–0.12), SPtW 0.16 (0.14–0.18), DPtL 0.08 (0.05–0.11), DPtW 0.38 (0.32–0.46), GS1L 0.54 (0.53–0.57), GS1W 0.75 (0.67–0.82), GS2L 0.55 (0.53–0.60), GS2W 0.73 (0.71–0.78).

Size 4–4.5 mm. Color variable ranging from red-brown to brown, to black. Body slender. Mandibles shiny, yellow, lighter in coloration than head, with apical teeth on remainder of masticatory margin with denticles. Eyes large with about 16–20 distinct ommatidia, visible in full face view, far (OMD 0.14–0.18 mm) from posterior clypeal border. Antennae similar in color to body. Scapes surpass posterolateral margin of head by amount nearly equal to length of first 3 funicular segments. Scapes covered apically with directed short, stout appressed pubescence. Funicular segments nearly equal in size for entire length, not forming club, densely covered with short stout decumbent-appressed pubescence. Head ovate, longer than wide, covered with short thin appressed pubescence. In some specimens midline of head from frontal lobes to frons devoid of hairs. Head puncticulate, reflective under fluorescent light, posterior border straight. Pronotum reflective, puncticulate. Promesonotal suture distinct, depressed. Mesonotum rounded, angled upward, inclined posteriorly, dorsopropodeum and posteropropodeum evenly rounded. Mesonotal-pleural suture present. Dorsopropodeum below level of mesonotum, distinct mesometanotal groove present. Dorsopropodeum even, slightly raised at posterior edge before meeting posteropropodeum, forming a straight drop at posteropropodeum. Mesosoma hump-backed, pronotum



and mesonotum weakly convex and higher than dorsopropodeum. Propodeum slightly tectiform in dorsal view. Mesosoma punctulate, with scattered erect hairs on dorsum. In lateral view petiole scale-like; anterior and posterior faces converging dorsally, anterior face usually slightly concave near apex, apex rounded. Subpetiolar process small with reduced anterior lobe. Spiracular process small, reduced. Terminal gastral segments with long flagellate subdecumbent to erect hairs, abundant appressed pubescence present. Gaster punctulate, but pits more distant than on head and mesosoma.

**Etymology.** Named in honor of the Swiss naturalist and ant taxonomist Auguste-Henri Forel.

**Discussion.** *Hypoponera foreli* is similar to *H. idelettae* but can be distinguished as the eye is much smaller with 5–7 ommatidia in *H. idelettae*, compared to 16–20 in *H. foreli*. *Hypoponera idelettae* has less sculpturing and is shinier than *H. foreli*. *Hypoponera vernacula* superficially resembles *H. foreli*, however the petiolar shapes separate the two species; the petiole is quadrate in *H. vernacula* whereas in *H. foreli* the petiole is scale-like (in *H. idelettae* the petiole is broadly scale-like). *Hypoponera foreli* may potentially be confused with *H. subsarissa* (see *H. subsarissa* for comparison).

This is the nominate species for the *foreli* species group, which included *H. foreli*, *H. idelettae*, and *H. vernacula* (Kempf 1962), and currently includes additional species described in this work. In some specimens the medial portion of the dorsopropodeum has a slight concavity whereas in other specimens the dorsum is even in profile. Color is variable from light brown to nearly black. This species is not likely to be confused with any other of the New World *Hypoponera*. The gyne and male are unknown.

**Natural History.** *Hypoponera foreli* is collected in leaf litter, with nests being found in rotten wood or in soil. Alex Wild found this species in humid sub-tropical forest, within an armadillo hole and a nest within rotten wood. In addition to humid subtropical forest, *H. foreli* has been collected in montane evergreen forest in Bolivia. The ants of Cachoeira nature reserve project (<http://www.ants-cachoeira.net/Home%26News/news.html>) found *H. foreli* in advanced secondary forest and primary forests. Colony size is around 20 workers (Kempf 1962). This species has been found from 40–1400 m in elevation.

**Distribution.** North from Ecuador, Peru, Brazil south into Argentina, Bolivia and Paraguay.

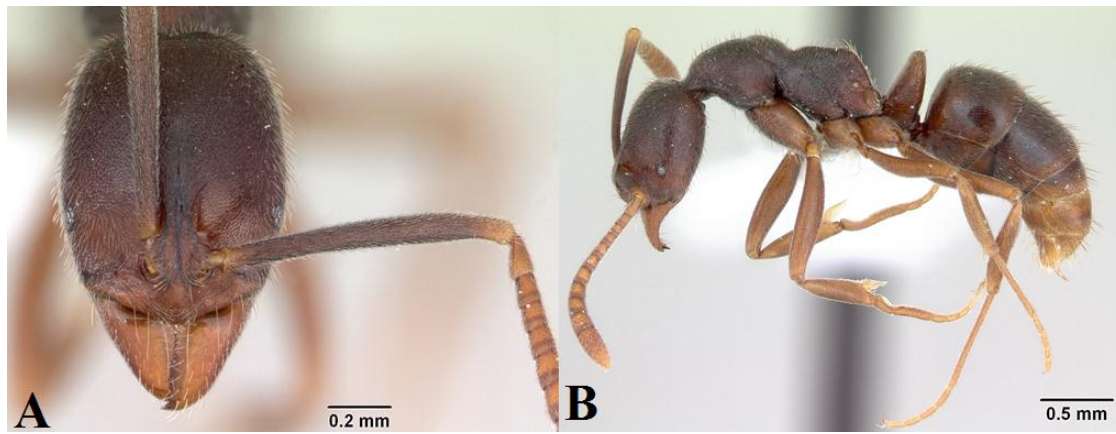
**Material examined.** Type material examined.

Lectotype BRAZIL, Santa Catarina [1 specimen examined I designated one specimen to serve as the lectotype following article 74.1-74.3 of the ICZN, specimen bears a label designating it as a lectotype] (NHMW).

Paralectotypes BRAZIL, Santa Catarina [3 specimens examined I designated these specimens to serve as the paralectotype following article 74.1-74.3 of the ICZN specimen bears a label designating it as a paralectotype] (NHMW).

Nontype material examined.

ARGENTINA. *Misiones*, 20 km SE Puerto Iavazo, 21-XII-1990, Forest, S & J Peck [1 W STDC].  
BRAZIL. *Federal Dist*, Parque Mun. do Gam, 13-14-V-1971, WL&DE, Brown Gallery Forest [3 MCZC]; Agudos State Park, 6/3/1955, C Gilbert, [4 W MCZC]; *Parana*, Cachoeria Nature Reserve [virtual examination]; *Sao Paulo*, Caraguatatuba Res Forest, 18-22-May-1971, WL&DE Brown, 40-80 m rain forest [6 MCZC]; *Minas Gerais*, Lavras, M.G, 6-xii-1978, W.D. Fronk, Berlese Funnel [6 MCZC].  
BOLIVIA. *Cochabamba*, 109 km E. Cochabamba, at Lagunitas, 17° 6' 22" S 65° 40' 57" W, 01-II-1999, Montane Evergreen Forest, Forest litter, R. Anderson [1 CWEM]; Cochibamba, 109 km E. Cochabamba, 17° 08' 47" S 66° 43' 55 W, 08-II-1999, Montane forest litter, 1400 m, R. Anderson [1 CWEM]; *La Paz*, Canamina, Mulford Bio. Expl, 1921-1922, W. M. Mann [1 USMN & 1 MCZC].  
ECUADOR. *Napo Prov*, 20 km S of Tena, 11-Jul-, S&J Peck, 600 m B360 [3 MCZC]. PARAGUAY. Canindeyu, Res. Nat. Bosque Mbaracayu, Jejuimi, 24° 06' S 55° 30' W, 24-VII-1996, A. Wild [1 LACM]; Canindeyu, Res. Nat. Bosque, Mbaracayu Jejuimi, 24° 06' S 55° 30' W, 20-II-1997, Leaf litter, in armadillo hole, humid subtropical forest, A. Wild [1 LACM]; Itapua, San Benito, 29-X-1982, V. Mahnert. PERU. Perene, 21-VI-1920, J.C.B [1 CUIC].



**Figure 57.** *Hypoponera foreli* nontype, frontal view (A) and lateral habitus (B). Map of distribution (C). Photographs courtesy of A. Noble and B. Fisher, [www.antweb.org](http://www.antweb.org).

*Hypoponera idelettae* (Santschi, 1923) Fig. 58

*Ponera idelettae* Santschi, 1923: 1258 worker, BRAZIL: Santa Catarina, Blumenau, CA. Reichensperger leg. [4 specimens examined] (NHMB). Combination in *Hypoponera*, Kempf 1972: 122.

**Diagnosis.** The worker is a medium sized (TL 4.0 mm) species. The eyes are small with 5 to 7 small ommatidia and the scape slightly surpasses the posterior border of head by an amount equal to the length of the first funicular segment. The petiolar node is scale-like.

**Description.**

**Measurements (mm) of paratype workers. (n=3)** TL 4.03 (4.00–4.10), HL1.04 (1.00–1.10), HW<sub>2</sub> 0.73(0.72–0.74), CI 70 (67–73), HS 0.89 (0.87–0.92), EL 0.03, EW 0.03, OMD 0.16 (0.14–0.18), SL 0.87 (0.85–0.88), SI 118 (118–119), ML1.39 (1.20–1.56), WbL 1.48 (1.42–1.56), PnL 0.50 (0.46–0.53), PnW 0.57 (0.56–0.57), MsL 0.35, MsW 0.39, DF 0.47 (0.46–0.49), PF 0.57 (0.53–0.60), PnH 0.66 (0.64–0.67), PtL 0.45–0.54 (n=2), PtW 0.26 (0.25–0.28), PtI 0.50 (0.45–0.54), PeNI 45 (43–49), SPtL 0.14–0.15 (n=2), SPtW 0.14 (n=2), DPtL 0.15 (0.12–0.17), DPtW 0.36 (0.35–0.37), GS1L 0.62 (0.57–0.67), GS1W 0.71, GS2L 0.67 (0.60–0.71), GS2W 0.73 (0.71–0.74).

Light brown to red-brown in coloration. Mandibles yellow, two apical teeth distinct, remainder of masticatory border with 7 or more denticles, with scattered punctures, nitid. Clypeus yellow, nitid, short

appressed pubescence directed toward midline. Eyes small with one to two ommatidia, visible in front view (OMD 0.16 mm). Scape slightly widening apically, surpassing posterior border by amount equal to first funicular segment; funicular segments gradually increasing in size, not forming distinct club, covered in dense appressed, white-grey, apically directed pubescence. Head ovate, longer than broad (CI 67–73), sides parallel, punctulate, nitid, with dense appressed short white hairs, posterior border nearly straight, slightly concave at midpoint. Pronotum nitid, punctate, lighter in color than propodeum; promesonotal suture slightly impressed. Mesonotum rounded dorsally in lateral view, sloping posteriorly, nitid, punctulate; punctures decreasing in density laterally. Mesonotal-pleural suture present. In dorsal view mesonotum subquadrate. Mesopleuron foveate, similar in sculpturing and color to propodeum but less dense and more reflective. Mesosoma humped in profile view, pronotum and mesonotum raised above propodeum. Propodeum darker red-brown in coloration; in dorsal view sides converging dorsally, slightly tectiform. Metapleuron with fine lateral carinae. Propodeum with abundant white appressed pubescence, with scattered suberect and erect hairs; posteropropodeum lacking pubescence and sculpturing. Petiole scale-like, thick (PtW 0.25–0.28 mm, PI 0.45–0.54), rectangular in lateral view, anterior and posterior faces not distinctly converging, slightly narrower at apex, apical portion rounded. Anterior face of petiole with abundant long appressed and decumbent white-yellow pubescence, punctate, spiracular process tooth-like. Subpetiolar process quadrate. Gaster of typical form, densely covered by yellow-white pubescence. Three terminal segments with long decumbent to subdecumbent hairs on posterior edge of segments. Integument shiny, punctulate.

**Etymology.** Eponymous.

**Discussion.** *Hypoponera idelettae* could be confused with *H. vernacula* but the latter has a thick subquadrate petiolar node. *Hypoponera foreli* has larger eyes (12–16 ommatidia) than *H. idelettae* (5–7 ommatidia); additionally the scapes of *H. foreli* surpass the posterior border of head by an amount greater than the first three funicular segments whereas in *H. idelettae* the scapes only marginally surpass the posterior border of the head by the length of the first funicular segment. *Hypoponera idelettae* can be distinguished from *H. leninei* by having a thinner and less robust petiolar node (PtW 0.26 mm, DPtL

0.15 mm in *H. idelettae* compared to PtW 0.28 mm, DPtL 0.19 mm in *H. leninei*). *Hypoponera idelettae* also has shallower and less dense sculpturing than that found in *H. leninei*.

*Hypoponera idelettae* belongs to the *foreli* -species group. This species does not have as pronounced of a mesometanotal groove when compared to *H. foreli* and *H. vernacula*, but the propodeum is distinctly below the level of the mesonotum.

**Natural History.** Unknown.

**Distribution.** Known only from type material. Brazil, Santa Catarina, Blumenau.

**Material Examined.** Type material examined.

BRAZIL: Santa Catarina, Blumenau, CA. Reichensperger leg. [4 specimens examined, I designated this specimens the lectotype and paralectotype following article 74.1-74.3 of the ICZN specimen bares a label designating it as a lectotype and paralectotype] (NHMB).



**Figure 58.** *Hypoponera idelettae* paralectotype. Frontal view (A) and lateral habitus (B).

***Hypoponera ignigera* (Menozi, 1927) *incertae sedis***

*Ponera ignigera* Menozzi, 1927: 271 worker and queen (gyne) COSTA RICA, San Jose, Heinr. Schmidt [1 queen examined] (DEIC). Combination in *Hypoponera*, Kempf, 1972: 122.

**Diagnosis.** I have reviewed Menozzi's description and gathered those characters which I currently judge to be informative. I present those characters here, though they may be nebulous and not diagnostic. This

species is reddish in coloration. The lateral margins of the head are subparallel and covered in dense pubescence and fine punctation. The eyes are small with 2–3 facets that are positioned dorsolaterally. The scapes just reach the posterior margin of the head and the funicular segments form a distinct club. The petiolar node is tall, reaches the level of the dorsopropodeum and is squamiform.

**Description.** The following is translated from Menozzi's (1927) original description.

**Worker.**

“Ferruginous; legs and antennae somewhat lighter. Pubescence dense on the head, more sparse on the mesosoma and gaster, where it is nevertheless a little longer, erect hairs sparse on the flexor surface of the tibia. Sides of the head subparallel, slightly narrower posteriorly than anteriorly, half as long as wide, excluding the mandibles, with fine punctation superimposed on a microscopic subsculpture which makes everything opaque. Mandibles shiny, with some piligerous punctures and masticatory margin with 5 teeth. Clypeus narrow, with the anterior margin arched. Frontal carinae short but well-marked. Scape exactly reaches the occipital margin, segments 2–6 of the funiculus are transversal, segments 7–10 wider than the previous ones and a little shorter than wide; club distinct. Eyes tiny, two or at most three facets, placed in the anterior fourth of the head. Mesosoma as wide as the head, polished, as are the peduncle and the gaster, punctuated much less densely than the head and without the subsculpture, propodeum compressed at the sides, you could say cuneiform, its basal face much longer than the descending face, which is combined through an obtuse angle, but very distinct, and sides weakly marginate. The peduncle has a scale a little higher than the propodeum and distinctly wider than it, the scale is much higher than the width at the base, the anterior face is slightly sloping, the posterior face is higher and thinner and has a convex face from one side to the other, below the peduncle is a process in a form of a lamina with free margin obtuse. Postpetiole truncated in front, the bottleneck that separates this segment from the next is poorly marked

**Gyne.**

Length 3.2 mm Female. Apart from the usual characteristic features, has well marked sculpturing throughout all of the body, so that even the mesosoma and gaster are opaque, yet the pubescence and pilosity, the latter being restricted only to the gaster and the flexor face of the tibia, is more abundant.

Eyes distant from the base of single articulation of the mandibles for a space equal to half their diameter. Scale of the peduncle similar to that of the worker, but more slender. Postpetiole less sharply truncated anteriorly.

Wings haline, abundantly hairy, with brown veins. The female I have attributed to the worker above described by the mere fact of a reasonable correspondence of characters and because I found them together in the same vial when there was no other *Ponera* (= *Hypoponera*). Rather than the species of Central or South America, this new *Ponera* (= *Hypoponera*) I think may be compared to our European species *P. coarctata testacea* (= *P. testacea*) Emery, 1895 from which the petiole is much more slender and quite sufficient to distinguish, apart from the pubescence, shape of the head and, by other minor characters that do not permit it to be confused with that.”

**Etymology.** Latin *ignigera* meaning born of fire.

**Discussion.** I was only loaned the gyne of this species. *Hypoponera* workers are widely agreed to lack or have limited autapomorphic or distinguishing characters. Whereas this is not completely true, a thorough and focused dedication of time to the workers is required to determine species. Currently, the reproductive forms have not been addressed. Resulting from the disparity in characters between workers and reproductive-forms, a detailed and intensive morphological studied is required to plot species limits for gynes, males, and reproductive-intercaste. Such intercastes, limited material, nominative taxa based on reproductives with no association to workers have wholly retarded an understanding of the alpha taxonomy regarding reproductive-forms. Therefore, a clear treatment of *H. ignigera* is currently not possible and I have elected to take a conservative approach and place the status as uncertain. Further study is required to resolve *H. ignigera*’s taxonomic placement. Based on the gyne this species would belong to the *foeda*-species group. Given the distribution of the species within this group there is a potential for it to be *H. foeda* or *H. famini*. Compared to the gynes of *H. ignigera* both are very similar in appearance. However the description is general and could represent any number of species. Menozzi’s (1927) comparison of *H. ignigera* and *P. testacea* is of little help in placing this species.

**Natural History.** Unknown.

**Distribution.** Known only from the type locality.

**Material Examined.** Not examined.

*Hypoponera iheringi* (Forel, 1908) Figs. 59 and 60

*Ponera iheringi* Forel, 1908: 344. Worker, BRAZIL San Paulo, Ihering [3 specimens examined] (MHNG). Forel, 1912: 204. Queen, Male BRAZIL, San Paulo, Gere d'Alto de Serra [2 specimens examined] (MHNG). Wheeler, G.C. and Wheeler, J. 1971: 1211 larvae. Combination in *Hypoponera*: Kempf, 1972: 122. [This name frequently misspelled as *jheringi*, for example by Emery, 1911: 92; Kempf, 1972: 122].

**Diagnosis.** *Hypoponera iheringi* is a large species (TL 5.5–6.0 mm). The body is colored red-brown to dark brown. The mandibles have large apical teeth followed by smaller teeth to the midpoint of the mandible and the remainder of the masticatory margin has denticles. The eyes are medium to large, can easily be seen in frontal view and are comprised of 23–27 facets. The eyes are not situated far from the posterior border of the clypeus. The scapes surpass the posterior margin by a length equal to the first funicular segment. In frontal view the head is quadrate with convex lateral margins. The sculpturing on the head is densely foveate with deep depressions. In lateral view the mesosoma is uneven and the dorsopropodeum is below the mesonotum. The mesopleuron is opaque in the upper area with punctate sculpturing that becomes foveate medially and the posterior edge of mesometanotal region is carinate. The propodeum is inclined posteriorly and the dorsum is opaque with finely foveate sculpturing. The lateral area of the propodeum is opaque and foveo-punctate. In lateral view, the dorsal face of the propodeum has an obscure medial impression. The pilosity is denser on the dorsum of the propodeum than on promesonotal region. The petiolar node is subtriangular with the anterior and posterior faces converging. The spiracular process is distinct and tooth-like and the subpetiolar process forms a distinct lobe.

**Description.**

**Measurements (mm) of paratype worker. (n=1)** TL 3.9, HL 1.4, HW<sub>2</sub> 0.77, CI 55, HS 1.1, EL 0.08, EW 0.08, OMD 0.17, SL 0.77, SI 100, ML 1.15, WbL 1.43, PnL 0.63, PnW 0.56, MsL 0.35, MsW 0.42,



DF 0.42, PF 0.56, PnH *obscured by glue*, PtL 0.52, PtW 0.24, PtI 45, PeNI 43, SPtL *obscured by glue*, SPtW *obscured by glue*, DPtL 0.17, DPtW 0.38, GS1L 0.49, GS1W 0.70, GS2L 0.63, GS2W 0.70. Medium to large in size (TL 3.9 mm, WbL 1.43 mm) color red-brown to dark brown, integument dull, opaque. Mandibles with large apical tooth followed by 3 teeth smaller teeth between, large teeth stop mid-mandible, remainder of margin with smaller teeth; outer border lacking concavity; red-brown, lighter in coloration than head; shiny. Anterior medial edge of clypeus with slight medial notch; medial lobe of typical form, flat. Eyes medium (EL 0.08 mm), 23–27 distinct facets; ommatidia visible in frontal view, eyes situated dorsolaterally, slightly breaking outline of side of head, far (OMD 0.17 mm) from clypeal border. Antennae red, lighter in coloration than head. Scapes extend past posterior margin of head by length of half of first funicular segment, base not as wide as apex; suberect, appressed pilosity, punctate; funiculus without distinct club, gradually increasing; punctate pilosity, appressed suberect hairs present. Head quadrate in frontal view (CI 55), lateral margins distinctly convex; posterior width (HW<sub>3</sub> 0.89 mm) wider than anterior of head (HW<sub>1</sub> 0.78 mm); posterior border of the head with no concavity to slight concavity. Head densely foveate, depressions deep, distance between impressions subequal to diameter of impressions, fine appressed, white-yellow pubescence present. Mesosomal profile not even, propodeum distinctly below level of mesonotum. Promesonotal suture slightly impressed, mesonotum even with pronotum. Mesonotum inclined in profile; mesonotal-pleural suture present, distinct. Mesopleuron opaque, upper area punctate, foveate medially, posterior edge of mesometanotal region carinate. Mesometanotal suture distinct, incised, forming a distinct mesometanotal groove. Propodeum inclined posteriorly, dorsal face meeting posterior face at a distinct rounded angle; dorsum distinct; dorsum opaque, finely foveate; lateral portion opaque foveo-punctate, in lateral view dorsal face of propodeum with obscure impression, pilosity more dense on dorsum of propodeum; metapleuron opaque, carinate. Mesosoma dorsum opaque, foveo-punctate with scattered long (0.75 mm) erect and suberect hairs, many hairs curved. Appressed yellow pubescence present. Sculpturing on mesosoma not as deep as on head. Petiolar node squamiform, broad (PtW 0.24 mm, PtI 45); tall, reaching level of propodeal dorsum (PnL 0.52 mm); anterior and posterior faces straight, apex rounded. Spiracular process distinct tooth-like, opaque foveo-punctate; subpetiolar process forming

distinct lobe, anterior portion lobate; in dorsal view node broad, wider than propodeum, opaque, elute, foveo-punctate. Gaster of typical form, opaque, foveo-punctate.

**Etymology.** Named in honor of the German Zoologist Herman von Ihering (1850-1930).

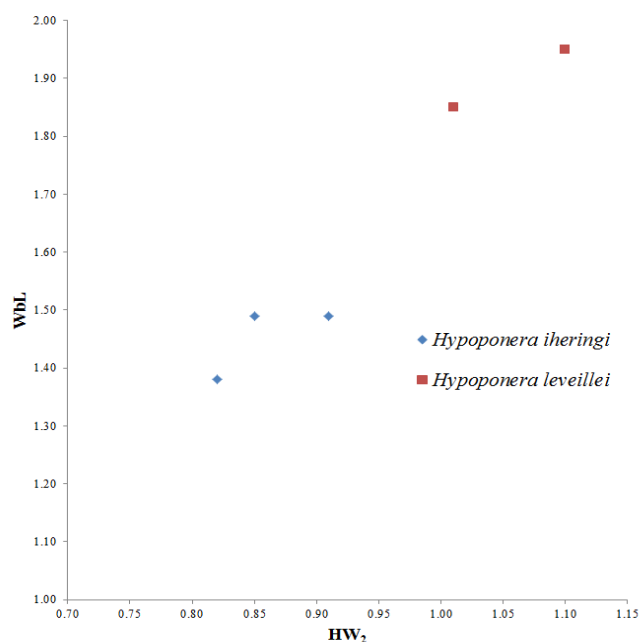
**Discussion.** *Hypoponera iheringi* and *H. leveillei* are similar but can be separated by the following character states: *H. leveillei* is larger (Fig. 59) with small dense punctae on head. The size of the worker of *H. leveillei* is the same size as the gyne of *H. iheringi*. Additionally, the mandibles have teeth along the entire edge and the subpetiolar process is short and quadrate with an anterior depression in *H. leveillei*. *Hypoponera iheringi* belongs to the *leveillei*-species group. See discussion of *H. leveillei*.

**Natural History.** Unknown.

**Distribution.** Brazil, Kempf range (1972).

**Material examined.**

Type material examined. BRAZIL San Paulo, Ihering [3 specimens examined, I designated one specimen the lectotype and other specimens as paralectotypes following article 74.1-74.3 of the ICZN, specimens bares a label designating them as a lectotype and paralectotype] (MHNG).



**Figure 59.** Scatter plot comparison of Weber length (=WbL) versus head width (=HW<sub>2</sub>) for *H. iheringi* and *H. leveillei* (n=4 for each, some values were the same).



**Figure 60.** *Hypoponera iheringi* lectotype. Frontal view (A) and lateral habitus (B).

*Hypoponera impartergum* Dash sp. nov. Fig. 61

**Diagnosis.** The worker of this species is a medium-sized (TL 4.1–4.3 mm) specimen of *Hypoponera*. The mandibles are reflective and the outer border is concave. The eyes are comprised of 4 partially fused ommatidia. The scapes distinctly surpass the posterior border of the head by an amount equal to the length of the first and half of the second funicular segments. The mesonotum slopes posteriorly and the mesometanotal junction is incised, forming a groove. The propodeum is below the surface of the mesonotum, forming an uneven mesosomal profile. Sculpturing is apparent on the propodeum, the anterior edge has longitudinal striae and punctae and the remainder is rugulose-punctate. In lateral view of the propodeum, the anterior margin possesses striae which become more developed. The lateral portions are rugulose-punctate which become dilute and less dense towards the spiracle and longitudinal striae appear between the spiracle and the base of the mesopleuron. The petiole is scale-like with the anterior and posterior faces converging apically and the apex is rounded. In profile the subpetiolar process is rectangular with a faint profenestra present.

**Description.**

**Measurements (mm) of holotype worker. (n=1)** TL 4.3, HL 1.10, HW<sub>2</sub> 0.75, CI 74, HS 0.96, EL 0.06, EW 0.05, OMD 0.21, SL 0.92, SI 89, ML 1.40, WbL 1.70, PnL 0.50, PnW *obscured by glue*, MsL 0.32,

MsW 0.33, DF 0.48, PF 0.50, PnH 0.69, PtL 0.57, PtW 0.28, PtI 96, PeNI 56, SPtL 0.14, SPtW 0.32, DPtL 0.25, DPtW 0.18, GS1L 0.57, GS1W 0.74, GS2L 0.74, GS2W 0.78.

**Measurements (mm) of workers. (n=3)** TL 4.2 (4.1–4.3), HL 1.10, HW<sub>2</sub> 0.82, CI 74, HS 0.96, EL 0.05 (0.03–0.06), EW 0.05 (0.03–0.06), OMD 0.18 (0.11– 0.21), SL 0.95 (0.92–1.02), SI 86 (80–89), ML 1.48 (1.36–1.67), WbL 1.65 (1.62–1.70), PnL 0.48 (0.35–0.55), PnW 0.52 (0.50–0.53), MsL 0.35 (0.31–0.43), MsW 0.36 (0.31–0.43), DF 0.46 (0.43–0.48), PF 0.50 (0.46–0.53), PnH 0.71 (0.67–0.78), PtL 0.59 (0.57–0.64), PtW 0.28, PtI 47 (43–49), PeNI 52–56 [n=2], SPtL 0.13 (0.10–0.14), SPtW 0.28 (0.21–0.32), DPtL 0.19 (0.18–0.21), DPtW 0.33 (0.25–0.43), GS1L 0.62 (0.57–0.71), GS1W 0.74 (0.74–0.75), GS2L 0.70 (0.66–0.74), GS2W 0.78.

Red-brown in color. Mandibles reflective, shiny; scattered fine hairs arising from small punctae over surface of mandible, thicker hairs along masticatory margin; large apical tooth with two to three subapical teeth, remainder of masticatory border with large tooth-like denticles; outer border of mandibles concave. Clypeal same color (or nearly so) as head, reflective; median portion of clypeus with faint thin carinae; anteroposterior margin rugo-punctate, sculpturing fading medially. Eye small, 3–5 partially fused ommatidia, circular in shape, visible in frontal view, dorsolateral in position; eyes far from mandibles (OMD 0.18 mm). Frontal lobes densely punctate, punctae larger than punctae on remainder of head, intercarinal space with short striae; outer regions covered in dense thick appressed decumbent long (0.04 mm) setae. Scapes slightly lighter in color than head, reflective; wider at apex, expanded distally, surpassing posterior border of head by length nearly equal to the first and half of the second funicular segments (0.21 mm). Funiculus dull yellow-tan; densely covered in yellow-gray subdecumbent-decumbent short setae; funicular segments gradually enlarging, not forming distinct club. Posterior border even. Head rectangular; shiny, but not as reflective as mandibles because of dense mat of setae; shallow depressions present, space between depressions slightly larger than depression. Promesonotal suture apparent, incised. Dorsum of mesonotum in profile rounded, anterior region above posterior region, inclined posteriorly. Mesonotal-pleural suture apparent, distinct; mesometanotal suture apparent, incised. Pronotum and mesonotum punctate, punctae on pleural regions less dense than on dorsum, space between punctae at least two to three punctae wide; 10 erect (0.07 mm) hairs present on

pronotum, mesonotum with limited shorter suberect hairs. Dorsopropodeum inclined posteriorly; meeting posteropropodeum in broadly rounded angle, tectiform; anterior portion below level of mesonotum; anterior edge with longitudinal striae and punctae; remainder rugulose-punctate. In lateral view of propodeum anterior margin with striae more developed dorsally, longitudinal striae along anterior margin of propodeum; rugulose-punctate, become less dense towards spiracle, at level of spiracle with longitudinal striae; mesopleuron with long striae. Mesosoma with long (0.05 mm) thin appressed setae; long erect scattered pilosity. Petiolar node scale-like, tall; taller than gaster, anterior and posterior faces converging apically; apex rounded; dorsum thin round; shiny, less pubescence laterally, apex with appressed pubescence, erect suberect pilosity. Spiracular process distinct, tooth-like; subpetiolar process quadrate, anterior face punctate, posteropropodeum nitid, very few (one to three) punctae present. Gastral constriction with longitudinal rugae, not distinct, constriction terga with long (0.04–0.06 mm) suberect pilosity, arranged in scattered offset lines, dorsum covered in dense appressed setae; terga nitid, setae arising from small punctae.

**Etymology.** Latin *impar* meaning uneven and *tergum* meaning back, referring to the stair-like mesosomal profile.

**Discussion.** *Hypoponera impartergum* is similar to *H. foreli* and *H. idelettae*. *Hypoponera foreli* has larger eyes and a taller (PnH 0.67–0.78 mm) and thinner petiolar node (PtW 43–49 mm) as well as longer scapes (SL 0.92–1.02 mm). *Hypoponera idelettae* can be distinguished from *H. impartergum* by the following character states: the outer border of the mandible is straight whereas in *H. impartergum* the outer border is concave. *Hypoponera nemsisea* can be separated from *H. impartergum* as in *H. nemsisea* the dorsum of the propodeum is distinctly inclined posteriorly, the petiole is shorter (0.46 mm in *H. nemsisea* compared to 0.67 mm in *H. impartergum*) and the mesometanotal junction forms a distinct deep groove, whereas in *H. impartergum* there is a shallow incised mesometanotal junction but it does not form a distinct deep groove.

*Hypoponera impartergum* belongs to the *foreli* -species group. Though I have only two specimens from a single collection and cannot demonstrate clear sympatry with other *Hypoponera* species; the uniqueness of morphology suggests a singular lineage that I hypothesize to be this novel

species. The holotype and two paratypes were designated from the collection made by S. and J Peck (1969). The holotype and one paratype are deposited in the MCZC and the other paratype is deposited in the CASC.

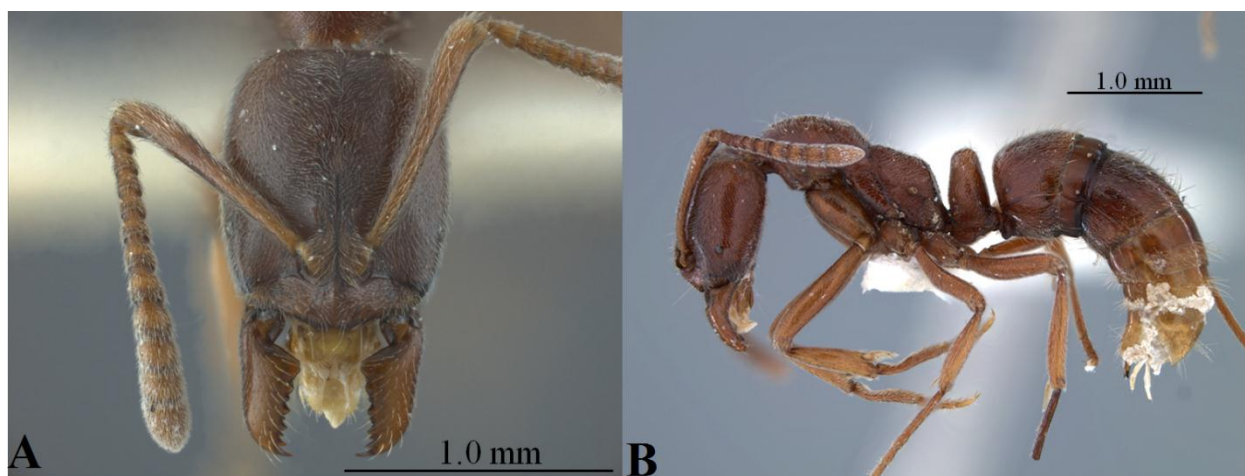
**Natural History.** The park is a mix of pine-oak forest. The Pecks collected three specimens via berlesate.

**Distribution.** Only known from type locality. Though only collected at type locality of Chipinque Park, two different collections were made; one by Stewart and Jarmila Peck in 1969 and one by J. Garcia Pérez in 1990.

**Material Examined.** Holotype MEXICO: Nuevo Leon, Mount. Chipinque Park, 29-ix-1990, J. Garcia Pérez # 69. [specimen bares a label designated Holotype] (MCZC)

Nontype Material.

MEXICO: Nuevo Leon, Nr. Monterrey, Mesa de Chipinque, 1969, S & J Peck [3 specimens] (MCZC); Monterrey, Chipinque Park, 29-ix-1990 J. Garcia Pérez # 69 [2 specimens] (MCZC).



**Figure 61.** *Hypoponera impartergum*. Frontal view (A) and lateral habitus (B).

***Hypoponera inexorata* (Wheeler, 1903) Fig. 62**

*Ponera inexorata* Wheeler, 1903: 94-95, Fig 2. Paratypes workers and gyne, USA: Texas, Travis Co., Austin, M. Holliday; Travis Co., Austin Shad Creek; Jeff Davis Co., Ft. Davis [24 specimens examined] (LACM). Combination in *Hypoponera*, Taylor, 1968: 64.

**Diagnosis.** Both the worker and female are yellow, yellow-orange to yellow-brown in coloration. *Hypoponera inexorata* is easily diagnosed by the concave outer borders of the mandibles. The development of this concavity is variable even within the same nest series, but it is apparent. The head is distinctly longer than broad. The scape just reaches the posterior margin of the head. Funicular segments 3–7 are about equally as broad as long, segment 8 is longer than broad, and segments 9–11 slightly increase in length to form a poorly defined club. The eyes are small, consisting of one ommatidium and they are far (more than two eye lengths) from the posterior margin of the clypeus. The mesometanotal suture is apparent. The head, mesosoma, and gaster have numerous dorsal suberect to erect hairs.

**Description.**

**Measurements (mm) of worker. (n= 1)** TL 2.80, HL 0.78, HW<sub>2</sub> 0.72, CI 92, EL 0.03, EW 0.03, OMD 0.07, SL 0.49, SI 68, ML 0.31, WbL 1.60, PnL 0.40, PnW 0.39, MsL 0.24, MsW 0.29, DF 0.26, PF 0.40, HF 0.49, PnH 0.46, PtL 0.39, PtW 0.22, PtI 118, PeNI 56, SPtL 0.10, SPtW 0.19, DPtL 0.14, DPtW 0.31, GS1L 0.42, GS1W 0.49, GS2L 0.46, GS2W 0.53.

Orange to yellow-brown in coloration. Body surfaces mostly shiny with scattered punctures. Mandibles long, flattened, with concavely sinuate lateral borders, with apical tooth followed by about 12 denticles. Clypeus broadly rounded anteriorly, convex in middle. Eyes small, comprised of 3–4 ommatidia, slightly fused to fused; far from posterior border of the clypeus (OMD 0.07 mm). Scapes extend to posterolateral corner, reaching or slightly surpassing posterior margin. Antennal joints 3–7 about equally as broad as long, 8 longer than broad, 9–11 gently increasing in length to form a poorly defined club. Head quadrate, posterior concavity present. Head with dense coarse piligerous punctures, punctae large. Dense short appressed hairs cover the head, with scattered longer suberect hairs. Mesosoma uneven, promesonotal and mesometanotal sutures incised, distinct. Mesonotum convex in lateral view, mesonotal-pleural suture present, distinct and faint; mesometanotal junction incised. Mesometanotal

suture may be incised; dorsopropodeum frequently below level of mesonotum, not in all specimens, inclined posteriorly to even meeting posteropropodeum at rounded junction. Meso and metapleuron with horizontal rugae present. Body covered with scattered piligerous punctures. Mesosoma with numerous long erect and suberect hairs mixed with shorter erect hairs. Legs of typical form. Petiole subtriangular, anterior and posterior faces nearly parallel, dorsum rounded, long (0.02 mm) erect hairs present on dorsum, subpetiolar process quadrate, small. Gaster of typical form with numerous erect hairs both dorsally and ventrally. Dorsal surface shiny but with numerous scattered piligerous punctures.

**Etymology.** Latin *inexorabilis* meaning not prevailed upon or not persuadable, perhaps inflexible.

**Discussion.** Within the current known range of *H. inexorata*, no species should be confused with this species as none are the size of *H. inexorata* with concave outer margins of the mandibles (see discussion). *Hypoponera inexorata* may potentially be confused with *H. agilis* and *H. inexpedita*. *Hypoponera inexorata* can be distinguished from *H. agilis* by the larger and less dense punctae on the head, a more reflective body, and a concave outer margin of the mandibles. *Hypoponera inexorata* can be separated from *H. inexpedita* as in the latter species the scapes do not reach the posterior margin of the head, the mandibles have only a slight concavity, the sculpturing of the head is more dense, the foveate depressions are in contact, and the mesometanotal suture is indistinct and not with an incised area or groove.

*Hypoponera inexorata* belongs to the *foeda* -species group. Two workers from San Jose, Costa Rica appear similar to specimens from the typical form described by Wheeler (1903) from Texas but are a bit darker in coloration and the outer margin of the mandibles is not as concave as in the types. Wheeler (1903) considered *H. inexorata* to be related to *H. distinguenda* (Emery) however gave no reasons why. There are similarities between *H. distinguenda* (especially the former species *H. wilsoni*) and *H. inexorata* but they may be separated on the basis of color, concavity of the mandible, smaller size and larger size of punctae on the head of *H. inexorata*. *Hypoponera wilsoni* is similar in coloration to *H. inexorata* and the type does have concave outer margins of the mandible, however the punctate sculpturing is finer when compared to *H. inexorata*. Within the variation of *H. distinguenda* some



specimens have the outer border of the mandibles concave, however I have not seen the concavity as pronounced as in *H. inexorata*.

In material from the Nearctic I have seen a number of specimens of *H. pampana* misidentified as *H. inexorata*. These misidentifications are on the basis of considering only color; I have found large series of *H. pampana* from the mountain and arid regions of Arizona to be yellow-orange in coloration. However these specimens do not have the concavity of the mandible and have fewer erect hairs over the petiolar node dorsum and gastral tergites. Additionally, *H. pampana* frequently has a number of facets comprising the eyes.

The concavity of the mandible has been used to unite or group species together. This concavity is found in a number of taxa and perhaps too much emphasis has been placed on this character state in grouping species. It may be the result of convergence.

**Natural History.** This species is found throughout the southeastern United States, mostly in dry habitats. Wheeler (1903) collected specimens from dry hilly slopes of central Texas. Deyrup et al. (2003) reported collecting specimens from dry hammocks in Florida and the Florida Keys (Deyrup et al. 1988). Cover collected specimens from under a rock that was in the open on a rocky dry slope in southeastern Arizona. Specimens have been collected in the Black Belt Prairie region of Mississippi. Both Wheeler (1903) and Smith (1936) noted this species is rare and currently does not appear to be common in collections. It is found throughout the southern United States but has not been collected in Louisiana (Dash and Bui 2008).

**Distribution.** Southern United States, Mexico south to Panamá.

**Material examined.** Type material examined.

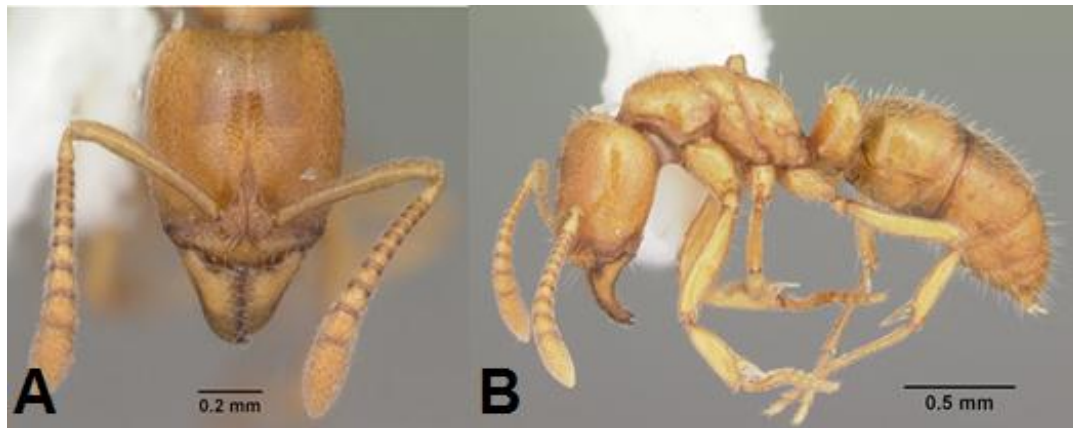
Lectotype. Austin Shad Creek, III.23.02 I designated the 3<sup>rd</sup> specimen from the top most specimen the lectotype following article 74.1-74.3 of the ICZN this information is on a label designating the lectotype. Texas, Travis Co., Austin, M. Holliday [5 specimens] (LACM)

Nontype material examined.

PANAMA: Isla Calba Veraguas, Rio Amarillo, 18-Ago-1983, J. M Cuadra (1 worker CWEM).

MEXICO: *Hidalgo*, San Miguel, W.M. Mann 1954 (2 specimens) [USNM]. USA: *Alabama*, Greene

Co., 8.3 mi S of Aliceville, 33° 14' 09" N 88° 24' 15" W, 20-Jul-2005, Collected in Black Belt Prairie remnant, J. G. Hill, (1 worker) [MEM]. *Arizona*, Cochise Co., Chiricahua Mnts, 0.2 mi W SWRS on Herb Martyr Rd. elev. 5500', under stone on rocky grassy slope in open. S. P. Cover (1 CASC virtual examination). *Florida*, Highland Co., Lake Placid, 9mi S. Archbold Biol Sta, Rd N 19E, 2-Oct-92, *Carya* litter, M. Deyrup (1 worker) [CWEM]. *Mississippi*, Kemper Co., 5 mi N of Scooba, 32° 52' 24" N 88° 29' 28" W, 03-Sep-2005, collected in black belt prairie, J. G. Hill, (1 worker) [MEM]; Oktibbeha Co., Osborn, 33° 20' 21" N 88° 44' 09" W, 12-Nov-2004, collected in black belt prairie, J. G. Hill (1 worker) [MEM]. *Texas*, Austin, M. Holliday (cotype) (4 workers on pin 1 ♀) [LACM]; Shad Creek, Austin, III-23-02 (Type) (4 workers) [LACM]; Ft. Davis, June-8-02, (12 workers) [LACM]. 10 mi SE Sanderson, 1-30-1943, E. S. Ross, det. M. R. Smith, (3 specimens) [CASC].



**Figure 62.** *Hypoponera inexorata* nontype. Frontal view (A) and lateral habitus (B) and distribution (C).

***Hypoponera inexpedita*** (Forel, 1911) stat. nov. Fig.63

*Ponera inexorata* var. *inexpedita* Forel, 1911: 285, worker and gyne described, BRAZIL Sao Paulo, Ihering [examined 2 workers and 1 female] (MHNG). Strips of *Ponera distinguenda* Santschi, 1923b: 247. Strips of *Ponera distinguenda* Santschi, 1929: 277. Combination in *Hypoponera*, Kempf, 1972: 122.

**Diagnosis.** *Hypoponera inexpedita* is a medium sized species (TL 2.6–2.8 mm, WbL 1.2–1.8 mm) which is red-brown to brownish-ferruginous in coloration. The outer border of the mandible is slightly

concave. The eyes are small and faint and appear as one ommatidium (under low magnification) but are shown to consist of 4–5 fused ommatidia under higher magnification. The eyes are close to the clypeus (OMD 0.11 mm). The scapes of the antennae do not reach the posterior margin of head and the funiculus has a five segment club. The promesonotal suture is impressed and the mesometanotal suture is not apparent. The mesonotum meets the dorsum of the propodeum evenly and is gently inclined toward the posterior face of the propodeum. The mesonotal-pleural suture is distinct. The propodeum is not tectiform. The lateral portions of the propodeum are rugulose-costate, becoming thinner and more finely costulate on the metapleuron. The petiolar node is squamiform and the subpetiolar process does not form a large lobe; the lobe is rather short in comparison to the node (SPtI 22).

### **Description.**

**Measurements (mm) of worker. (n= 2)** *Type specimens are covered in amber glue limiting measurements and observations of pilosity, pubescence and sculpturing.* TL 2.60–2.80, HL 0.74–0.78, HW<sub>2</sub> 0.63, CI 80–85, HS 0.71 [n=1], EL 0.03, EW 0.03, OMD 0.07, SL 0.49, SI 78, ML 0.31, WbL 0.92–1.84, PnL 0.39–0.42, PnW 0.39–0.42, MsL 0.19–0.24, MsW 0.21–0.29, DF 0.24–0.31, PF 0.39, HF 0.49, PnH 0.46–0.49, PtL 0.35–0.39, PtW 0.20–0.28, PtI 131–126, PeNI 51–67, SPtL 0.10, SPtW 0.19–0.21, DPtL 0.14, DPtW 0.31, GS1L 0.42, GS1W 0.49, GS2L 0.46, GS2W 0.53.

Coloration reddish-brown. Mandibles darker red-brown than head, outer border slightly concave. Eyes small, 3–4 fused ommatidia, faint, dorsolateral in position, not interrupting lateral margin of head, close to posterior border of clypeus (OMD 0.07 mm). Scapes widen distally, failing to reach posterior margin of head by half of first funicular segment; funiculus with indistinct club; segments gradually increasing in length. Sides of head slightly convex, posterior border concave; head reflective with small shallow punctae present, becoming more dense medially, becoming less so laterally, fine appressed pubescence; longer, less fine pubescence on frontal lobes. Mesonotum not even, pronotum of typical form, promesonotal suture impressed, faint groove in lateral view; dorsum with shallow punctae, spacing subequal to diameter of punctae. Mesonotum (MsL 0.19–0.24 mm, MsW 0.21–0.29 mm) inclined posteriorly; mesometanotal suture not apparent, mesonotal-pleural suture distinct, mesonotum even with propodeal dorsum. Dorsopropodeum evenly inclined to posterior face; mesopleuron with limited

sculpturing, fine carinae present on posterior edge spreading from metapleuron to sides of propodeum. Propodeum not tectiform, dorsum wide (0.14 mm), meeting posterior face at a distinct angle, posterior face straight, parallel to petiole, nearly perpendicular. Metapleuron rugulose-costate, costulae finer than those on propodeum. Petiole triangular, thick (PtW 0.20–0.28 mm), anterior and posterior faces converging slightly apically, tall; apex rounded with depressions; appressed pubescence with some erect hairs; dorsum with shallow punctae widely spaced; spiracular spine reduced, small; subpetiolar process short (SPtL 0.10 mm, PtI 50–53). Gaster of typical form, gastral constriction distinct, second gastral tergite with cross ribs meeting longitudinal carinae of constrictions; large shallow punctae present on dorsum of gastric tergites.

**Etymology.** Latin, combination of *in* meaning without and *expeditus* for unimpeded or easy. Used as an adjective for confused, perhaps in reference to the similarity to *H. inexorata*.

**Discussion.** *Hypoponera inexpedita* is similar in appearance to *H. inexorata* but it is more red-brown compared to the yellow-orange coloration of *H. inexorata*. *Hypoponera inexorata* has a distinct concavity on the outer border of the mandibles, whereas *H. inexpedita* has only a slight concavity. Additionally, *H. inexorata* has distinct 4–5 faceted eyes, and the scape reaches the posterior margin of the head. *Hypoponera inexpedita* is also similar in form to *H. fallax*, *H. antoniensis*, and *H. stoica* but *H. inexpedita* is larger than these species and has a shorter scape. *Hypoponera fallax* can also be separated by a tectiform propodeal dorsum. *Hypoponera saroltae* and *H. transiens* may be confused with *H. inexpedita* but the former species are smaller and both lack rugae and carinae on the sides of the propodeum and the metapleuron. *Hypoponera inexpedita* has a distinct metanotal-pleural suture whereas in *H. saroltae* the suture is poorly developed. Table 4 provides a comparison between each species and their diagnostic character states.

*Hypoponera inexpedita* belongs to the *foeda* -species group. Forel (1911) noted the similarity of *H. inexorata inexpedita* to *H. inexorata*. However, *H. inexpedita* is slightly darker in color with less pilosity and smaller vestigial eyes. I suspect these two taxa are different because *H. inexorata* differs in color, size, eyes, and mandibles. Santschi (1923b, 1929) considered *H. inexorata inexpedita* to be more closely allied with *H. distinguenda* but gave no evidence explaining this conclusion. Santschi's ideas of

species groupings are frequently misleading and the criteria are ill defined. I consider *H. inexpedita* to be related to the members of the *foeda* group.

**Natural History.** Unknown.

**Distribution.** Known only from type locality.

**Material examined.** Type material examined.

[BRAZIL] Sao Paulo, Ihering [examined 2 workers and 1 female (gyne) I designated the top most specimen as the lectotype following article 74.1-74.3 of the ICZN, the pin bares a label designating it as a lectotype] (MHNG).



**Figure 63.** *Hypoponera inexpedita* lectotype. Frontal view (A) and lateral habitus (B).

*Hypoponera leninei* (Santschi, 1925) Fig. 64

*Ponera leninei*, Santschi, 1924: worker, BRASIL, Santa Catarina, Blumenau, Reichensperger [2 specimens examined] (NHMB). Combination in *Hypoponera*, Kempf, 1972: 123.

**Diagnosis.** The worker is a medium-sized (TL 4.93 mm) red-brown specimen of *Hypoponera*. The eyes are comprised of 8–11 partially fused ommatidia. The scapes surpass the posterior border of the head by an amount equal to nearly the entire length of the first funicular segment. The dorsum of the mesosoma has few (11–18) scattered erect hairs, the majority of which are located on the dorsum of the propodeum. The entire mesosoma has dense (edges of pits in contact) foveate sculpturing, which becomes foveo-lacunose sculpturing on the propodeum. The anterior edge of the propodeum and the mesopleuron have carinate sculpturing. The mesometanotal junction is incised, producing an uneven

mesosomal profile and the propodeum is below the level of the mesonotum. The petiolar node is thick and rectangular in both lateral and dorsal views and has distinct foveo-punctate sculpturing.

### **Description.**

**Measurements (mm) of paratype workers. (n=4)** TL 4.93 (4.80–5.00), HL 0.96, HW<sub>2</sub> 0.70 (0.67–0.73), CI 73 (69–76), HS 0.94 (0.82–1.25), EL 0.08 (0.07–0.11), EW 0.07 (0.04–0.11), OMD 0.19 (0.14–0.21), SL 0.76 (0.74–0.78), SI 92 (90–94), ML 1.11 (1.10–1.13), WbL 1.31 (1.27–1.35), PnL 0.64 (0.53–0.83), PnW 0.52 (0.50–0.53), MsL 0.32 (0.25–0.43), MsW 0.36 (0.35–0.39), DF 0.40 (0.39–0.43), PF 0.43 (0.41–0.44), PnH 0.59 (0.57–0.60), PtL 0.54 (0.46–0.71), PtW 0.28, Ptl 58 (57–60), PeNI 53 (52–56), SPtL 0.11 (0.10–0.14), SPtW 0.21 (0.18–0.25), DPtL 0.19 (0.18–0.21), DPtW 0.39 (0.39–0.40), GS1L 0.52 (0.50–0.53), GS1W 0.65 (0.60–0.67), GS2L 0.59 (0.56–0.62), GS2W 0.72 (0.71–0.74).

Medium to large sized ant (TL 4.93 mm), brown in coloration. Mandibles lighter in color than head, yellow, reflective, only small punctae where setae arise; masticatory edge with large denticles, not distinctly tooth-like; lateral margins of clypeus with striae and punctae becoming dilute and absent medially, lighter in color than remainder of head. Eyes with 8–11 partially fused ommatidia; eye far from mandible (OMD 0.19 mm); above level of frontal lobes. Antennae yellow; scapes surpassing posterior border of head by length equal to nearly length of first funicular segment; funiculus not forming distinct club. Posterior border of head flat to slightly concave. Head with dense small shallow depressions, distance between depressions equal to width of depression. Short, flat appressed pubescence present. Mesosomal profile uneven, propodeum below mesonotum. Dorsum of pronotum with dense punctae; posterior edge of pronotal shoulder with few punctae, small area smooth, mostly lacking sculpturing, promesonotal suture impressed. Mesonotum in dorsal view cuboidal; in profile sloping down from anterior edge to propodeum; dorsum foveate becoming dense foveolate posteriorly; mesonotal-pleural suture distinct; in dorsal view forming an apparent lateral shelf with large punctae, pleural region with large irregular, dense punctae; anteriorly punctae limited, smooth and reflective; posterior region with abundant punctae. Mesometanotal suture incised; propodeum below level of mesonotum; posterior margin of mesonotum forming a visible face; dorsal face of propodeum inclined

posteriorly, meeting posteropropodeum at angle; dorsum and pleural regions foveate-lacunose reaching level of spiracle, below metathoracic spiracle rugose-costate anteriorly, remainder of metapleuron costate; outer margin of propodeum and edge of posteropropodeum thick. Dorsum of mesosoma foveate; with short, appressed pubescence, abundant erect and suberect, long (0.06 mm) hairs present. Petiole thick, rectangular in lateral view, anterior and posterior faces parallel, dorsal apex even to rounded, dense foveate sculpturing and appressed pubescence present; subspiracular process distinct, tooth-like; subpetiolar process forming broad rounded, thick process, nearly as long as petiolar node, posterior of subpetiolar process with abundant appressed pubescence. Gaster foveate-punctate, covered with dense appressed pubescence with numerous long, scattered subdecumbent hairs.

**Etymology.** Named after Vladimir Ilyich Lenin on the day of his death.

**Discussion.** *Hypoponera leninei* belongs to the *foreli* -species group. The amount and density of the sculpturing makes this species distinct from other members in the *foreli*-group. In addition, the shape of the petiole readily separates *H. leninei* from other species in the *foreli*-group. *Hypoponera idelettae*, *H. vernacula*, and *H. corruptela* most resemble *H. leninei*. *Hypoponera leninei* can be distinguished from *H. idelettae* by having a thicker, more robust petiolar node (PtW 0.28 mm, DPtL 0.19 mm in *H. leninei* and PtW 0.26 mm, DPtL 0.15 mm in *H. idelettae*). *Hypoponera idelettae* also has shallower, less dense sculpturing than that found in *H. leninei*. Both *H. vernacula* and *H. corruptela* have similar sculpturing patterns and petiolar node shapes, however the three species can be separated by examination of the mesosomal profile and scape length. *Hypoponera corruptela* can be distinguished from *H. leninei* as the former species is darker in coloration, has more developed eyes (~40 ommatidia in *H. corruptela* and only 8–11 in *H. leninei*), and longer scapes (SL 0.88 mm in *H. corruptela* and SL 0.76 mm in *H. leninei*). One other character state that will separate the two species is the mesometanotal junction, in *H. corruptela* this junction is apparent but not incised and the propodeum is not below the level of the mesonotum, however in *H. leninei* the junction is incised and the propodeum is below the level of the mesonotum. *Hypoponera vernacula* can be separated from *H. leninei* as the former species has larger eyes (41–43 ommatidia in *H. vernacula* and 8–10 in *H. leninei*) and the scape is longer (SL 0.905 mm in *H. vernacula* and SL 0.76 mm in *H. leninei*). The petiolar node in *H. vernacula* (PeNI 64) is larger than

in *H. leninei* (PeNI 53). *Hypoponera vernacula* also has the propodeum more distinctly below the mesonotum than in *H. leninei*.

**Natural History.** Unknown

**Distribution.** This species is currently known only from type locality.

**Material Examined.** Type material examined.

[BRASIL], Santa Catarina, Blumenau, Reichensperger [2 specimens examined I designated this specimen the lectotype following article 74.1-74.3 of the ICZN, specimen bears a label designating it as a lectotype the other with a label designating as paralectotype] (NHMB).



**Figure 64.** *Hypoconera leninei* lectotype. Frontal view (A) and lateral habitus (B).

***Hypoconera leveillei*** (Emery, 1890) Fig. 65.

*Ponera leveillei* Emery, 1890a: 61 worker VENEZUELA. [not examined]. Combination in *Euponera* (*Mesoponera*): Emery, 1901a: 46; in *Mesoponera*: Kempf, 1972: 141; in *Pachycondyla*: Brown, in Bolton, 1995b: 306. See also: Mackay & Mackay, 2010: 433.

**Diagnosis.** *Hypoconera leveillei* is a large (TL 6.0 mm, WbL 1.8 mm) *Pachycondyla*-like species (see discussion), that varies in coloration from red-brown to dark-brown with a dull integument. The mandibles have 5–7 distinct teeth along the masticatory margin. The anterior clypeal border has a medial notch. The eyes are small with 4–7 distinct facets and they are far from the posterior border of the clypeus (OMD 0.14 mm). The scapes surpass the posterior margin of the head by a length equal to the first funicular segment. In frontal view the head is quadrate with the lateral margins distinctly convex. The sculpturing of the head is dense and finely foveate and the head is covered in fine appressed



pubescence. In lateral view, the mesosoma is uneven, with the propodeum distinctly below the mesonotum. The propodeum has shallow foveate sculpturing that becomes elute laterally. The dorsum of the mesosoma has numerous (~20–40) erect and suberect hairs that are best seen in lateral view. The petiolar node is scale-like and the anterior and posterior faces converge dorsally. The subpetiolar process is poorly developed, quadrate and has an anterolateral depression.

### **Description.**

**Measurements (mm) of worker. (n=1)** TL 6.0, HL 1.3, HW<sub>2</sub> 1.0, CI 80, HS 1.1, EL 0.07, EW 0.07, OMD 0.14, SL 0.87, SI 87, ML 2.0, WbL 1.8, PnL 0.77, PnW 0.84, MsL 0.41, MsW 0.56, DF 0.59, PF 0.59, PnH 0.87, PtL 0.70, PtW 0.35, Ptl 75, PeNI 64, SPtL 0.17, SPtW 0.28, DPtL 0.14, DPtW 0.49, GS1L 0.70, GS1W 0.63, GS2L 0.73, GS2W 0.98.

Large (TL 6.0 mm, WbL 1.8 mm); red to brown, dark brown in coloration, integument dull. Mandibles (MnL 0.49 mm) with large apical tooth followed by 5 to 7 teeth; outer border lacking concavity; red-brown to brown, same coloration as head; opaque. Anterior medial edge of clypeus notched; medial lobe flat, foveate. Eyes small (EL 0.07 mm), 4 to 7 distinct facets; ommatidia black; visible in frontal view, eyes situated dorsolaterally, not breaking outline of side of head, far (OMD 0.14 mm) from clypeal border. Antennae red-brown to black, same to slightly lighter in coloration than head, opaque. Scapes extend past occipital margin by a length equal to length of first funicular segment, base wider than apex; suberect, appressed finely foveate; funiculus without distinct club, gradually increasing; dense appressed, suberect fine small foveate sculpturing present. Head quadrate in frontal view (CI 80), lateral margins distinctly rounded to convex; posterior width (HW<sub>3</sub> 1.12 mm) wider than anterior of head (HW<sub>1</sub> 0.94 mm); posterior border of the head with distinct concavity. Head finely foveate, dense impressions subequal to diameter, becoming denser medially; finely dense, appressed, white-gray in coloration. Mesosomal profile uneven, propodeum distinctly below level of mesonotum. Promesonotal suture impressed, mesonotum even with pronotum. Mesonotum inclined posteriorly; mesonotal-pleural suture present, distinct. Mesopleuron opaque, upper portion foveo-punctate, medially lacking sculpturing, carinate along lower portion with mesometapleural carinae. Mesometanotal suture distinct, incised, forming a groove. Propodeum inclined posteriorly, dorsal face meeting posterior face at a distinct

rounded angle, dorsum distinct in dorsal view; dorsum opaque, shallow foveate sculpturing; lateral portion opaque, elute, foveate; metapleuron opaque, foveate, carinate. Mesosoma dorsum opaque, foveo-punctate with long scattered numerous (23–38) erect and suberect hairs, long (0.13 mm) flexuous yellow curved hairs, appressed pubescence present. Petiolar node squamiform, broad (PeNI 75); tall, at most reaching level of propodeal dorsum (PnL 0.70); anterior and posterior faces straight, slightly converging toward apex, posterior face more strongly converging than anterior, apex rounded. Spiracular process distinct, tooth-like, opaque, nitid; subpetiolar process with depression (profenestra); process reduced (SPtL 0.17 mm), anterior portion weakly rounded; node broad in dorsal view, opaque with faint depressions, long (0.13 mm) flexuous yellow erect to decumbent hairs. Gaster of typical form, constriction with crossribs, opaque, faint foveate sculpturing, long (0.15 mm) posteriorly directed suberect hairs.

**Etymology.** Eponymous.

**Discussion.** *Hypoponera leveillei* could be confused with *H. clinei*, *H. iheringi*, and *H. foreli*. *Hypoponera leveillei* can be distinguished from *H. foreli* because *H. foreli* has longer scapes that surpass the posterior margin of the head by at least the first two funicular segments, larger eyes composed of 16–20 facets (compared to the 4–7 facets of *H. leveillei*), and a more elongate head. *Hypoponera clinei* can be distinguished from *H. leveillei* as it is smaller (WbL 0.41), the anterior border of the clypeus is not notched, the mandibles are red-brown and differ in color compared to the head (mandibles are the same color as the head in *H. leveillei*), and the apex of the scape is not distinctly expanded as it is in *H. leveillei*. *Hypoponera leveillei* can be separated from *H. iheringi* based on the larger size (Fig. 64) of *H. leveillei* (the size of the *H. leveillei* worker is the same as the size of the gyne of *H. iheringi*), small dense punctae on head, mandibles with teeth along the entire edge, and a short, quadrate subpetiolar process with an anterior depression.

*Hypoponera leveillei* belongs to the *leveillei*-species group. *Hypoponera leveillei*, formerly *Pachycondyla leveillei*, is *Pachycondyla*-like in general habitus. This species is larger than the majority of New World *Hypoponera* and has large denticles and teeth on the mandibles when compared to other *Hypoponera* species. This species does not have paired metatibial spurs but there is a single pectinate

spur, placing it in *Hypoponera*. *Hypoponera leveillei* is the largest of the New World *Hypoponera*. I have noticed that as size increases in *Hypoponera*, eye and teeth development also increases. This observation is in congruence with the observation that as *Hypoponera* decreases in body size, there is a reduction of eye size as a relationship to a hypogenic lifestyle. It would be interesting to examine the natural history of *H. leveillei*, *H. clinei*, and *H. iheringi* to see if these species are less cryptobiotic and therefore have a larger body size, increased eye size and more developed teeth on the mandibles. Additionally, Schmidt (2009) noted a potential Old World origin for *Hypoponera*, and a cursory examination of Old World taxa reveals a number of species that are large, with well-developed eyes and more common mandibular teeth.

**Natural History.** Collected in wet montane and gallery forest.

**Distribution.** Brazil.

**Material Examined.** Nontype material examined.

BRASIL, Dist. Federal, Parque Nac. Da Brasilia, 13-14-V, gallery forest, W.L. Brown and D. E. Brown (MCZC) [2 specimens examined]; *Est. Sao Paulo*, Boraceia Biol. Sta. Mun. Salesopolis 850 m wet mt. forest, W.L. Brown and D. E. Brown (MCZC) [2 specimens examined].



**Figure 65.** *Hypoponera leveillei* nontype. Frontal view (A) and lateral habitus (B).

*Hypoponera nemsisea* sp. nov. Dash Fig. 66

**Diagnosis.** The worker is a yellow to tan colored ant that is medium sized (TL 3.70 mm). The eyes have 9–12 partially fused ommatidia, are set close to the head, and are far from the posterior border of the clypeus (OMD 0.07 mm). The scapes surpass the posterior margin of the head only slightly by an amount equal to the first funicular segment. The head is subquadrate in frontal view; the sides are parallel and not distinctly convex. The mesosoma is uneven in profile and the propodeum is distinctly below the level of the pronotum and mesonotum. The mesosoma (in profile) has abundant erect scattered pilosity. The mesopleuron has distinct dense rugo-punctate sculpturing. The mesometanotal groove is distinct and obviously incised. The dorsum of the propodeum is flat, not distinctly inclined posteriorly, shiny and punctate, becoming more densely rugo-punctate along the anterior edge. The petiole is scale-like and tall, reaching the level of the propodeum.

**Description.**

**Measurements (mm) of holotype worker. (n=1)** TL 3.90, HL 0.75, HW<sub>2</sub> 0.60, CI 80, HS 0.68, EL 0.07, EW 0.07, OMD 0.07, SL 0.64, SI 93, ML 1.11, WbL 1.14, PnL 0.39, PnW 0.35, MsL 0.30, MsW 0.32, DF 0.28, PF 0.37, PnH 0.46, PtL 0.37, PtW 0.21, PtI 56, PeNI 60, SPtL 0.07, SPtW 0.21, DPtL 0.11, DPtW 0.25, GS1L 0.32, GS1W 0.50, GS2L 0.43, GS2W 0.57.

**Measurements (mm) of worker. (n=1)** TL 3.70, HL 0.78, HW<sub>2</sub> 0.57, CI 73, HS 0.68, EL 0.07, EW 0.07, OMD 0.07, SL 0.64, SI 89, ML 0.99, WbL 1.10, PnL 0.46, PnW 0.35, MsL 0.27, MsW 0.24, DF 0.31, PF 0.39, PnH 0.46, PtL 0.39, PtW 0.17, PtI 43, PeNI 43, SPtL 0.07, SPtW 0.21, DPtL 0.11, DPtW 0.28, GS1L 0.39, GS1W 0.50, GS2L 0.53, GS2W 0.55.

Medium sized (TL 3.7 mm) pale yellow, integument appearing dull. Mandibles with large apical tooth followed by larger denticles, becoming smaller denticles for remainder of masticatory border; outer border lacking concavity; same coloration as head, shiny. Anterior medial edge of clypeus with slight rounded medial edge, medial lobe of typical form. Eyes medium sized (EL 0.07 mm), 9–12 partially fused ommatidia; visible in frontal view, eyes situated dorsolaterally, breaking outline of side of head, close to clypeal border (OMD 0.07mm). Frontal lobes with dense appressed pubescence, puncticulate. Scapes extend past occipital margin by amount equal to length of first funicular segment, base as wide

as apex; with decumbent pilosity, punctate; funiculus without distinct club; with short decumbent and suberect pilosity; punctulate, spacing between punctae about equal to diameter. Head subquadrate, in frontal view (CI 80), lateral margins parallel; posterior width (HW<sub>3</sub> 0.60 mm) about equal to anterior width of head (HW<sub>1</sub> 0.53), posterior margin of head not concave; densely punctate, spacing of punctae equal to diameter of punctae, density increasing towards midline; pubescence appressed, white-gray in coloration. Mesosomal profile uneven, propodeum distinctly below level of mesonotum. Promesonotal suture barely defined, mesonotum even with pronotal dorsum. Mesonotum slightly rounded in profile, sloping posteriorly; mesonotal-pleural suture present, distinct. Mesopleuron opaque, rugo-punctate, dense, space between punctae subequal; posterior area lacking sculpturing; mesometapleural carina distinct. Mesometanotal suture distinctly incised, forming distinct groove. Propodeum flat, slightly inclined posteriorly, dorsal face meeting posteropropodeum at broadly rounded junction, dorsal face slightly shorter than posteropropodeum (DF 0.28 mm, PF 0.37mm); in dorsal view propodeum tectiform (the width of the dorsum 0.09 mm); dorsum shiny, punctate; lateral portion shiny, punctulate, spacing between punctae equal to diameter of punctae, anterior edge becoming densely rugo-punctate near mesometanotal groove. Metapleuron nitid, punctate, spacing between punctae equal to diameter of punctae, carinae limited to metapleural bulla. Mesosoma dorsum nitid, punctulate, punctae shallow and scattered; long (0.07 mm) abundant erect pilosity and appressed pubescence present. Petiolar node subtriangular, broad (PeNI 60, DPel 36) and tall, reaching level of propodeal dorsum (PnL 0.37 mm); anterior and posteropropodeums converging toward apex, apex rounded; spiracular process small, tooth-like; subpetiolar process lacking fenestra; process forming distinct lobe (subpetiolar lobe width 0.21 mm), anterior portion lobate, rounded, meeting with posterior edge; in dorsal view node thin, as wide as propodeum; petiole nitid, faintly punctulate, punctae subequal. Gaster of typical form, constriction with crossribs, shiny, reflective, punctulate where hairs arise; abundant flexuous erect and suberect pilosity over terga, dense appressed thin pubescence present.

**Etymology.** Named in honor of Nemesis, the Greek spirit (goddess) of retribution against those who surrender to arrogance; also applied to the derived definition of a formidable opponent, such as the taxonomy of *Hypoponera*.

**Discussion.** *Hypoponera nemsisea* may be distinguished from *H. idelettae* and *H. apateae* as the latter species lack the abundant erect hairs on the mesosomal dorsum. *Hypoponera nemsisea* is very similar to *H. impartergum*. The two species can be separated by examining the mandibles, head shape, the propodeum and the petiole. In *H. impartergum* the outer border of the mandible is sinuate whereas in *H. nemsisea* the outer border lacks a concavity. Additionally, the head of *H. impartergum* is longer (HL 1.10 mm) and more elongate (CI 74) than in *H. nemsisea* (HL 0.76 mm, CI 80). The mesometanotal groove is incised in *H. impartergum* but not deeply so and the dorsum of the propodeum is inclined posteriorly. In comparison, the mesometanotal groove of *H. nemsisea* is deeply incised and the dorsum of the propodeum is flat, only slightly sloping posteriorly. These two species can also be separated by the smaller and more robust petiole in *H. nemsisea* (PnH 0.46 mm, PnW 0.22, PtI 59, PeNI 61) compared to *H. impartergum* (PnH 0.67 mm, PnW 0.27 mm, PtI 49, PeNI 51).

*Hypoponera nemsisea* belongs to the *foreli* -species group. Though I have only one specimen and cannot demonstrate clear sympatry with other *Hypoponera* species; the uniqueness of morphology suggests a hypothesized singular lineage. The holotype was designated from one specimen collected in 2005, while visiting the MCZC I found another specimen collected in the area of the type locality in 1953. The holotype is deposited in the MCZC.

**Natural History.** Unknown.

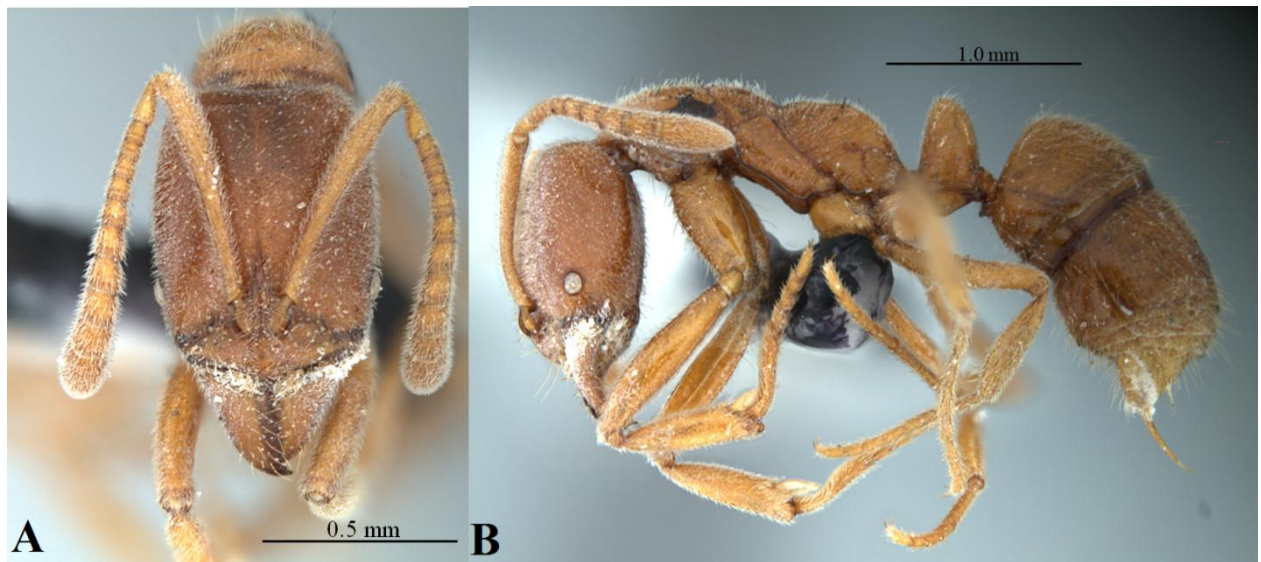
**Distribution.** Known only from type locality.

**Material examined.**

Holotype Veracruz: Los Tuxtlas, Lopez Manteos N 18° 26' 25" W 94° 57' 06," II-2005, A. Angeles and P. Rojas (MCZC).

Nontype material examined.

Mexico. Veracruz, Tuxtla, Las Mamacas 17 km N. Santiago, 26-28-VIII-1953, E. O. Wilson [3 MCZC].



**Figure 66.** *Hypoponera nemsisea* nontype material. Frontal view (A) and lateral habitus (B).

***Hypoponera nitidula*** (Emery, 1890) Fig. 67

*Ponera nitidula* Emery, 1890: 43, worker, COSTA RICA. [Also described as new by Emery, 1894: 49.] [3 specimens examined] (MCSN). Larvae described Wheeler, G.C. & Wheeler, J. 1964: 453. Combination in *Hypoponera*, Kempf, 1972: 123.

**Diagnosis.** The worker is a medium sized species (TL 3.20–4.10 mm). This species is nearly all black with metallic blue iridescence, and is very nitid. Some individuals are dark brown in coloration. The legs, antennae and mandibles are red-brown to red-orange in coloration. The body has numerous appressed whitish hairs and the dorsum of the head, mesosoma and gaster have long suberect and erect hairs. The scapes surpass the posterolateral margin of the head by a length about equal to the length of the first three funicular segments.

**Description.**

**Measurements (mm) of holotype worker. (n=1)** TL 3.20, HL 0.85, HW<sub>2</sub> 0.60, CI 70, HS 0.73, EL 0.07, EW 0.07, OMD 0.11, SL 0.89, SI 65, ML 1.07, WbL 1.28, PnL 0.50, PnW 0.48, MsL 0.26, MsW 0.28, DF 0.39, PF 0.42, PnH 0.67, PtL 0.50, PtW 0.21, PtI 42, PeNI 44, SPtL 0.09, SPtW *obscured by glue*, DPtL 0.09, DPtW 0.46, GS1L 0.36, GS1W 0.57, GS2L 0.53, GS2W 0.60.

**Measurements (mm) of workers. (n=5)** TL 3.62 (3.20–4.10), HL 0.89 (0.82–0.96), HW<sub>2</sub> 0.64 (0.60–0.71), CI 72 (71–74), HS 0.77 (0.71–0.84), EL 0.11 (0.07–0.14), EW 0.09 (0.07–0.11), OMD 0.11, SL 0.75 (0.39–0.89), SI 76 (67–82), ML 1.12 (1.07–1.20), WbL 1.29 (1.18–1.42), PnL 0.49 (0.46–0.53), PnW 0.48 (0.43–0.54), MsL 0.32 (0.26–0.36), MsW 0.29 (0.25–0.36), DF 0.40 (0.36–0.46), PF 0.47 (0.42–0.53), PnH 0.68 (0.62–0.71), PtL 0.56 (0.50–0.60), PtW 0.23 (0.20–0.28), PtI 41 (33–48), PeNI 47 (43–52), SPtL 0.11 (0.09–0.16), SPtW 0.18 (0.16–0.21) [n=4], DPtL 0.07 (0.05–0.09), DPtW 0.50 (0.46–0.57), GS1L 0.50 (0.36–0.53), GS1W 0.68 (0.57–0.78), GS2L 0.55 (0.50–0.60), GS2W 0.73 (0.60–0.82).

Body dark brown to black (most frequently black); shiny; mesosoma and lateral portions of head with metallic blue iridescence. Appendages red-brown to red-orange. Appressed evenly spaced short, white-silver hairs cover body. Mandibles red-orange, four apical teeth, small denticles on remainder of masticatory edge. Eye with 10–23 ommatidia, large (EL 0.07–0.11 mm), no more than one eye length away (OMD 0.11 mm) from posterior border of clypeus. Antennae red-brown; appressed and decumbent pubescence present; apex of scape with short erect hairs; scapes surpass posterior border of head by length equal to or greater than first three funicular segments. Funicular segments failing to form distinct club, segments 2–10 gradually increase in length to apex, segments 8–12 increase in width and length. Posterior margin of head straight, not concave at midline; hairs appressed, numerous suberect and erect hairs present on dorsum of head. Pronotum nitid, with numerous decumbent pubescence and scattered long erect hairs; promesonotal suture distinct and slightly incised; mesonotal-pleural suture distinct. Mesometanotal suture variable, lacking in some individuals, in others apparent but faint; mesosoma and propodeum not incised at suture. Dorsopropodeum shorter than posteropropodeum (DF 0.36–0.46 mm, PF 0.42–0.53 mm), gradually declining posteriorly, junction of faces rounded. Propodeal pleuron lacking punctae, Metapleuron with distinct longitudinal striae. Legs red-brown with numerous appressed white hairs. Petiole scale-like, thick (PtW 0.20–0.28 mm) and taller than posterior edge of propodeum; anterior and posterior faces converging dorsally, degree of convergences variable, anterior face with abundant decumbent hairs. Spiracular process reduced; petiole thin in dorsal view. Subpetiolar process



quadrate, lacking fenestra and anterior depression. Gaster of typical form with numerous appressed hairs, suberect and erect long hairs present on dorsal and ventral surfaces.

**Etymology.** From the Latin *nitidus*, referencing the species' shiny or sleek appearance.

**Discussion.** *Hypoponera nitidula* is easily separated from the other species of *Hypoponera* because it is the only species with limited sculpturing on the mesosoma and it lacks punctae on the lateral portions of the propodeum. Additionally, *H. nitidula* is the only nitid, reflective, dark colored species. Like *H. corruptela*, in *H. nitidula* the propodeal dorsum is even with the mesonotum or just slightly below.

*Hypoponera nitidula* belongs to the *foreli* -species group. Both the gyne and worker are similar in overall appearance. The worker is on the lower point of the type material. There is some material from scattered records in Costa Rica that appears very similar to the types of *H. nitidula* but they are less reflective, slightly larger and hairier.

**Natural History.** *Hypoponera nitidula* is a commonly encountered leaf litter species; as such it is frequently collected by Berlese or Winkler extractions and on occasion collected by pitfall trapping. This species is distributed from 10 to 1400 meters in elevation and has been collected in the following habitats: tropical rainforest, cloud forest, montane hardwood forest and cocoa plantations.

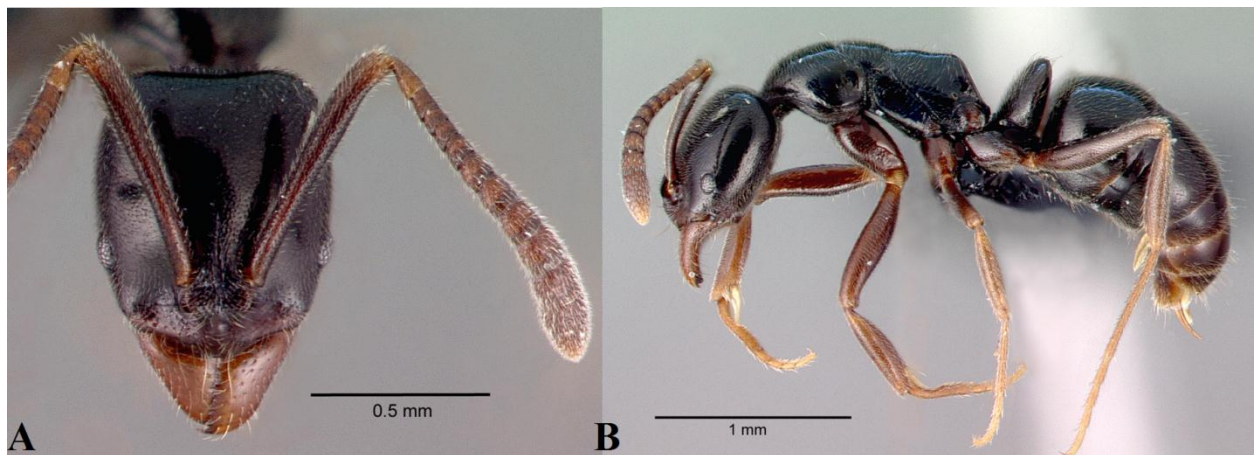
**Distribution.** Southern Mexico south into Panama.

**Material examined.** Holotype and paratypes Costa Rica [3 specimens examined]( MCSN).

Nontype material examined.

Belize. Orange Walk, Lamanni, 17° 45' 45" N 88° 39' 11.8" W, Tropical forest, rocky loam soil, 10 m elev, Litter extraction, W. & E. Mackay (1 specimen) [CWEM]. COSTA RICA. Alajuela, 27 km N & 8 km W San Ramon, 10°13'30"N 84°35'30"W. 950 m elv., 14-vi-1997, wet premontane forest litter, R. Anderson (7 specimens) [CWEM]; Guanacaste, Maritza Field Station, 3-v-1995, 800M, R. Anderson (8 specimens) [CWEM]; Guanacaste Maritza Field Station 3-v-1995, 800 m, Leaf Litter Montane Hardwood Forest Berlese Leaf litter R. Anderson [CWEM]; Guanacaste, Pitilla Field Station 14-ii-1997, 1000 m, Cloud-Wet Montane Forest transition litter, R. Anderson, (14 specimens) [CWEM]; Heredia, Est. Biol. La Selva, 5-Aug-04 FOT/53/10 CES 250 m. (11 specimens) [CWEM]; 27 km N and 8 Km W San Racon, 10° 13' 30" N 84° 35' 30"W, 14-XI-1997, wet premontane forest litter 950 m elv., R.

Anderson (4 specimens) [CWEM]. GUATEMALA. Peten, estacion, Biological Las Gaucamyas, 17° 14' 49.7" N 90° 17' 33.3" W, 22-VII-2004, Tropical rain forest, rocky loam soil 68 m elv. 24 hr Winkler, W. & E. Mackay (7 specimens) [CWEM]; Peteni Tikal, 20-23-VI-1972, J. H. Hunt [LACM]. HONDURAS. Progreso, W. Mann (1 specimen) [USNM]. MEXICO. Chiapas, 10 km S Palenque, 30-IV-1988, Forested area pitfall, W. Mackay (4 specimens) [CWEM]; Tabasco, Gauanducan in Tercera Piedra, 18° 04' 53" N 93° 10' 56" W, 08-IX-2006, Cocoa Plantation leaf litter, I. Del Toro (1 specimen) [STDC]; Tabasco, Humanguillo Aguaselva, 17° 24' 08.0" N 83° 42' 53" W, 07-VII-2006, leaf litter, I. Del Toro (1 specimen) [STDC]; Tabasco, Macuspana, Aguablanca Bio. Rsv., 17° 29' 15.0" N 92° 29' 15.0" W, 04-VIII-2006, Leaf litter 115-175 m, I. Del Toro (5 specimens) [STDC]; Tabasco, Macuspana, Aguablanca Bio. Rsv., 17° 29' 15.0" N 92° 37' 15.0" W, 04-VIII-2006, Nesting in leaf litter with foragers, I. Del Toro (1 specimen) [STDC]; Oaxi NM 6 mi S. Valle Nacional, 1400' eleve, 19-V-1971, leaf litter (2 specimens) [FMHD]; Oaxi NM 6 mi S. Valle Nacional, 2000' eleve, 19-V-1971, leaf litter, S. Peck (2 specimens) [FMHD]. PANAMA. Chiriquí, Bocas del Toro Cont. Div., 9-vi-1995, wet mountain cloud forest litter #17840, R. Anderson (6 specimens) [CWEM].



**Figure 67.** *Hypoponera nitidula* nontype specimen. Frontal view (A) and lateral habitus (B).

***Hypoponera opaciceps* (Mayr, 1887) Fig. 68**

*Ponera opaciceps* Mayr, 1887, 536, worker, & queen described Brasil, Santa Catarina

Male described, Smith, 1929, 545. Ergataner described, Smith 1931, 507-509. *Ponera perkinsi* senior synonym of *opaciceps* Wilson and Taylor, 1967. *Ponera perkinsi* description. Forel, 1899.

*Ponera andrei* Junior synonym of *Ponera perkinsi* Wilson, 1958. Combination in *Hypoponera*, Taylor, 1967.

**Diagnosis.** *Hypoponera opaciceps* is a medium-size species (TL 2.80 mm, WbL 0.93 mm) that varies in color from light brown to black. The eyes have 10–13 facets. The scapes fail to reach or just reach the posterior lateral margins of the head. The head and body are covered with dense appressed hairs. The dorsums of the mesosoma and gaster have a few scattered suberect hairs. The pleural sutures are distinct. The dorsal surface of the propodeum is at the same level as the remainder of the mesosoma. There are dense punctae on the head, pronotum and anterior mesopleuron. The petiolar node is subquadrate, the dorsum is not rounded or is only slightly so, and the anterior and posterior faces are parallel.

**Description.**

**Measurements (mm) of worker. (n=4)** TL 2.8 (2.7–3.0), HL 0.63 (0.63–0.66), HW<sub>2</sub> 0.56 (0.55–0.58), CI 88 (87–90), HS 0.98 (0.97–0.99), EL 0.03 (0.02–0.03), EW 0.03, OMD 0.07 (0.06–0.08), SL 0.64 (0.61–0.65), SI 1.00 (0.96–1.0), ML 0.96 (0.95–0.99), WbL 0.93 (0.90–0.98), DF 0.25, PF 0.32, PnH 0.37 (0.34–0.41), PtL 0.22 (0.19–0.24), PtW 0.20 (0.19–0.22), PtI 67 (65–71), SPtL 0.05 (0.05–0.07), SPtW 0.86 (0.85–0.86), DPtL 0.27 (0.24–0.31), DPtW 0.31 (0.26–0.34), GS1L 0.34 (0.32–0.37), GS1W 0.40 (0.39–0.40), GS2L 0.36 (0.35–0.38), GS2W 0.41 (0.39–0.41).

Color variable from light brown, red-brown to nearly black. Mandibles with 11–12 teeth, apical 3–4 teeth tooth-like, remaining teeth denticle-like. Clypeus subtruncate; raised medially to level of frontal lobes, some specimens with shallow notch. Frontal lobes with numerous appressed hairs, borders with numerous long hairs. Eyes with 10–13 distinct facets, dorsolateral position, close (OMD 0.06–0.08 mm) to posterior border of clypeus. Scapes variable in length. Funicular segments 1–4 as long as broad and equal in size, segments 5–11 gradually increasing in length apically; final 6 segments may form weak club. Head in frontal view quadrate (CI 87–90), posterior margin with distinct concavity, sublucid,

densely foveo-punctate sculpturing depressions large, easily seen, dense appressed pubescence present. Mesonotal pleural suture faint, but visible. Profile of mesosoma nearly even, slight impression at promesonotal and mesometanotal sutures. Mesonotal-pleural suture elute to distinct. Dorsopropodeum not below level of mesonotum; angles smoothly to posterior face forming a weak angle. Mesosoma dull and opaque. Dorsum and to a lesser degree pleural regions of mesosoma and gaster with dense appressed pilosity with scattered erect hairs on dorsal surfaces. Petiolar node as wide at base as at apex, quadrate, anterior and posterior faces not converging, apex even and not acutely rounded. Subpetiolar process with small anterior lobe. Gaster of typical form.

#### **Female.**

Similar to worker in overall appearance. Eyes large with 20–30 ommatidia. Ocelli of equal size, located near vertex. Overall head shape like that of the worker. Mesosoma with typical modification common in alate females. Pleural sulcus development lacking on metathorax. Scutuparapteral, parapterascutellar sutures faint. Petiole unlike that of the worker; not appearing quadrate in lateral view. Parallel faces of petiole converging apically. Similar to that of the workers of *H. trigona* and *H. opacior*. Gaster of typical form.

#### **Ergataner.** (from Smith 1936)

“Color sordid yellow; margins of compound eyes and antennal cavities black, articulations of legs and sutures of thorax brown. Head, including mandibles, longer than broad; posterior border almost straight, and sides subparallel, thus giving the head a more rectangular appearance than with the worker. Mandibles moderately broad, triangular, edentate stubs. Clypeus strongly convex, protuberant; scapes short, subcylindrical, approximately equal in length to the second and third, and fourth segments of the funiculus taken together. Compound eyes small, almost circular, separated from the base of the mandibles by a space equivalent to approximately one and one-half times their greatest diameter. Thorax short, robust; viewed laterally the pro-mesonotal and mesometanotal sutures are very distinct, especially on the dorsum; mesonotum strongly gibbous, clearly projecting above the general surface of the pronotum and epinotum (=propodeum). Between the mesonotum and epinotum (propodeum) the suture is represented by a very strong constriction, following which, the epinotum (propodeum) forms a rather

long and gentle arch terminating at the petiole. The basal surface and declivity of the epinotum (propodeum) merge into each other so gradually that they are hardly distinguishable. Petiole large, robust, anterior and posterior faces convex, superior border rounded. Gaster similar to that of the worker, but bearing prominent genital appendages. The above description is based on two specimens which were taken from a colony of *Ponera opaciceps* at Landon, Mississippi, By G. W. Haug August 25, 1930.”

**Etymology.** Combination of Latin *opacus* meaning obscure and *ceps* for caput meaning head. *Nescio* for this combination.

**Discussion.** *Hypoponera opaciceps* is similar in appearance to *H. opacior* and *H. trigona* and is most likely to be confused with *H. opacior* as both are widespread tramp species inhabiting many of the same localities. *Hypoponera opaciceps* may be separated from these species by the shape of the petiole. Both *H. trigona* and *H. opacior* have triangular petioles where the base is wider than the rounded apex. In *H. opaciceps* the shape is subquadrate, where the base is equally as wide as the rather flat apex. The females of *H. opaciceps* and *H. opacior* are frequently misidentified. Such misidentifications are the result of confusing worker and female character states. The petiolar shape of the workers of *H. opacior* is triangular whereas in *H. opaciceps* it is subquadrate but these character states are wrongly applied to the females. The female of *H. opaciceps* is similar in appearance to the female of *H. opacior* as both have a scale-like petiolar node. They can be distinguished, however, because the female of *H. opaciceps* is more heavily punctate on the pronotum. *Hypoponera opaciceps* belongs to the *opaciceps*-species group.

Lectotype worker: Brazil, Santa Catarina designated by Kempf (1962). Forel (1908) designated *H. opaciceps postangulata* based on the following perceived differences: head narrower posteriorly than anteriorly, sides of head not as convex and posterior margin of the head more rounded. Forel (1917) designated *H. opaciceps gaigei* based on differences from the normative species: eyes larger than the type, funicular segments thicker than in the type, and the petiolar node thicker than in the type. *Hypoponera opaciceps gaigei* and *H. o. postangulata* look identical to the types of *H. opaciceps*. I suggest that Forel’s (1917) thoughts of *H. opaciceps gaigei* being different are correct as those

specimens may represent ergatogynes. *Hypoponera opaciceps* appears to be a widespread tramp species found across the New World and as well as a number of localities in the Old World (Wilson and Taylor 1967, Bolton et al. 2006). I have examined a number of specimens of *H. opaciceps* from across the New and Old World and character states appear stable with limited variation. There are also a number of character states that are continuous and variable.

**Natural History.** This species has been collected under rocks, in leaf litter and in soil. Small colonies can be found in moist habitats in forested areas. Van Pelt (1958) found this species in wet flooded areas of the Welaka Reserve in Florida, in such habitats as hydric hammocks, swamps, and longleaf-pine flatwoods. Deyrup et al. (1988) noted *H. opaciceps* from numerous islands in the Florida Keys, in disturbed areas as well as in beach wreck. Clouse (1999) found *H. opaciceps* in areas of high moisture within pepper stands in Florida.

Howard and Oliver (1979) located this species in pastures in East Baton Rouge and Iberville parishes (Louisiana), where it was the third most commonly collected ant. In Costa Rica, Longino (2010) noted this species on bare slopes of Volcan Arenal, Monteverde. On Tonga, specimens were found in taro fields. Wilson and Taylor (1967) reported both normal winged and ergatoid males in their collections of *H. opaciceps* in Polynesia. This species has a pantropic distribution with the Old World records most likely representing introductions from the New World. This species is considered to be predatory, feeding on soil arthropods. *Hypoponera opaciceps* appears to have foraging areas limited by the red imported fire ant in pastures in Louisiana (Howard and Oliver 1979).

**Distribution.** North from the southern United States and Mexico, south to Argentina, Greater Antilles, Lesser Antilles, and Bahamas. Also found sporadically throughout the Old World such as in Japan, Philippines and parts of Polynesia.

**Material examined.** Type material.

Brasil, Santa Catarina Lectotype designation by Kempf 1962

Nontype material examined.

COLOMBIA: Magdalena, Tayrona Park, C. Kugler 1977, Los Naranjos, 29-vi-1997 (2 workers) [USNM]. MÉXICO: *Baja California*, Las Parras, Oct-23, W M. Mann (1 f CASC); Palmadita, W. Mann

collector (9 workers) [USNM]; *Oaxaca*, 42 K NE Oaxaca rt 175, 4-Jun-88, Collected under rock M. Mackay (4 workers [CWEM]. Cuernava, No. 2, 12-26-00 (1 male) [USNM]; Yacua Venez, H. A. Betty N. 336 (1 worker) [USNM]. TONGA: Tongatapu IS. Vaini Res. Stat., 18-Aug-95, in taro field, J Wetterer (1 worker) [CWEM]. USA: *California*, Big Canyon, Sierra Legund, x-13-1941, Ross and Bohart (1 female) [CASC]. *Georgia*, 10 mi N Brunswilk, II-10-1943, W. S. Ross (5 males) [CASC]. *Hawaii*, Kiloou, xi-4-1919 (1 female) [CASC]. *Mississippi*, Forrest Co., Brooklyn, 31° 03' 06" N 89° 11' 35" W, 21-Jun-05, Litter-hardwood forest on bluff overlooking Black Creek, G. Christodoulou (1 female) [MEM]; Jackson Co., Hurley, 30°38'58" N 88° 29'35" W, 7-Oct-04, Berlese-soil from field with cogon grass, R. L. Brown (1 worker) [MEM]. *Texas*, Brazos Co., Deer Lick Creek, 15-Jul-1987, collected under log, M. Mackay (1 worker) [CWEM]; Dripping Spr., Viii-9-1942, W. S. Ross (15 workers) [CASC].



**Figure 68.** *Hypoponera opaciceps* nontype. Frontal view (A) and lateral habitus (B).

***Hypoponera opacior* (Forel, 1893) Fig. 69**

*Ponera trigona* var. *opacior* Forel, 1893: 363 Lectotype and paralecotype designated by (R. Taylor), worker paratype worker and female, SAINT VICIENT, West Indies, [2 examined] (MHNG) (paratype MCZC). Male Emery, 1895 [not examined] (MCSN). Raised to subspecies Kempf, 1962. Larva described, Wheeler and Wheeler, 1964. Combination in *Hypoponera*

Taylor, 1968.

*Ponera opaciceps* r. *chilensis* Forel, 1914: 264, worker, CHILE, Valparaiso, H. G. Brameld [not examined] (MNHG). Combination in *Hypoponera*, Kempf, 1972. Junior synonym of *Hypoponera opacior* Snelling and Hunt, 1975.

**Diagnosis.** *Hypoponera opacior* is a tiny to small sized species of *Hypoponera*. The coloration of this species variable ranging from yellow to black. The head quadrate, the lateral margin are slightly convex. The sculpturing on the head is densely punctulate. The eyes are small which consist of 1–2 fused facets. The scapes reach and surpass the posterior margin of the head by a length equal to the  $\frac{1}{2}$  or 1<sup>st</sup> funicular segment. In lateral view the mesosomal profile even, the mesonotum is flight with the dorsopropodeum inclined posteriorly. The mesometanotal junction faint and not forming an incised groove. The meta and mesopleuron shiny to opaque lacking striae or carinate sculpturing. The petiolar node distinctly scale-like (PtI 48); the anterior and posterior faces are converging apically. The subpetiolar process with a distinct lobe.

#### **Description.**

**Measurements (mm) of worker. (n=6)** TL 2.1 (2.0–2.6), HL 0.63 (0.57–0.69), HW<sub>2</sub> 0.57 (0.56–0.60), CI 90 (81–98), HS 96 (94–100), EL 0.03 (0.02–0.04), EW 0.03 (0.02–0.04), OMD 0.07, SL 0.50 (0.43–0.55), SI 80 (71–93), ML 0.84 (0.83–0.90), WbL 0.87 (0.79–0.92), PnL 0.32 (0.30–0.37), PnW 0.36 (0.35–0.40), MsL 0.27 (0.26–0.28), MsW 0.23 (0.22–0.25), DF 0.22 (0.20–0.25), PF 0.34 (0.32–0.36), PnH 0.40 (0.36–0.46), PtL 0.32 (0.26–0.37), PtW 0.12 (0.10–0.15), PtI 45 (33–58), PeNI 33 (29–38), SPtL 0.05 (0.03–0.06), SPtW 0.11 (0.10–0.13), DPtL 0.10 (0.07–0.14), DPtW 0.32 (0.28–0.34), GS1L 0.39, GS1W 0.54 (0.53–0.59), GS2L 0.40 (0.39–0.42), GS2W 0.49.

Small to medium sized species; coloration variable from red-brown to black, integument appearing dull, shiny. Mandibles (MnL 0.05 mm) with large apical tooth followed by 1–2 teeth, remainder with small numerous denticles; outer border lacking concavity; orange–yellow lighter in coloration than head, shiny; small indentations with appressed hairs arising from indentations. Anterior medial edge of clypeus straight, medial lobe flat, truncate, anterior edge nitid posterior and posterior lateral punctulate. Eyes small (EL 0.03 mm), 1–2 fused facets; ommatidia black-silver; not visible in frontal view, eyes



situated laterally, not breaking outline of side of head, far (OMD 0.07 mm) from clypeal border. Antennae orange–yellow, lighter in coloration than head, shiny, opaque. Scapes extend past posterior margin by length of one third to one half first funicular segment, base not as wide as apex; decumbent hairs present, punctulate; funiculus with indistinct club, segments gradually increasing in width and length; short decumbent yellow pubescence. Head quadrate in frontal view (CI 90), lateral margins slightly convex; posterior border of head with or lacking concavity. Head punctulate, dense, punctae spacing subequal to diameter, edges not in contact; thin appressed hairs, white-yellow in coloration. Mesosomal profile even. Promesonotal suture may be slightly or not impressed, mesonotum even with pronotum. Mesonotum flat in profile; mesonotal-pleural suture present, distinct; limited rugo-carinate sculpturing along edge. Mesoplueron shiny, punctulate apically, glabrous medially mesometapleural carinae distinct. Mesometanotal suture very faint to lacking, not incised. Propodeum inclined posteriorly, flat, dorsal face meeting posterior face at a distinct rounded angle, in dorsal view with distinct dorsum, not tectiform; dorsum shiny, punctulate, punctae spacing subequal to diameter of punctae; lateral portion reflective, punctulate; metapleuron shiny to opaque. Pronotum more reflective and shiny than mesonotum and propodeum, both of which are opaque. Pronotum punctulate, mesonotum and propodeum punctulate. Mesosoma dorsum with short erect and appressed hairs present. Petiolar node squamiform, thin (PtW 0.12 mm, PtI 45); tall, reaching level of propodeal dorsum (PnL 0.32 mm); anterior and posterior faces converging towards apex, apex rounded. Spiracular process distinct lobe, opaque punctate to punctulate; subpetiolar process forming distinct lobe, anterior portion lobate; in dorsal view node thin, opaque, punctulate; with appressed pubescence. Gaster of typical form, opaque densely punctulate; limited scattered erect hairs with appressed pubescence present.

**Etymology.** Latin *opacus* to shade or obscure.

**Discussion.** *Hypoconera opacior* may be confused with *H. pampana* and *H. trigona*. In the United States and the Caribbean, it may also be confused with *H. opaciceps*. *Hypoconera opacior* can be separated from the very similar appearing *H. pampana* by the presence of carinae on the mesoplueron and metapleuron as well as by the rugae on the pronotum found on *H. pampana*. Along with this character state, the profile of the mesosoma is uneven and a mesometanotal groove is present in *H.*

*pampana* (whereas in *H. opacior* it is absent). *Hypoponera trigona* can be separated from *H. pampana* as the former species is darker in coloration ranging from mostly black to very dark brown. Both species can be distinguished based on the following suite of characters: sculpturing of the mesosoma, development of the mesonotal pleural suture and mesometanotal groove, and the presence of hairs on the dorsum of the mesosoma. In *H. trigona* the dorsum and lateral portions of the propodeum have rugo-punctate sculpturing whereas in *H. pampana* the punctae are smaller and do not form rugo-punctate sculpturing. The mesonotal-pleural suture is distinct in *H. trigona*, whereas in *H. pampana* this suture is faint or indistinct. Additionally, in *H. pampana* the mesometanotal junction forms a distinct groove, in contrast the mesonotum and dorsum of the propodeum are straight and there is not a groove formed in *H. trigona*. The dorsum of the mesosoma in *H. trigona* has numerous (10–23) erect hairs whereas in *H. pampana* and *H. opacior* there are limited erect hairs on the dorsum of the mesosoma. *Hypoponera pampana* (as well as *H. opacior* and *H. trigona*) can easily be distinguished from *H. opaciceps* because the latter species has a thicker, quadrate petiolar node, in lateral view the anterior and posterior faces do not strongly converge, and the apex is flat whereas in the former species the node is scale-like with a rounded apex. Though the determination of these species seems simple, numerous mistakes have occurred in museum material that confused *H. opaciceps* with these species.

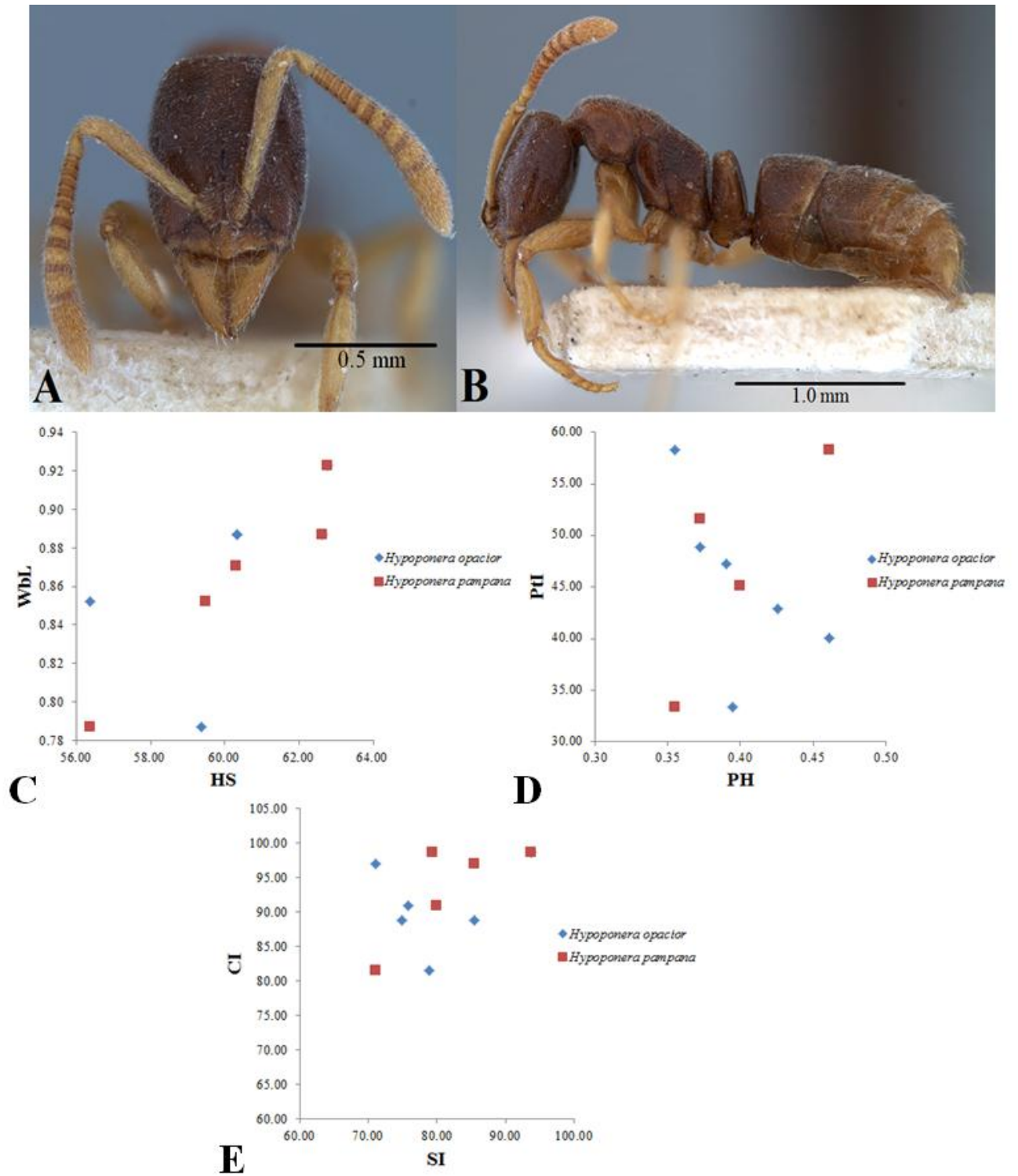
*Hypoponera opacior* belongs to the *trigona*-species group. Since Smith's 1936 and Creighton's 1950 treatments of US (within the Nearctic) myrmecofauna, the name *H. opacior* has been widely and wrongly applied. Such misapplication is understandable as *H. opacior* has a confusing history. In fact Mayr's type series of *H. trigona* have a few *H. opacior* mixed in. However *H. opacior* and *H. trigona* are very distinct (see *H. trigona* for comparison). Looking through over 45,000 specimens determined as *H. opacior*, any *Hypoponera* with a thin squamiform petiolar node is determined as *H. opacior*. Examination of Table 4 and character 24 and 25 will provide a number of other species which also have scale-like and thin petiolar nodes. It should be noted also, that thickness and degree of convergences of the anterior and posterior faces is variable. Most material that I have examined that has been determined to be *H. opacior* is in fact *H. pampana*. See *H. opacior* and *H. pampana* for comparison of characters (Figs. 69 and 70). There is considerable overlap in morphometric parameters (Fig 69 C, D, E) between

*H. opacior* and *H. pampana*, but they two species are easily separated on the basis of by the presence of carinae on the mesopleuron and metapleuron as well as by the rugae on the pronotum found on pronotum and an incised mesometanotal groove. *Hypoconera opacior* is not common within the US and has a limited range in Florida, the Caribbean and northern parts of South America. However, when comparing specimens to *H. pampana*, a large percentage match or are very similar to the types. I consider the range of *H. pampana* to include the southern United States south through Latin America, as well as on in the Caribbean, Galapagos, and Hawaii. For the majority of collected natural history for *H. opacior* a reapplication is needed to link it with *H. pampana* (at least within US with the limited *Hypoconera* species richness). Examination of *H. pampana* provides a number of character states that are variable, however I have not been able to sort these into any patterns suggesting sympatry or biogeographically. See *H. pampana* discussion

**Natural History.** Found throughout the Caribbean and only making it into the USA in southern Florida. The copious amounts of natural history for this species in the literature cannot be applied to the current species as a result of misidentification.

**Distribution.** Caribbean to Florida.

**Material examined.** Type material examined. Saint Vicient, [2 specimens examined 1 type (MHNG) 1 designated paralectotype by R. Taylor (MCZC).



**Figure 69.** *Hypoponera opacior* paralectotype. Frontal view (A) and lateral habitus (B). Comparison between *H. opacior* and *H. pampiana* with overlap between morphometric parameters. Comparison of HS=head size v. Weber length (C), PH=petiolar height v PTI= Petiolar node index (D), and SI=scape index v. CI=cephalic index.

***Hypoponera pampana* (Santschi, 1925) Fig. 70**

*Ponera opaciceps pampana* Santschi, 1925: 153 types worker, queen, male ARGENTINA, Catamarca, Cerro Colorado, Weiser (NHMB) [not examined], ARGENTINA, Santa Fe, Fives Lille Weiser [2 specimens examined] (NHMB). Combination in *Hypoponera*, Kempf, 1972.

*Ponera opaciceps cubana* Santschi, 1930: 76, worker, female, CUBA, Havana, Sierra Banilla, A. Bierig [3 specimens examined] (NHMB). Combination in *Hypoponera*, Kempf, 1972. Syn. n. junior synonym of *Hypoponera pampana*.

**Diagnosis.** The worker of *H. pampana* is a small sized (TL 2.30–2.50 mm, WbL 0.89 mm) species. This species is variable in coloration, ranging from orange-brown to dark brown or black. The antennae, mandibles, and legs are yellow or yellow-tan and are lighter in coloration than the body. The number of ommatidia is variable, ranging from 3 to 9 slightly fused facets. The scapes surpass the posterior border of the head by a length equal to half of the first or the first funicular segment. The funicular segments gradually increase in width and length but do not form a distinct club. The head in frontal view is quadrate with the sides of the head being slightly convex and on the posterior border of the head there is a slight concavity. The sculpturing of the head is densely punctate and the punctae edges are in contact with each other. The mesosoma is uneven in lateral view with an incised promesonotal suture and a mesometanotal groove. An important character state that separates this species from others is the sculpturing of the lateral portion of the mesosoma. The mesopleuron is distinctly carinate and these carinae appear from the base to the mesonotal-pleural suture. These carinae extend onto the mesopleuron and follow the junction of the metathorax and propodeum. The dorsum and lateral portions of the propodeum have punctate sculpturing. The humeral areas of the pronotum have rugal sculpturing present. The dorsum of the mesosoma has numerous appressed hairs, however only a few (2–9) short, erect or suberect hairs. The petiole is scale-like and thin in lateral view.

**Description.**

**Measurements (mm) of type worker (n=2)** TL 2.3–2.5, HL 0.67, HW<sub>2</sub> 0.53, CI 79, HS 0.6, EL 0.03, EW 0.03, OMD 0.07, SL 0.53–0.54, ML 0.78–0.79, WbL 0.89, PnL 0.37, PnW 0.37–0.40, MsL 0.27–0.28, MsW 0.23, DF 0.25, PF 0.32, PnH 0.39–0.43, PtL 0.28–0.35, PtW 0.14–0.18, PtI 45–48, SPtL

0.02–0.05, SPtW 0.06, DPtL 0.11, DPtW 0.32, GS1L 0.38–0.41, GS1W 0.53–0.54, GS2L 0.41, GS2W 0.38–0.42.

Small (TL 2.3–2.5 mm); color variable from yellow-tan to black, opaque. Mandibles with large apical tooth followed by 2 teeth, followed by denticles along edge; outer border lacking concavity; yellow to yellow-tan, lighter colored than head, shiny. Anterior medial edge of clypeus straight, medial lobe of typical form. Eyes small (EL 0.03 mm), 5–9 slightly fused facets; ommatidia silver; barely visible in frontal view, eyes situated laterally, not breaking outline of side of head, close (OMD 0.07 mm) to clypeal border. Antennae yellow-brown, lighter in coloration than head, opaque. Scapes extend past occipital margin by length of first funicular segment or less, base about as wide as apex; appressed stout pubescence, shallow punctae, punctate. Funiculus without distinct club, segments gradually increasing, weak club in some specimens, surface with yellow-white appressed and decumbent hairs, densely punctate. Head quadrate in frontal view (CI 79), lateral margins slightly convex; posterior width (HW<sub>3</sub> 0.54 mm) equal to anterior width of head (HW<sub>1</sub> 0.52 mm); posterior border of the head with slight concavity. Head densely punctate, punctae edges in contact; pilosity fine short appressed, white-yellow in coloration. Mesosomal profile uneven, incised at promesonotal and mesometanotal sutures. Pronotum with faint shallow depressions. Mesonotum even with pronotum. Mesonotum flat; mesonotal-pleural suture present, distinct. Mesopleuron opaque, carinae reaching to mesonotal pleural suture, becoming punctate at edge to mesonotum. Propodeum straight with dorsal face meeting posterior face at rounded angle; dorsum distinct in dorsal view; dorsum opaque, with shallow depressions (deeper than on promesonotum); lateral portion opaque, punctate, punctae shallow, anterior edge becoming carinate at level of spiracle with metapleuron opaque, carinate. Mesosoma dorsum opaque, punctate, punctae shallow, short erect scattered hairs. Petiolar node squamiform thin, tall, surpassing level of propodeal dorsum; anterior and posterior faces distinctly converging towards apex, apex rounded, dense shallow punctae. Spiracular process reduced, opaque; subpetiolar process with faint profenestra; process forming distinct lobe, anterior portion lobate, rounded with posterior; in dorsal view node thin, wider than posterior propodeum, opaque, numerous shallow dense depressions, punctate. Gaster of typical form,

constriction without crossribs, opaque, fine abundance appressed pubescence, few (10–15) erect hairs on segments 1 and 2.

### **Larva.**

From Wheeler and Wheeler (1964), who determined these as *Hypoconera opacior*. Given the current understanding of the misinterpreted characters, it is likely that these specimens were actually *H. pampana*. However, given that *H. opacior* has been found in southern Florida there is a possibility they could be *H. opacior* although this is unlikely.

"Length (through spiracles) about 2 mm. Similar to *P. coarctata pennsylvanica* Buckley, except in the following details: body stouter. Anus with conspicuous posterior lip. Tubercles less numerous (130). Spirelike tubercles distributed as follows: thoracic somites and abdominal somites IV, V and VII, 10 each; I-III and VI, 12 each; VIII, 8; IX, 6; X, 4. Integument with a dense covering of isolated, long (0.01–0.03 mm), hairlike spinules on the dorsal and lateral surfaces. Body hairs slightly longer (0.05–0.08 mm long). (Material studied: 12 larvae from Georgia, courtesy of Dr. P. B. Kannyowski)."

**Etymology.** Named in reference to the type locality of the grasslands of Argentina.

**Discussion.** *Hypoconera pampana* may be confused with *H. opacior* and *H. trigona*. It may also be confused with *H. opaciceps* in the United States and Caribbean. *Hypoconera opacior* can be separated from the very similarly appearing *H. pampana* by the presence of carinae on the mesopleuron as well as the metapleuron, and the rugae on the pronotum found in *H. pampana*. Along with this character state, the uneven profile of the mesosoma and the mesometanotal groove present in *H. pampana* (absent in *H. opacior*) will separate these two species. *Hypoconera trigona* can be separated from *H. pampana* as the former species is darker in coloration, ranging from mostly black to very dark brown. Both species can be distinguished based on the following suite of characters: sculpturing of the mesosoma, development of the mesonotal pleural suture and mesometanotal groove, as well as the presence of hairs on the dorsum of the mesosoma. In *H. trigona* the dorsum and lateral portions of the propodeum have rugo-punctate sculpturing whereas in *H. pampana* the punctae are smaller and do not form rugo-punctate sculpturing. The mesonotal-pleural suture is distinct in *H. trigona*, whereas in *H. pampana* this suture is faint or indistinct. Additionally, in *H. pampana* the mesometanotal junction forms a distinct groove, in contrast

the mesonotum and dorsum of the propodeum are straight and there is no groove formed in *H. trigona*. The dorsum of the mesosoma in *H. trigona* has numerous (10–23) erect hairs whereas in *H. pampana* and *H. opacior* there are limited erect hairs over the dorsum of mesosoma. *Hypoconera pampana* (as well as *H. opacior* and *H. trigona*) can easily be distinguished from *H. opaciceps* because the latter species has a thicker, quadrate petiolar node, in lateral view the anterior and posterior sides do not strongly converge, and the apex is flat compared to the former species in which the node is scale-like with a rounded apex. Though the identification of these species seems simple, numerous mistakes have occurred in museum material that confused *H. opaciceps* with these species.

*Hypoconera pampana* belongs to the *trigona*-species group. See *H. opacior* discussion. Kempf (1962) commented on the infraspecific taxa of *H. opaciceps* but made no judgment of any of their statuses except *H. opaciceps pampana*; which he noted was distinct from *H. opaciceps*. If his conclusion was that *H. opaciceps pampana* should be raised to specific status or that this taxon represents a valid subspecies, I cannot determine. *Hypoconera opaciceps cubana* was described by Santschi (1930) based on the head being shorter, with the posterior border of the head more rounded than in the types. The scapes barely surpass the posterior border of head, the anterior face of the propodeum is slightly convex, and the pubescence is shorter and more obvious than in the types. The head dimensions and overall shape are variable in both the nominate type series (*H. opacior*) and within the subspecies (*H. opaciceps cubana*) series. Santschi's (1930) notes on the arching or convexness of the propodeum is confusing as it does not really arch in the types of *H. opaciceps* either. Even a cursory examination of *H. opaciceps pampana*, *H. opaciceps cubana*, and *H. opaciceps* provides the evidence and justification for the separation of the former species from *H. opaciceps*. Both *H. opaciceps pampana* and *H. opaciceps cubana* lack a quadrate petiolar node and the strongly punctate sculpturing on the mesosoma and petiole is found in *H. opaciceps*. I here raise *H. pampana* to species level, and synonymize *H. opaciceps cubana* with *H. pampana*. Comparison of meristic character states of type material of *H. opaciceps pampana* (*H. pampana*) and *H. opaciceps cubana* lead me to conclude that these two species were in fact the same species. Table 5 summarizes characters that are widely employed in determining species identities but for these species considerable overlap occurs. This overlap in morphometric parameters (Fig 69 C,D,E)



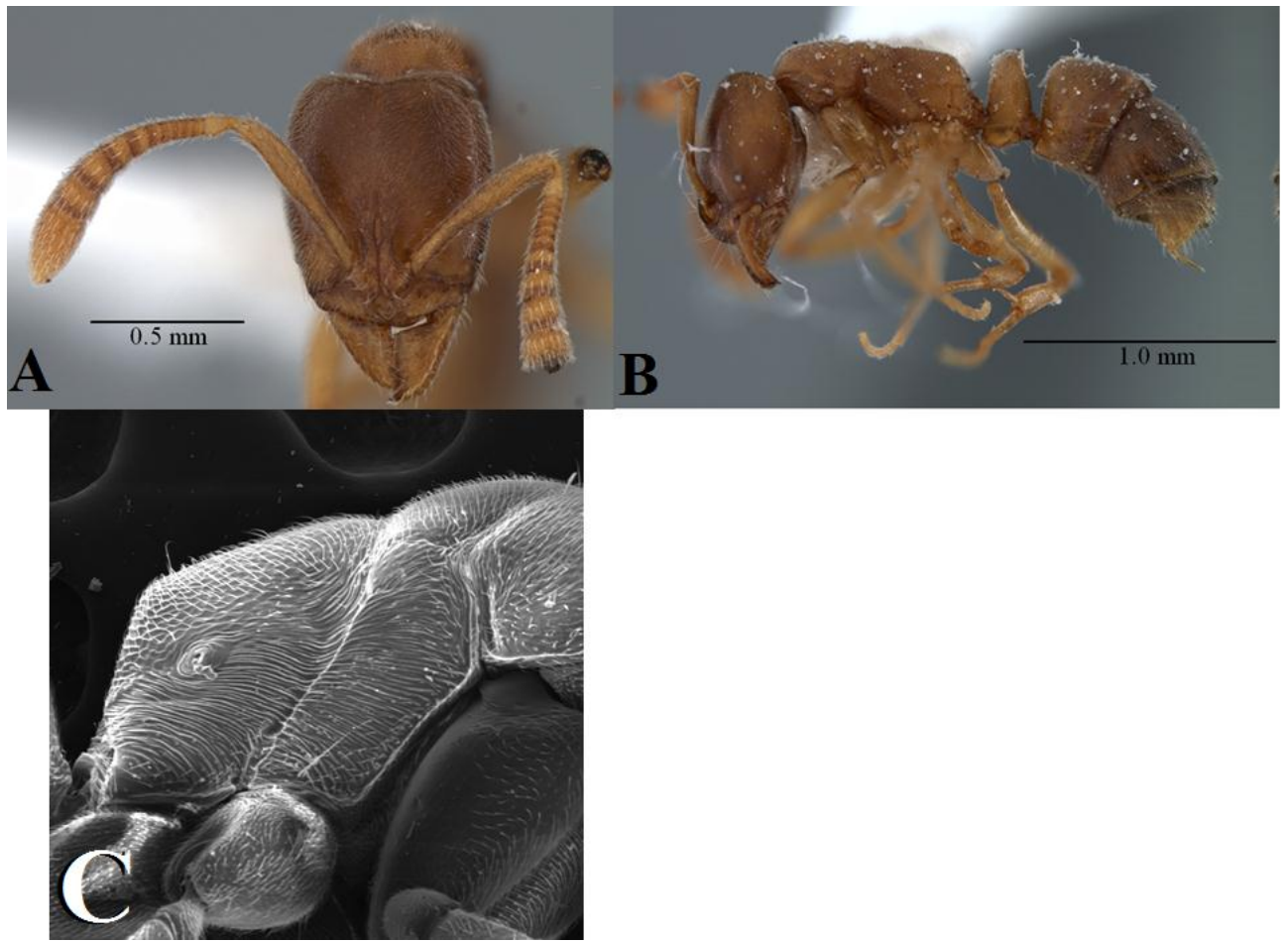
between *H. opacior* and *H. pampana* does not retard documenting species boundaries, as the two species are easily separated on the basis of by the presence of carinae on the mesopleuron and metapleuron as well as by the rugae on the pronotum found on pronotum and an incised mesometanotal groove.

**Natural History.** MacGown and Brown (2006) found *H. pampana* in loose association with cherry bark oak (*Quercus pagoda*) in the Tombigbee National Forest in Mississippi. Collection of *H. pampana* by MacGown and Brown (2006) was either by locating the nest or by Berlese, however no specimens were collected from baits (regardless of bait type: cookies, tuna, or peanut butter).

**Distribution.** USA south through Central and South America.

**Material examined.** Type material examined.

ARGENTINA, Santa Fe, Fives Lille Weiser [2 specimens examined I here designated one specimen as a lectotype and paralectotype specimen the lectotype following article 74.1-74.3 of the ICZN, each specimen bears a label designating it as a lectotype or paralectotype] (NHMB).



**Figure 70.** *Hypoponera pampana* lectotype, SEM non type material. Frontal view (A) and lateral habitus (B) and the striae on the meta and mesopleura (C).

**Table 5.** Comparison of character states between *H. pampana* and *H. cubana*. Across all important diagnostic characters both taxa overlap in character states based on type material.

	WBL	HW2	HL	CI	PH	Manidular Color	Apical Teeth	Scape Length to Posterior Margin of Head	Club 0 no club, 1 gradual club, 2 distinct club	Eye position 0 lateral, 1 dorsolateral	# of facets 0 30+, 1 15-30, 2 5-10, 3 1-4	Posterior Border of Head	Pronotum Sculpturing	Prometanotal Suture	Mesonotal-plural Suture	Mesonetanotal Suture	Mesopleuron Sculpturing	Metapleuron Sculpturing	Petolar Node
<i>Hypoponera pampana</i>	0.87	0.53	0.67	79.1	0.39	yellow	3, promient	surpassing	1	1	3	concave	foveate	incised	distinct	incised	carinate	carinate	scale-like, thick
<i>Hypoponera cubana</i>	0.87	0.52	0.67	77.6	0.42	yellow	3, promient	surpassing	1	1	3	concave	foveate	incised	distinct	incised	carinate	carinate	scale-like, thick

***Hypoponera parva*** (Forel, 1909) Fig. 71

*Ponera parva* Forel, 1909: 244 worker GUATEMALA [3 specimens examined] (MHNG).

Combination in *Hypoponera*, Kempf, 1972: 123.

*Ponera reichenspergeri* Santschi, 1923: 1255, type workers, BRAZIL: Santa Catarina, Blumenau,

Reichensperger [2 specimens examined] (NHMB). Combination in *Ponera* (*Hypoponera*)

Santschi, 1938. Combination in *Hypoponera* Kempf, 1972. syn. nov.

**Diagnosis.** *Hypoponera parva* is a tiny (TL 1.40–1.50 mm) species of *Hypoponera*, perhaps the smallest in the New World. This species is pale yellow to light yellow, with the mandibles and legs lighter in coloration than the body. The head in a number of specimens appears lighter colored than the mesosoma. The eyes are tiny, appearing absent under lower magnifications. The eye consists of only one facet and this facet is light in coloration and small. The scapes fail to reach the posterior border of the head by a length equal to the length of the first and second funicular segments. The funicular segments form a distinct club. In profile, the outline of the mesosoma is even, lacking deep grooves or a strongly arched dorsum. The promesonotal suture is incised, however the mesometanotal junction is not distinct, hard to see and not incised. The lateral regions of the propodeum are reflective and the metapleuron has striae-punctate sculpturing. The sculpturing on the metapleuron does not extend onto the mesopleuron. The petiolar node is quadrate in some specimens and in lateral view the anterior and posterior faces converge whereas in others they do not.

**Description.**

**Measurements (mm) of worker. (n=2)** TL 1.4–1.5, HL 0.48 (0.42–0.50), HW<sub>2</sub> 0.31 (0.30–0.32), CI 64 (61–71), HS 0.39 (0.36–0.41), EL 0.02 (0.02–0.04), EW 0.03 (0.02–0.04), OMD 0.03 (0.02–0.04), SL 0.29 (0.28–0.30), SI 100, ML 0.57 (0.48–0.72), WbL 0.61 (0.48–0.74). Specimens are in multiple pieces and missing body regions.

Tiny (TL 1.4–1.5 mm); color pale yellow, appears dull, opaque. Mandibles with large apical tooth followed by 7–10 denticles varying in size; outer border lacking concavity; yellow similar in coloration to head, opaque. Anterior medial edge of clypeus of typical form. Eyes small (EL 0.02 mm), 3–5 partially fused facets; ommatidia yellow; not visible in frontal view, not breaking outline of side of head,

close (OMD 0.03 mm) to posterior clypeal border. Antennae yellow, lighter in coloration than head. Scapes fail to reach occipital margin by length of first and second funicular segments, base not as wide as apex; funiculus with distinct club, club segments longer than preceding funicular segments. Head rectangular in frontal view (CI 64), lateral margins parallel; posterior width (HW<sub>3</sub> 0.33 mm) subequal to anterior width of head (HW<sub>1</sub> 0.25 mm); posterior border of the head with distinct concavity. Head punctulate, dense, punctae spacing equal to diameter of punctae, fine appressed pubescence present. Mesosomal profile even. Promesonotal suture impressed, mesonotum even with pronotum. Mesonotum flat, slightly rounded in profile; mesonotal-pleural suture absent, feeble. Mesopleuron shiny, limited puncticulate; mesometapleural carinae faint. Mesometanotal suture faint, not incised. Propodeum gradually inclined posteriorly, dorsal face meeting posterior face at a broadly rounded angle; dorsum distinct in dorsal view; dorsum opaque, punctate; lateral portion shiny; metapleuron shiny, rugose around bulla. Mesosomal dorsum opaque, short numerous erect hairs present. Petiolar node scale-like, subtriangular, broad, reaching level of propodeal dorsum (PnL0.23 mm); anterior and posterior faces weakly converging straight towards apex, rounded. Spiracular process distinct, tooth-like, shiny punctate; subpetiolar process lacking fenestra; process forming anterior distinct lobe, rounded; in dorsal view node thin, as wide as propodeum, shiny. Gaster of typical form, constriction with crossribs, opaque, some areas reflective, punctuate. Dense pubescence with longer hairs on posterior edges of segments present. Few (5–7) short decumbent hairs on gaster segments 1 and 2.

**Etymology.** Latin *parva* meaning small.

**Discussion.** *Hypoponera parva* may be confused with the following species: *H. promontorium*, *H. aliena*, and *H. clavatula* however by examining sculpturing, size, scape length and propodeal shape, it may be distinguished. *Hypoponera promontorium* can be separated from *H. parva* based on its distinctly tectiform propodeum (in dorsal view), whereas in *H. parva* the dorsum of the propodeum has a distinct surface. Both *H. aliena* and *H. clavatula* are larger than *H. parva*. *Hypoponera aliena* is distinguished from *H. parva* because the scapes reach and in some specimens slightly surpass the posterior margin of the head and in contrast in *H. parva* the scapes fail to reach the posterior margin of the head by a length equal to at least the length of the first funicular segment. *Hypoponera clavatula* has a duller mesosoma

which is not as shiny or reflective when compared to *H. parva*, in which only the sides of the mesosoma are reflective. Additionally, *H. clavatula* has larger, denser punctae on the sides of the propodeum and striae across the meta and mesopleurons but *H. parva* has smaller, finer punctae on the sides of the propodeum and striae only present on the bulla.

*Hypoponera parva* belongs to the *parva*-species. There is little doubt that the current species represents a species complex. Currently the variation is impenetrable and a detailed analysis with additional material will result in clarification. During this study a preliminary analysis of character states did not show any geographic patterns. However, characters that I propose to be important for species separation include eye size, number of facets, scape length, width of the base of the scape compared to the apex, sculpturing of the meso and metapleuron, and petiolar node shape.

I have proposed the synonymy of *H. parva* and *H. reichenspergeri* based on numerous overlapping character states. Both species overlap in morphometric components. Both species are pale yellow to yellow in coloration. Both species have tiny eyes consisting of one ommatidium, with the eyes being located close to the posterior margin of the clypeus. The scapes in both species fail to reach the posterior margin of the head by a length equal to at least the first funicular segment. The promesonotal sutures are distinct but are slightly incised. Both species have the mesonotum and dorsum of the propodeum even, not with a mesometanotal groove and this junction is indistinct. The sculpturing and pilosity on the dorsum of the mesosoma is similar. The petiolar node is subrectangular with the anterior and posterior faces slightly converging apically, the apex is rounded and there is a distinct subspiracular spine present. Notable differences (or perhaps variation) between the type specimens are limited, but will nevertheless provide insight in future studies. The head width of *H. reichenspergeri* is slightly wider and the sides of the head are more convex and not as parallel as in *H. parva*. Additionally, the mesonotal-pleural suture in *H. parva* is indistinct whereas in *H. reichenspergeri* this suture is distinct.

Santschi (1923) did not compare *H. reichenspergeri* with *H. parva* (Santschi did provide a comparison for *H. clavatula* and *H. schwebeli*) and the designation of the two species by subsequent taxonomists is alleged to be on a distributional split where *H. parva* is not located in South America and *H. reichenspergeri* is not distributed in Central or North America. However, as outlined above the two

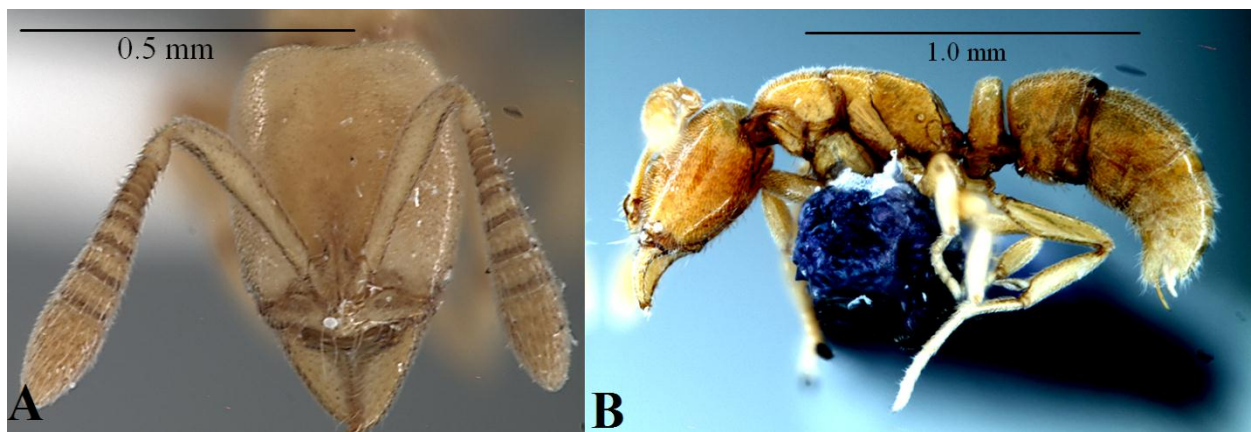
species are similar in both morphometric and meristic character states and as no biogeographic evidence exists for separate Central and South American species a synonymy is warranted.

**Natural History.** Unknown.

**Distribution.** Southern Texas to Southern Brazil.

**Material examined.** Type material examined.

GUATEMALA [3 specimens all in pieces examined the most complete as the lectotype specimen bares a label designating it as a lectotype] (MHNG



**Figure 71.** *Hypoponera parva* nontype material Frontal view (A) and lateral habitus (B).

*Hypoponera perplexa* (Mann, 1922) Fig. 72

*Ponera perplexa* worker Mann, 1922, 8: workers HONDURAS, La CIBA [3 specimens examined] (AMNH). Combination in *Hypoponera*, Kempf 1972: 123.

**Diagnosis.** *Hypoponera perplexa* is yellow to yellow-brown in coloration. The body is covered with appressed pubescence and the cuticle is shiny. The dorsal surfaces of the head, mesosoma, and gaster are covered with decumbent and appressed hairs. The eye has four ommatidia. The median furrow is distinct. The scapes surpass the posterolateral corner of the head by approximately the length of the first funicular segment. The scape is densely covered with short erect and decumbent hairs and the funiculus has decumbent and scattered suberect hairs. The funicular segments are enlarged apically, but do not form a distinct club. The posterior border of the head has a slight concavity. Pubescence on the lateral

surfaces is less dense than on the dorsum. The promesonotal suture is distinct; with a small posteriorly directed lobe. The promesopleural suture and mesopropodeal sutures are also distinct. An anterior oblique suture is present but faint and it rises supra-posteriorly. The mesometanotal suture is distinct, with a slight furrow at the dorsum of the junction of the mesonotum and propodeum. The dorsal face is convex and rounded smoothly to the posterior face of the propodeum. The anterior surface of the petiolar node is straight and the posterior face is rounded. The node is not strongly converging dorsally. The apex of the petiolar node is rounded in lateral view. The subpetiolar process is quadrate and short, at a posterior angle with erect hairs. A small fenestra is present. The gaster is covered with appressed yellow pubescence and scattered erect hairs on the dorsal and ventral surfaces.

### **Description.**

**Measurements (mm) of worker. (n=1)** TL 3.90, HL 0.84, HW<sub>2</sub> 0.63, CI 75, HS 0.74, EL 0.03, EW 0.03, OMD 0.12, SL 0.16, SI 82, ML 1.10, WbL 1.10, PnL 0.55, PnW 0.45, MsL 0.24, MsW 0.37, DF 0.28, PF 0.41, PnH 0.58, PtL 0.52, PtW 0.24, PtI 82, PeNI 0.53, SPtL 0.10, SPtW 0.14, DPtL 0.15, DPtW 0.41, GS1L 0.46, GS1W 0.56, GS2L 0.53, GS2W 0.64.

Yellow to yellow-brown coloration, body covered with pubescence, cuticle shiny. Mandibles yellow orange; large apical tooth followed by denticles. Anterior edge of clypeus broadly rounded distally. Median portion of clypeus convex in lateral view. Anterior and medial area with long suberect hairs, directed ventrally and dorsally, respectively, in lateral view. Clypeus with short appressed hairs; frontal lobes covering antennal insertions, anterior edge lacking medial notch. Eye with 4–6 partially fused ommatidia. Scape surpassing posterolateral portion of head by length of first funicular segment; scape densely covered with short erect and decumbent hairs; funiculus with decumbent and scattered suberect hairs. Funicular segments enlarged apically; do not form distinct club. Posterior border of head with slight concavity. Mesosoma with pleurae glabrous. Dorsal surface of pronotum covered with decumbent and appressed hairs; spacing between hairs equal to width or 1.5 times width of hairs. Pubescence on lateral surfaces less dense than on dorsum. Promesonotal suture distinct. Mesopleural suture distinct; with small posteriorly directed lobe. Anterior edge of mesonotum rounded, posterior edge concave in dorsal view, inclined posteriorly. Promeso and mesopropodeal sutures distinct, thicker and darker,



forming sharp edge. Mesopleural suture present, faint, rises supraposteriorly. Mesometanotal suture distinct, slight furrow between mesonotum and dorsum of propodeum. Dorsopropodeum convex, rounded smoothly to posterior face of propodeum. In dorsal view sides of propodeum converge dorsally forming a broad region. Petiolar node subtriangular, anterior surface of petiole straight, posterior face rounded; apex of petiolar node rounded in lateral view. Numerous long erect hairs on apex of petiolar node. Anterior edge rounded, sloping anteriorly, posterior face straight in dorsal view. Subpetiolar process quadrate, short, anterior depression present, posterior angle with 6 erect hairs. Gaster covered with appressed yellow pubescence, scattered erect hairs on tergites, frequency and density increase posteriorly. Gastric sternites 3–5 with numerous erect hairs.

**Etymology.** Latin *perplexus* for confused or entangled.

**Discussion.** This species is similar to *H. distinguenda*. *Hypoponera perplexa* can be separated from *H. distinguenda* as *H. perplexa* is more reflective with less sculpturing on the lateral areas of the propodeum and metapleuron, the mesonotum is convex (versus even in *H. distinguenda*), there is distinct concavity on the posterior margin of the head, and the anterior head width (HW<sub>1</sub> 0.63 mm) is nearly as wide as the posterior head width (HW<sub>3</sub> 0.64 mm) whereas in *H. distinguenda* the anterior head width is less than the posterior head width. *Hypoponera perplexa* belongs to the *distinguenda*-species group.

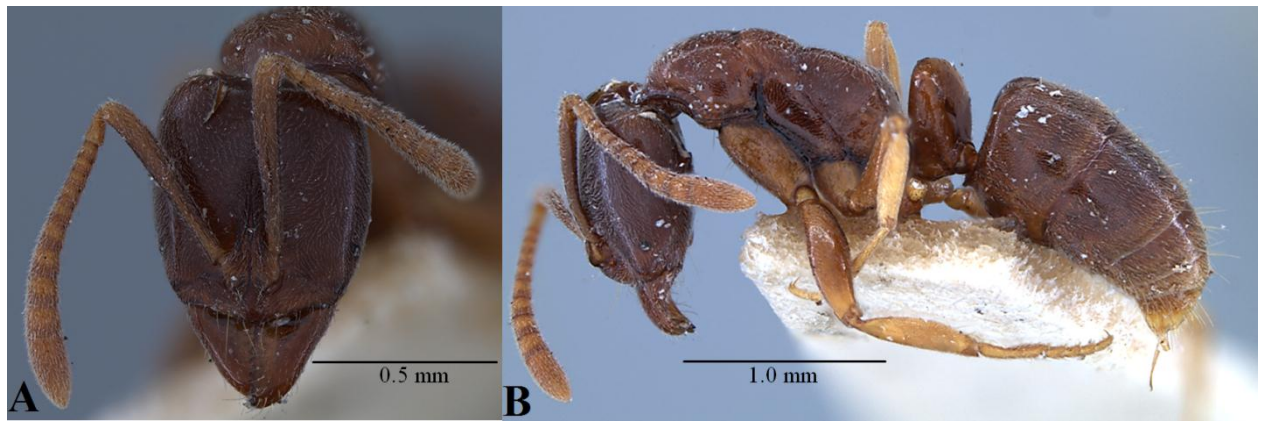
**Natural History.** Unknown.

**Distribution.** Honduras and Panama (Kempf 1972). Type material. Ceiba, Honduras

**Material examined.**

Type material examined.

HONDURAS: La Ceiba, W. Mann collector, (3 workers, 1 pin. I here designated the top specimen the lectotype following article 74.1-74.3 of the ICZN, this specimen bares a label designating it as a lectotype] [AMNH].



**Figure 72.** *Hypoponera perplexa* lectotype. Frontal view (A) and lateral habitus (B).

***Hypoponera promontorium* Dash sp. nov. Fig. 73**

**Diagnosis.** *Hypoponera promontorium* is a small sized ant that is yellow to yellow-brown or brown in coloration. The eye is small and appears to consist of 1 ommatidium but is actually made of 4–5 fused facets. The scapes do not reach the posterior margin of the head and are lighter in coloration than the head. The funicular segments form a distinct club. When viewed in full-face aspect, the head is quadrate with the lateral margins slightly convex. In dorsal view the dorsopropodeum is distinctly tectiform and the sides converge apically, reducing the dorsum of the propodeum to a small area.

**Description.**

**Measurements (mm) of worker. (n=1)** TL 3.0, HL 0.70, HW<sub>2</sub> 0.56, CI 80, HS 0.63, EL 0.03, EW 0.03, OMD 0.11, SL 0.49, SI 88, ML 0.84, WbL 0.97, PnL 0.39, PnW 0.43, MsL 0.26, MsW 0.33, DF 0.21, PF 0.31, PnH 0.41, PtL 0.15, PtW 0.21, PtI 110, PeNI 0.49, SPtL 0.10, SPtW 0.14, DPtL 0.15, DPtW 0.21, GS1L 0.35, GS1W 0.42, GS2L 0.31, GS2W 0.44.

Small (TL 3.0 mm); color pale yellow to brown, gaster darker than head and mesosoma, integument appears opaque but reflective under fluorescent light. Mandibles (MnL<sub>1</sub> 0.31 mm) with large apical tooth followed by reduced denticles, appearing to lack denticles; outer border lacking concavity; pale yellow, lighter in coloration than head; opaque. Anterior medial edge of clypeus with slight lobe. Eyes small (EL 0.03 mm), 4 to 5 fused facets that appear as 1 ommatidium, black; visible in frontal view, eyes situated dorsolaterally, breaking outline of side of head, close (OMD 0.11 mm) to clypeal border.

Antennae pale yellow, lighter in coloration than head. Scapes fail to reach occipital margin by at least length of first funicular segment, base not as wide as apex; suberect to appressed pubescence, punctate; funiculus with distinct club, terminal club segment (12) longer than preceding funicular segments; with dense, short appressed pubescence. Head quadrate in frontal view (CI 80), lateral margins slightly convex; posterior width (HW<sub>3</sub> 0.51 mm), wider than anterior of head (HW<sub>1</sub> 0.45). Head punctate, dense, punctae distance as wide as diameter, punctae edges in contact; pilosity appressed, fine, white-gray in coloration. Posterior border of head straight to slight concavity. Mesosomal profile even with rounded appearance, propodeum even with mesonotum. Promesonotal suture not impressed, mesonotum even with pronotum. Mesonotum flat; mesonotal-pleural suture present, distinct to faint. Mesopleuron opaque, glabrous, punctate sculpturing along dorsal and posterior edge; mesometapleural carinae distinct. Mesometanotal suture not apparent. Propodeum distinctly inclined posteriorly, dorsal face rounded, meeting posterior face in a broadly rounded profile; very tectiform in dorsal view, forming a long ridge where sides converge (DF 0.21 mm); opaque punctuate; metapleuron glabrous, carinate, fine microsculpturing posteriorly. Mesosoma dorsum opaque, nitid, densely punctate with short suberect pilosity and appressed pubescence present. Petiolar node squamiform, thin (PeNI 0.49); tall, reaching level of propodeal dorsum (PtL 0.15 mm); anterior and posterior faces converging toward apex, anterior face convex, posterior face straight, apex rounded. Spiracular process reduced, opaque glabrous; subpetiolar process lacking fenestra; process forming distinct lobe (SPtL 0.10 mm), distinct anterior lobe, in dorsal view node thinner or as wide as propodeum, opaque punctate. Gaster of typical form, reflective, punctate, spacing less than length of appressed hairs.

**Etymology.** *Promontorium*, Latin for mountain ridge in reference to the sharp ridge that is formed from the tectiform propodeum.

**Discussion.** *Hypoconera promontorium* belongs to the *parva*-species group. *Hypoconera promontorium* is similar to *H. aliena*, *H. clavatula*, and *H. parva*. All of these species are yellowish and have antennae with a distinct club. *Hypoconera promontorium* is distinguished from *H. aliena* by the shape of the dorsopropodeum which is tectiform and forms a distinct ridge. Both *H. clavatula* and *H. parva* may be

separated from *H. aliena* as *H. aliena* has longer scapes (SI 81) when compared to the two former species (SI 58–68) whose scapes just reach the posterior margin of the head.

**Natural History.** This species has been collected from mixed litter of leaf mold, rotten wood from forest in Bolivia.

**Distribution.** Bolivia and French Guiana.

**Material examined.**

Type material Examined

Holotype BOLIVIA, Santa Cruz 35 km E. Flou de Oro 450 m 13°50'S and 60°52' W. 29-xi-1993. P.S. Ward #12199-17. Sifted litter (leaf, mold, rotten wood in forest) [this specimen bares a label designating it as a holotype] (MCZC)

Paratype BOLIVIA, Santa Cruz Las Gamas P. N. Noel. Kempf Mercado 700 mi 14°48' S 60°23' W P.S. Ward #12285-9. [this specimen bares a label designating it as a holotype] (MCZC).

Nontype material.

FRENCH GUIANA La Mataroni river 15 km SE Regina 25 m 4°13,14.3' N 52°10'39 W. 8.xi.1996. G.D. Alpert M. Moffett \*couldn't read\*(MCZC)



**Figure 73.** *Hypoponera promontorium* holotype. Frontal view (A) and lateral habitus (B).

***Hypoponera punctatissima* (Roger 1859) Fig. 74**

*Ponera punctatissima* Roger, 1859: 246, pl. 7, fig. 7 (worker and queen) GERMANY [3 paratypes examined] (AMNH). Forel, 1874: 92 (male). Combination in *Hypoponera*, Taylor, 1967: 12. Senior synonym of *androgyna*: Emery & Forel, 1879: 455, Seifert, 2003: 69; of *tarda*: Dalla Torre, 1893: 41, Seifert, 2003: 69; of *kalakauae*, *mina*, *mumfordi*: Wilson & Taylor, 1967: 29; of *ergatandria*: Smith, D.R. 1979: 1343; of *mina*: Taylor, 1987: 30; of *exacta*: Atanassov & Dlussky, 1992: 71, Seifert, 2003: 69; of *jugata*: Seifert, 2003: 69.

**Diagnosis.** *Hypoponera punctatissima* is a small yellow to yellow-brown species (TL 1.50–2.00 mm) that has an overall shiny body. The eyes are small and consist of only a few (1–5) ommatidia. The scapes fall short of the posterolateral border of the head. The sides of the mesosoma are very shiny. The petiole is quadrate in shape when viewed in profile, with the dorsal face equal or nearly equal to the basal portion. The dorsum of the body has few short erect hairs. The shiny body, small size, yellow coloration and short square petiole readily separates this species from others.

**Description.**

**Measurements (mm) of worker. (n=3)** TL 2.95 (2.80–3.10), HL 0.75–0.78, HW<sub>2</sub> 0.58–0.67, CI 77–86, HS 66–73, EL 0.05–0.07, EW 0.05–0.07, OMD 0.18, SL 0.66–0.67, SI 82–90, ML 0.89 (0.85–0.96), WbL 1.06 (0.99–1.10), PnL 0.37 (0.32–0.43), PnW 0.44 (0.43–0.46), MsL 0.24 (0.21–0.26), MsW 0.32, DF 0.28 (0.25–0.32), PF 0.40 (0.36–0.43), PnH 0.34, PtL 0.25 (0.23–0.30), PtW 0.25 (0.22–0.31), PtI 56 (53–59), PeNI 50 (46–58), SPtL 0.11, SPtW 0.23, DPtL 0.14, DPtW 0.27 (0.21–0.32), GS1L 0.40 (0.36–0.44), GS1W 0.52 (0.50–0.55), GS2L 0.47 (0.46–0.50), GS2W 0.52 (0.50–0.53).

Small sized *Hypoponera* (TL 1.50–2.00 mm). Color yellow-brown. Body overall shiny. Mandibles shiny. Median portion of clypeus projecting anteriorly, resembling a bulb or bulge. Eyes small with one to five ommatidia. Antennal scapes falling short of posterolateral border of the head; funicular segments with dense suberect hairs; funicular segments 2–6 gently increasing apically in width and height; segment 7 dramatically increasing in height, segments 7–10 forming a distinct five segmented club. Frontal portion of head shiny, lacking dense suberect hairs, sides and dorsum of head with dense suberect hairs. Medial portion of head with slight concavity. Promesonotal suture distinct,

promesopleural suture distinct, mesopropodeal suture distinct, mesopropopleural suture distinct. Propodeum dorsum slightly declining posteriorly; posterior face meeting dorsal face at rounded angle. Pleural sides of mesosoma shiny. Dorsum of mesosoma with appressed hairs, scattered short suberect to erect hairs. Spiracle small. Metapleural gland bulb apparent. Legs shiny with few appressed hairs. Petiole short quadrate, anterior and posterior faces nearly parallel; evenly and gently converging dorsally. Dorsum of petiole nearly equal in width to base in profile; subpetiolar process forming small lobe. In dorsal aspect, petiole rectangular in shape. Dorsum of gaster with abundant, dense pubescence; hair length increasing to maximum length on segments 6 and 7, erect hairs few on first few segments, more dense and longer on segments 6 and 7.

### **Gyne.**

**Description.** Tan to light brown. Body overall shiny and reflective, with numerous appressed hairs. Mandibles triangular, shiny, like that of workers. Antennae lighter in color than rest of body, light yellow in coloration. Scape barely or failing to reach posterior border of head. Scape gradually expanding apically. Funicular segments 3–7 about equal in length and width, each consecutive segment increasing in size. Terminal four segments enlarged into club. Head quadrate (CI 77–86); posterior border with slight concavity. Three ocelli present; large compound eyes 5–10 partially fused ommatidia. Head covered with appressed white-grey, short hairs. Hair densely covering head. Mesosoma profile incised at promesonotal and mesometanotal suture. Pronotum and scutum of mesosoma broad. Pronotum rounded anteriorly, posterior border slightly concave when view dorsally; scutum quadrate. Mesosoma in lateral view with anterior oblique suture present. Anterior point of suture traversing pleuron and failing ventrally posteriorly. Dorsal surface of propodeum angled ventrally at junction of posterior face. Posterior face parallel to petiole, not sloping or angled. Dorsal surface of mesosoma with appressed white-grey hairs, with few scattered erect hairs. Pleural regions with appressed hairs, pleuron of propodeum with less hair. Petiole quadrate, apex of petiole rounded. Basal lateral portion of petiole lacking hairs, density of hairs increases dorsally. Dorsal surface of petiole with few erect hairs. Postpetiolar process present. Gaster similar to that of worker but larger in proportion to overall body.

Gaster with numerous appressed white hairs, terminal segments with long suberect-decumbent hairs, gaster shiny.

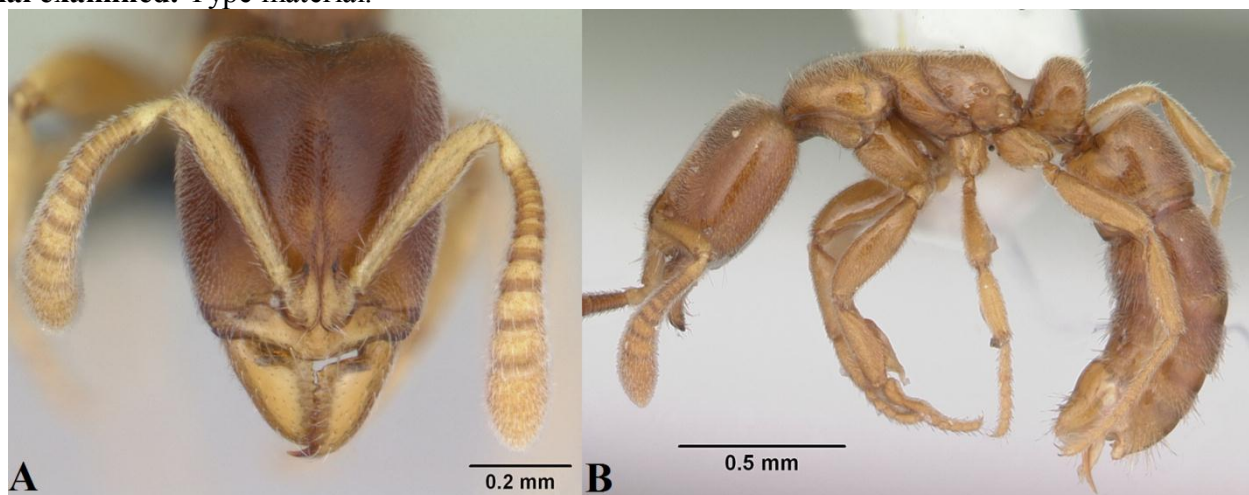
**Etymology.** A combination of the Latin *punctum* for small hole, prick, and *issimus* as an adjectival superlative, in reference to the head sculpturing.

**Discussion.** *Hypoponera punctatissima* belongs to the *punctatissima*-species group. Within the New World this species should not be confused with other species. The shape of the petiole and lack of dense punctuate sculpturing on the shoulders of the pronotum gives the shoulder a reflective shinny quality.

**Natural History.** Found throughout the Florida keys, in mesic areas with accumulated organic matter (Deyrup et al. 1988). Also found throughout the Caribbean islands.

**Distribution.** Pantropic into portions of temperate North American and Europe.

**Material examined.** Type material.



**Figure 74.** *Hypoponera punctatissima* nontype material. Frontal view (A) and lateral habitus (B).

***Hypoponera saroltae* (Forel, 1912) stat. nov. Fig. 75**

*Ponera foeda* r. *saroltae* Forel, 1912: 41. Worker, BRAZIL. [5 specimens examined] (MHNG).

Combination in *Hypoponera*, Kempf, 1972: 122.

**Diagnosis.** The eyes are small (EL 0.03–0.04 mm) with 5–7 fused facets. The scapes fail to reach posterior margin of the head by a length equal to length of first funicular segment or just reaching posterior margin. The base of the scape not as wide as apex; the funiculus without distinct club but

segments gradually increasing in length and width. The head quadrate in frontal view (CI 70–73), lateral margins convex. The head foveo-punctate, dense, punctae spacing subequal ( $\frac{1}{2}$  diameter) to diameter; pilosity appressed these hairs being white-yellow in coloration. The mesosomal profile even, propodeum not below level of mesonotum. Promesonotal suture impressed, mesonotum even with pronotum. The mesonotum is flat when viewed laterally, with the mesonotal-pleural suture present being distinct to faint. The mesometanotal suture obscure. The propodeum dorsum distinct (not tectiform) in dorsal view, dorsum shiny, elute, puncticulate sculpturing present; lateral portion shiny, elute. The petiolar node not squamiform, broadly rectangular process reduced forming lobe anterior and posterior faces gradually converging towards apex, apex rounded. Spiracular process tooth-like; petiolar node shiny, obscure sculpturing

### **Description.**

**Measurements (mm) of type worker. (n=3)** TL 2.57 (2.50–2.60), HL 0.66 (0.64–0.67), HW<sub>2</sub> 0.47, CI 71 (70–73), HS 0.56 (0.56–0.57), EL 0.04 (0.03–0.04), EW 0.04, OMD 0.07, SL 0.43 (0.42–0.45), SI 92 (89–95), ML 0.54 (0.41–0.75), WbL 0.78 (0.74–0.81), PnL 0.36 (0.34–0.38), PnW 0.36, MsL 0.23 (0.22–0.23), MsW 0.27 (0.25–0.28), DF 0.24 (0.23–0.25), PF 0.29 (0.25–0.35), PnH 0.47 (0.43–0.49), PtL 0.34 (0.32–0.35), PtW 0.16 (0.14–0.17), Ptl 46 (40–50), PeNI 43 (40–47), SPtL *obscured by glue*, SPtW *obscured by glue*, DPtL 0.13 (0.11–0.14), DPtW 0.26 (0.25–0.28), GS1L 0.35 (0.31–0.43), GS1W 0.37 (0.33–0.39), GS2L 0.41 (0.39–0.42), GS2W 0.48 (0.46–0.49).

Small (TL 2.50–2.60 mm); yellow-orange in color, integument sublucid. Mandibles (MnL 0.22–0.24 mm, MnL<sub>1</sub> 0.32–0.34 mm) with large apical tooth followed by 3 teeth, remainder of masticatory margin denticulate; outer border lacking concavity; yellow, shiny, lighter in coloration than head. Anterior medial edge of clypeus straight; medial lobe of typical form. Eyes small (EL 0.03–0.04 mm), 5–7 fused facets; ommatidia pale silver; visible in frontal view, eyes situated dorsolaterally, not breaking outline of side of head, close (OMD 0.07 mm) to clypeal border. Antennae yellow, lighter in coloration than head, opaque. Scapes fail to reach posterior margin by length equal to length of first funicular segment or just reaching posterior margin, base not as wide as apex; funiculus without distinct club, segments gradually



increasing. Head quadrate in frontal view (CI 70–73), lateral margins convex; posterior width (HW<sub>3</sub> 0.52–0.57 mm) wider than anterior of head (HW<sub>1</sub> 0.42–0.46 mm); posterior border of the head with distinct concavity. Head foveo-punctate, dense, punctae spacing subequal ( $\frac{1}{2}$  diameter) to diameter; pilosity appressed, white-yellow in coloration. Mesosomal profile even, propodeum not below level of mesonotum. Promesonotal suture impressed, mesonotum even with pronotum. Mesonotum flat; mesonotal-pleural suture present, distinct to faint. Mesopleuron reflective, anterior region nitid, posterior region with shallow punctae. Mesometanotal suture obscure. Propodeum slightly inclined posteriorly, dorsal face meeting posterior face at distinct rounded angle; dorsum distinct (not tectiform) in dorsal view, dorsum shiny, elute, puncticulate sculpturing present; lateral portion shiny, elute, shallowly puncticulate sculpturing present; metapleuron shiny, faintly carinate. Mesosomal dorsum shiny, shallow puncticulate elute sculpturing present with long (0.03–0.04 mm) numerous (10–15) erect hairs, fine appressed gray pubescence present. Petiolar node not squamiform, broadly rectangular (PeNI 40–47); tall, reaching level of propodeal dorsum (PnL 0.34–0.38 mm); anterior and posterior faces gradually converging towards apex, apex rounded. Spiracular process tooth-like; petiolar node shiny, obscure sculpturing; subpetiolar process lacking profenestra or fenestra; process reduced forming lobe; in dorsal view node thin, shiny, obscure sculpturing. Gaster of typical form, constriction with crossribs, sublucid, foveo-punctate.

**Etymology.** Eponymous, *nescio*.

**Discussion.** *Hypoponera saroltae* belongs to the *foeda* -species group. Table 4 provides a comparison between each species and their diagnostic character states. This species is similar in some body dimensions to *H. foeda* (Figs 56AB).

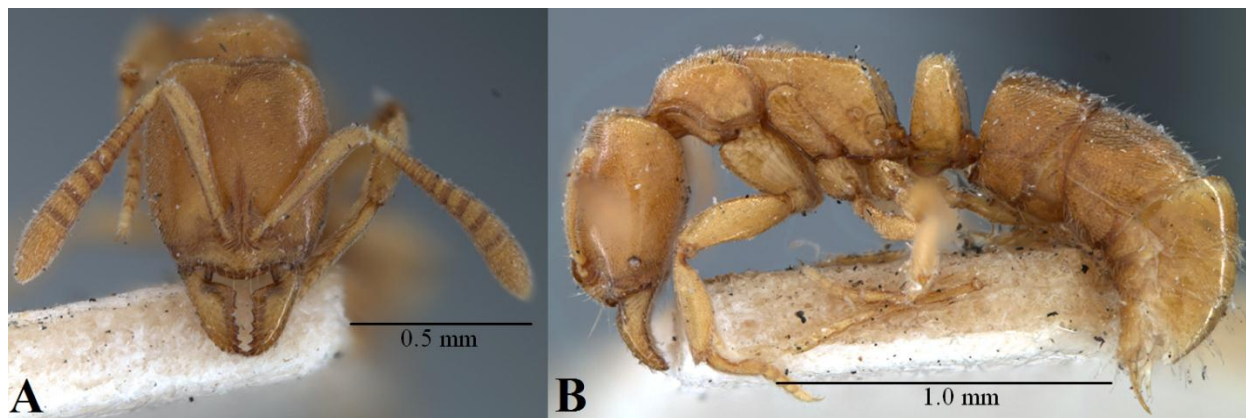
**Natural History.** Unknown.

**Distribution.** Brazil.

**Material examined.**

Type material examined.

Blumeana, St. Catharina Prov. Bresil, Dr. Moeller [I here designated the top specimen to be the lectotype following article 74.1–74.3 of the ICZN. this specimen bares a label designating it as a lectotype] (MHNG).



**Figure 75.** *Hypoponera saroltae* lectotype. Frontal view (A) and lateral habitus (B).

***Hypoponera schmalzi* (Emery, 1896) Fig. 76**

*Ponera schmalzi* Emery, 1896: 57. Worker, BRAZIL Santa Catharina, Joinville [3 specimens examined] (MCSN). Combination in *Hypoponera*, Kempf, 1972: 123.

**Diagnosis.** *Hypoponera schmalzi* is similar to *H. distinguenda*. *Hypoponera schmalzi* can be distinguished because it has deeper punctae on the propodeum than *H. distinguenda*.

**Description.**

**Measurements (mm) of worker. (n=1)** TL 3.95, HL 0.85, HW<sub>2</sub> 0.63, CI 74, HS 74, EL 0.07, EW 0.07, OMD 0.17, SL 0.98, SI 156, ML 1.0, WbL 1.0, PnL *head bent back and over*, PnW 0.45, MsL 0.24, MsW 0.36, DF 0.28, PF 0.42, PnH 0.59, PtL 0.52, PtW 0.24, PtI 46, PeNI 53, SPtL 0.10, SPtW 0.14, DPtL 0.14, DPtW 0.42, GS1L 0.46, GS1W 0.56, GS2L 0.52, GS2W 0.63.

Medium sized (TL 3.95 mm); color red-brown, integument appears opaque. Mandibles with large apical tooth followed by numerous irregular denticles; outer border lacking concavity; red-orange lighter in coloration than head, shiny. Anterior medial edge of clypeus slightly notched; medial lobe of typical form. Eyes large (EL 0.07 mm), 30–33 distinct facets; ommatidia black; visible in frontal view, eyes

situated dorsolaterally, breaking outline of side of head, close (OMD 0.17 mm) to clypeal border. Antennae tan, lighter in coloration than head, opaque. Scapes extend past occipital margin by half of first funicular segment; funiculus without distinct club, gradually increasing. Head quadrate, posterior portion rounded in frontal view (CI 74), lateral margins convex; posterior border of head straight. Head distinctly punctate, dense, punctae edges touch. Fine appressed white-gray pubescence present. Mesosomal profile even. Promesonotal suture slightly impressed, mesonotum even with pronotum. Mesonotum flat, inclined posteriorly; mesonotal-pleural suture present, distinct. Mesopleuron nitid anteriorly, posterior and apical portion punctate. Mesometanotal suture distinct, incised. Propodeum inclined posteriorly, dorsal face meeting posterior face at an angle; dorsum distinct in dorsal view; dorsum sublucid, punctate; lateral portion opaque to sublucid, punctate, rugopunctae on lateral propodeum larger than on dorsum, anterior edge carinate; metapleuron carinate. Mesosoma dorsum opaque, punctate with long (0.01–0.03 mm) numerous (10–14) erect hairs. Petiolar node squamiform (PeNI 53); tall, reaching level of propodeal dorsum; anterior and posterior faces parallel, slightly converging toward apex, apex rounded. Spiracular process reduced; subpetiolar process lacking profenestra and fenestra (SPtL 0.10 mm), anterior portion lobate; in dorsal view node thin, sublucid, punctuate. Gaster of typical form, constriction apparent.

**Etymology.** Named after the collector Signor Schmalz.

**Discussion.** *Hypoconera schmalzi* belongs to the *distinguenda*-species group.

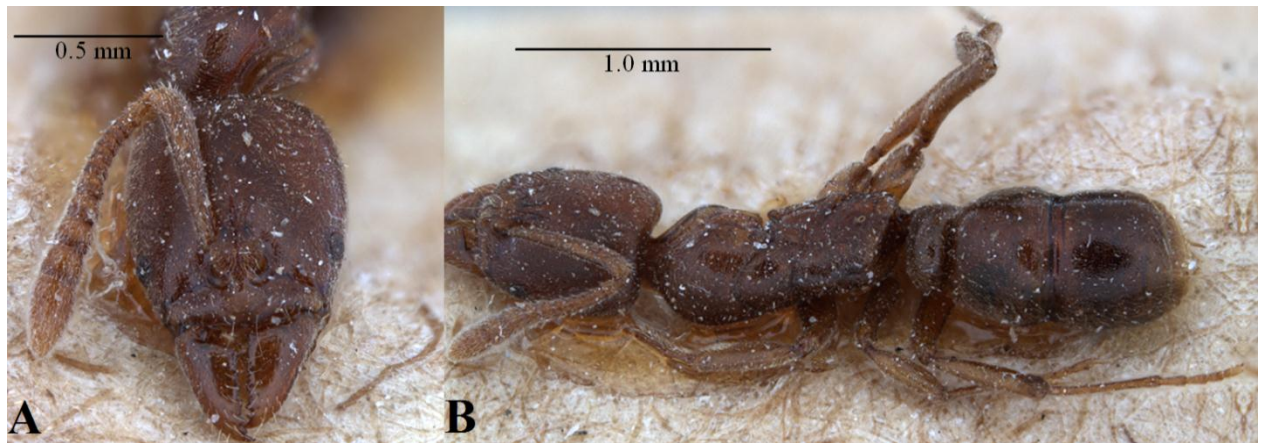
**Natural History.** Unknown.

**Distribution.** Brazil, states of Santa Catarina and São Paulo (Kempf 1972).

**Material examined.**

Type material examined.

[BRAZIL] Santa Catharina, Joinville [3 specimens examined, one specimen on a pin with no other specimens I here designate as the lectotype this specimen bares a label designating it as a lectotype. One pin has two specimens I designate these specimens as paralectotypes, this pins bares a label designating those specimens as paralectotypes.] (MCSN).



**Figure 76.** *Hypoponera schmalzi* lectotype. Frontal view (A) and lateral habitus (B).

*Hypoponera schmalzi paulina* (Forel, 1913) *incertae sedis* Fig. 77

*Ponera schmalzi* var. *paulina* Forel, 1913: 205 (queen and males) BRAZIL São Paulo, Ihering (Schwebel leg.) [2 gynes, 1 male examined] (MHNG). Combination in *Hypoponera*, Kempf, 1972: 123.

**Description.** The following descriptions are based on Forel's (1913) original description.

**Gyne.**

Total length 3.7 mm. Differs from the type of *H. schmalzi* worker by its stronger punctation, less shiny, and by its lighter color, a reddish yellow on the gaster and slightly darker on the head, whereas in the type, on the contrary, the gaster is brown and the head and thorax reddish. The scape precisely reaches the posterior edge of the head. This one is wider posteriorly than the worker, a little concave posteriorly, slightly trapeziform and significantly broader than the thorax. The petiole is shaped as in the preceding species, higher and more attenuated at the top than in the worker type. The wings are strongly tinted brownish and the pubescence is a little stronger on the head and thorax than the type (worker).

**Male.**

Total length 3.2 mm. Mandibles narrow, sharply pointed with a single apical tooth. Head as wide as long, posterior border narrowed in front. Scape two times longer than first segment of funiculus and half as long as wide. Petiole slightly conical but rounded on top, color brown with legs and mandibles of a dirty yellowish. Wings as in the female.

**Etymology.** Eponymous, nescio.

**Discussion.** *Hypoponera* workers are widely agreed to lack or have limited autapomorphic or distinguishing characters. Whereas this is not completely true, a thorough and focused dedication of time to the workers is required to determine species. Currently, the reproductive forms have not been addressed. Resulting from the disparity in characters between workers and reproductive-forms, a detailed and intensive morphological studied is required to plot species limits for gynes, males, and reproductive-intercaste. Such intercastes, limited material, and nominative taxa based on reproductives with no association to workers have wholly retarded an understanding of the alpha taxonomy regarding reproductive-forms. Therefore, a clear treatment of *H. schmalzi paulina* is currently not possible and I have elected to take a conservative approach and place the status as uncertain. Further study is required to resolve *H. schmalzi paulina*'s taxonomic placement. The gyne is smaller than the worker of *H. schmalzi*. As I can think of no known example of poneromorph species with microgynes, a more parsimonious conclusion is that the reproductives are either valid taxa or the gyne and male of an already described species, but not *H. schmalzi*.

**Natural History.** Unknown.

**Distribution.** Known only from type locality.

**Material Examined.** Type material.



**Figure 77.** *Hypoponera schmalzi paulina* Type-material. Gyne and male in copula (A).

*Hypoponera stoica* (Santschi, 1912) Fig. 78

*Ponera stoica* Santschi, 1912: 522 description of worker. Uruguay [1 specimen examined] (NHMB). Combination in *Hypoponera*, Kempf 1972: 124.

**Diagnosis.** Table 4 provides a comparison between each species and their diagnostic character states.

**Description.**

**Measurements (mm) of worker. (n=1)** TL 2.7, HL 0.72, HW<sub>2</sub> 0.57, CI 79, HS 0.65, EL 0.03, EW 0.03, OMD 0.14, SL 0.50, SI 88, ML 0.62, WbL 0.75, PnL 0.39, PnW 0.42, MsL 0.21, MsW 0.31, DF 0.36, PF 0.36, PnH 0.43, PtL 0.14, PtW 0.21, PtI 108, PeNI 0.50, SPtL 0.11, SPtW 0.11, DPtL 0.16, DPtW 0.25, GS1L 0.35, GS1W 0.41, GS2L 0.37, GS2W 0.47.

Yellow-tan in coloration. Mandibles light-yellow, long, shiny. Clypeus yellow, lighter than body. Median portion of clypeus not greatly extended or swollen. Eye small, consisting of 1 ommatidium (OMD 0.14 mm). Eyes lateral. Scapes reach but do not surpass the posterior border of head. Funicular segments gradually increase in size, not forming a distinct club. Scapes and funiculus with short, subdecumbent-decumbent pubescence. Frontal lobes barely covering antennae insertions. Head nitid, with punctulate sculpturing. Pronotum lighter yellow than rest of mesosoma, punctulate, with dense appressed pubescence. Mesonotum in dorsal view rectangular-ovate. Mesonotal-pleural suture distinct. Mesopleural-propodeal suture distinct in lateral view. In anteroposterior view, area with suture raised to carinae. Propodeum tectiform in dorsal view. Dorsal face of propodeum declining posteriorly, meeting posterior face smoothly, not forming a sharp (distinct) angle. Mesosoma covered with appressed short pubescence. Petiole broadly scale-like. Anterior and posterior sides slightly converging dorsally. Apex slightly narrower than base. Short appressed-decumbent pubescence on apex. Lower anterior face with a dorsally directed, small flange. Subpetiolar process small, lobate. Postpetiolar process rounded, broad. Gastric constriction distinct, pubescence on gaster dense.

**Female.**

**Description.** Similar in overall form to worker. Yellow to yellow-orange. Mandibles long, narrow, punctulate, lighter yellow than head. Clypeus brown-yellow, median bulb not distinct, punctulate. Eyes large, with 25–27 ommatidia. Ocelli prominent. Frontal lobes small, covering antennae insertions,

covered with appressed pubescence. Scape surpassing posterior border of head by amount equal to or half of first funicular segment. Funicular segments 2–5 about equal in size, segment 5 slightly longer, remaining segments gradually increasing in length and width. Median furrow present, reaching to lower ocellus. Posterior border flat, slightly concave at midline. Pronotum roughly subquadrate in lateral view. Pronotum narrowed in dorsal view, domed anteriorly. Distinct pronotal-mesopleural and mesometapleural sutures. Mesopleuron with faint pleural suture. Scutellum smooth, shiny, with numerous small faint punctures. Scutellum small, square. Metanotum small, thin. Dorsal face of propodeum slightly domed, meeting posterior face smoothly, not forming a sharp or distinct angle. Posterior face of propodeum flat, nearly vertical. Petiole scale-like, more so than in worker. Anterior and posterior faces strongly converging dorsally. Anterior base with small spiracular horn. Subpetiolar process with rounded anterior lobe, posterior portion thin, giving overall appearance of pot with handle. Postpetiolar process broadly rounded. Gaster with dense appressed pubescence.

**Etymology.** Greek *stoic*, of or relating to stoicism.

**Discussion.** *Hypoponera stoica* belongs to the *foeda* -species group.

**Natural History.** Unknown.

**Distribution.** The type specimen viewed was comprised of just a gaster. The description was based on another specimen determined by Santschi in 1920.

**Material examined.** Type material examined.

Uruguay, Colonie Nueva, Helvecia, Mme. Von Steiger here designated holotype by monotypy this specimen bears a label designating it as a holotype.





**Figure 78.** *Hypoponera stoica* holotype. Frontal view (A) and lateral habitus (B).

***Hypoponera subsarissa* sp. novo Fig. 79**

**Diagnosis.** This species is a small sized (TL 2.50 mm) *Hypoponera*. *Hypoponera subsarissa* can be readily identified by examining the shape of the head, length of the scapes, size of the eyes, mesosomal profile, sculpturing and petiolar morphology. The head has a roundish appearance, with the sides being convex giving the head a rounded or squarish appearance and all of the head is covered with foveo-punctate sculpturing. The scapes surpass the posterior margin of the head by an amount equal to at least the first three funicular segments. The eyes are small with only 5 partially fused ommatidia which are hard to discern from background sculpturing. The mesosomal profile is uneven and the mesometanotal suture is impressed, making the propodeum below the level of the mesonotum. The mesonotum is tilted and slopes posteriorly. The mesosoma is deeply sculptured with dense punctae, and the punctae are deeper, larger and more irregularly shaped on the dorsum and apical lateral portions of the propodeum. The petiolar node is thin both in lateral and dorsal view and the subpetiolar process is shallow with a posteriorly directed spine on the anterior margin.

**Description.**

**Measurements (mm) of worker. (n=2)** TL 2.56, HL 0.67, HW<sub>2</sub> 0.50, CI 74, EL0.04, EW 0.04, OMD 0.15, SL 0.58, ML 0.78, WbL 0.93, PnL 0.32, PnW 0.35, MsL 0.27, MsW 0.23, DF 0.22, PF 0.35, HF 0.63, PnH 0.45, PtW 0.10, SPtL 0.05, SPtW 0.11, DPtL 0.71, DPtW 0.63, GS1L 0.39, GS1W 0.53, GS2L 0.39, GS2W 0.49.



Small (TL 2.56 mm), red-brown to brown in coloration, body reflective. Mandibles (MnL 0.21 mm, MnL<sub>1</sub> 0.32 mm) with large apical tooth followed by reduced denticles; outer border lacking concavity; yellow, lighter in coloration than head, reflective. Anterior medial edge of clypeus straight, medial lobe of typical form. Eyes small (EL 0.04 mm), slightly longer than wide, five partially fused facets, ommatidia black, visible in frontal view, eyes situated dorsally, not breaking outline of side of head, far (OMD 0.15 mm) from clypeal border. Frontal lobes (FLW 0.18 mm) with dense appressed pilosity, densely punctate. Scapes extend past occipital margin by amount greater than first three funicular segments, base as wide as apex; suberect, erect, appressed pilosity present, shallow punctulate sculpturing, lighter in color than head, appearing tan; funiculus without distinct club, segments gradually increasing in width and length for length of funiculus; appressed with scattered decumbent pilosity, shallow punctae, distance between punctae subequal to diameter. Head squarish in frontal view (CI 74), lateral margins convex, distinctly rounded; posterior width (HW<sub>3</sub> 0.53 mm) slightly wider than anterior of head (HW<sub>1</sub> 0.47 mm). Head foveo-punctate, dense, punctae subequal to diameter, becoming more dense medially; pilosity appressed, suberect, white-gray in coloration. Mesosomal profile uneven, propodeum distinctly below level of mesonotum. Promesonotal suture distinct slightly impressed, mesonotum even pronotum. Mesonotum convex in profile, inclined posteriorly; mesonotal-pleural suture present, feeble, obscured by sculpturing. Mesopleuron shiny punctate to punctulate becoming less dense and glabrous antero-laterally, carinate along posterior margin; mesometapleural carinae visible but obscured by sculpturing. Mesometanotal suture faint, incised. Propodeum inclined posteriorly, slightly convex, dorsal face meeting posterior face at a broadly rounded angle, dorsal face shorter than posterior face (DF 0.21 mm, PF 0.35 mm); in dorsal view sides broadly converging, dorsum not forming a thin narrow ridge (DFW 0.88 mm); dorsum opaque reflective, foveo-punctate, punctae become less deep and wide laterally; lateral portion shiny foveo-punctate becoming dilute with less shallower punctae, punctulate near metapleural junction; metapleuron rugose with fine carinae. Mesosoma dorsum shiny and reflective to more opaque on pro and mesonotum, punctate to punctulate with long numerous scattered suberect pilosity with appressed pubescence on promesonotum. Petiolar node squamiform thin (PtW 0.11 mm, PeNI 115, DPel 67); tall reaching level of propodeal dorsum (PNL 0.42 mm); anterior

and posterior faces straight converging slightly towards apex, apex rounded. Spiracular process reduced, lobe-like; petiolar node nitid puncticulate; subpetiolar process reduced forming short lobe (SPtL 0.05 mm), anterior portion with distinct ventrally projected spine (length 0.03 mm), subpetiolar process weakly rounded posteriorly; in dorsal view node thin about equal in width to propodeum, nitid puncticulate. Gaster of typical form, constriction weak, shiny nitid puncticulate, small pits diameter nearly equal to pilosity arising from them.

**Etymology.** *Subsarissa* is derived from the Latin terms, *sub* for under and *sarissa* for pike alluding to the anterior subpetiolar projection.

**Discussion.** *Hypoponera subsarissa* belongs to the *trigona*-species group. The holotype is deposited in the MCZC and the paratypes are deposited in the MCZC. Eight specimens from Brazil (specimens in MCZC) have been included in the material examined but differ from the majority of the specimens from Trinidad. These Brazilian specimens have shallower punctae on the head, and fewer and less dense punctae on the pleuron of the mesosoma. Additionally, the specimens differ from the Trinidadian material in that they lack any anterior projection on the subpetiolar process. I have included them as *H. subsarissa* yet this variation could be dissimilar enough to warrant a distinct species. However, the extent of character state variation is not documented thoroughly and is noted here to aid in future research.

*Hypoponera subsarissa* is similar in appearance to *H. trigona* and *H. creola*. It is similar to *H. trigona* based on basic appearance, however *H. trigona* has less dense and pronounced foveo-punctate sculpturing on the propodeum and the mesosomal profile of *H. trigona* is even, that is the propodeum is not below the level of the mesonotum. The scapes are also slightly shorter in *H. trigona* and only surpass the posterior margin by an amount equal to the first funicular segment. Both *H. trigona* and *H. creola* lack an anterior, ventrally-directed spine on the subpetiolar process. *Hypoponera creola* may be confused with *H. subsarissa* as both have small eyes, thin petiolar nodes and the propodeum below the level of the mesonotum. However, they can be distinguished by the amount and density of sculpturing. The dorsum of the propodeum of *H. creola* is shorter than posterior face and is broadly rounded, meeting the posterior face in a gradually rounded junction. *Hypoponera subsarissa* is similar in

appearance to *H. foreli* and *H. impartergum* however is smaller (TL 2.56 mm compared to TL 4.0–4.1 mm in *H. foreli* and TL 4.1–4.3 mm in *H. impartergum*) in addition the subpetiolar process has an anterior flange that is directed ventrally this structure is absent in *H. foreli* and *H. impartergum*.

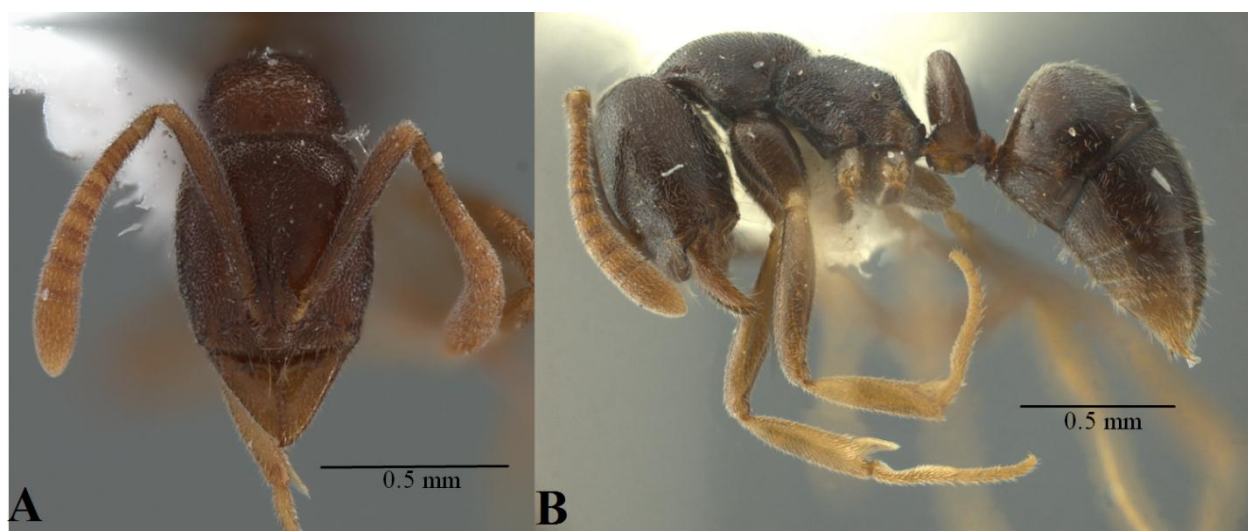
**Natural History.** Unknown

**Distribution.** Venezuela, Trinidad and Brazil.

**Material examined.**

Type material examined.

Holotype material: VENEZUELA. Bolivar, 16-x-1998, W. Mackay, pitfall trap, trap 2, 111909 (MCZC)



**Figure 79.** *Hypoponera subsarissa* holotype. Frontal view (A) and lateral habitus (B).

***Hypoponera transiens*** (Santschi, 1925) stat. nov. Fig. 80

*Ponera fiebrigi* var. *transiens* Santschi, 1925: 155. worker, ARGENTINA. [3 specimens examined] (NHMB). Combination in *Hypoponera*, Kempf, 1972: 122.

**Diagnosis.** *Hypoponera transiens* is a small, yellow to pale-yellow species. The outer border of the mandibles lack concavity and the mandibles have three apical teeth. The remainder of the masticatory border has denticles. The eyes are small and consist of only one ommatidium that is located close to the posterior border of the clypeus. The head in frontal view is quadrate (CI 71). The sculpturing on the head is densely foveo-punctate. In lateral view the mesosoma is even and the promesonotal and the

mesometanotal sutures are not incised. The mesometanotal suture is faint to distinct in appearance. The mesopleuron is reflective.

### **Description.**

**Measurements (mm) of worker. (n=1)** TL 2.3, HL 0.62, HW<sub>2</sub> 0.44, CI 71, HS 0.52, EL 0.03, EW 0.03, OMD 0.05, SL 0.50, SI 114, ML 0.61, WbL 0.75, PnL 0.37, PnW 0.42, MsL 0.20, MsW 0.31, DF 0.24, PF 0.36, PnH 0.39, PtL 0.13, PtW 0.19, PtI 114, PeNI 0.45, DPtL 0.14, DPtW 0.21, SPtL 0.10, SPtW 0.11, GS1L 0.30, GS1W 0.38, GS2L 0.31, GS2W 0.41.

Small (TL 2.3 mm); color pale-yellow to yellow, integument sublucid. Mandibles (MnL<sub>1</sub> 0.30 mm) with 3 large apical teeth followed by numerous denticles; outer border lacking concavity; yellow, lighter in coloration than head; opaque, sublucid. Anterior medial edge of clypeus straight; medial lobe of typical form. Eyes small (EL 0.03 mm), comprised of 1 pale yellow ommatidium; visible in frontal view, eyes situated dorsolaterally, not breaking outline of side of head, close (OMD 0.05 mm) to clypeal border. Antennae yellow, slightly lighter or similar in coloration to head. Scapes fail to reach occipital margin by length equal to half of first funicular segment or just reaching, base as wide as apex; funiculus with poorly defined club, indistinct club segments gradually increasing in size, club segments longer than preceding funicular segments. Head quadrate in frontal view (CI 71), lateral margins convex; posterior width (HW<sub>3</sub> 0.49 mm) wider than anterior of head (HW<sub>1</sub> 0.41 mm); posterior border of head with slight concavity. Head foveo-punctate, dense punctae, spaces subequal to diameter; pilosity appressed, few erect hairs, white-yellow in coloration. Mesosomal profile even. Promesonotal suture not impressed, mesonotum even with pronotum. Mesonotum flat; mesonotal-pleural suture present, feeble (hard to see). Mesopleuron reflective, sublucid, faintly punctuate. Mesometanotal suture distinct to faint. Propodeum slightly inclined posteriorly, dorsal face meeting posterior face at angle, dorsum distinct in dorsal view (DF 0.24 mm); dorsum sublucid, shallow depressions, punctate; lateral portion sublucid, punctate, with shallow, faint depressions; metapleuron sublucid with elute sculpturing, carinate. Mesosoma dorsum sublucid, punctate, elute with scattered (3–13) erect short hairs longer than appressed pubescence. Petiolar node subquadrate, broad (PeNI 0.45, PDI 45); tall, reaching level of propodeal dorsum (PtL 0.13 mm); anterior and posterior faces parallel to slightly converging towards apex, apex rounded.

Spiracular process distinctly tooth-like, sublucid, obscure shallowly punctuate; subpetiolar process forming distinct lobe (SPtL 0.10 mm), anterior portion lobate; node broad in dorsal view, sublucid, obscure, shallowly punctate. Gaster of typical form sublucid, fovea-punctuate.

**Etymology.** Latin, meaning to pass over.

**Discussion.** *Hypoponera transiens* belongs to the *foeda* -species group. *Hypoponera transiens* is very similar to *H. saroltae*. *Hypoponera transiens* can be distinguished because of smaller eyes composed of only 1 facet. *Hypoponera transiens* is smaller than *H. saroltae* (Table 4). Both of these species are very similar and may represent a single species. More material is needed to explore the variation of these taxa. Table 4 provides a comparison between each species and their diagnostic character states

The length of the scape is variable but does not surpass the posterior border of the head in all specimens.

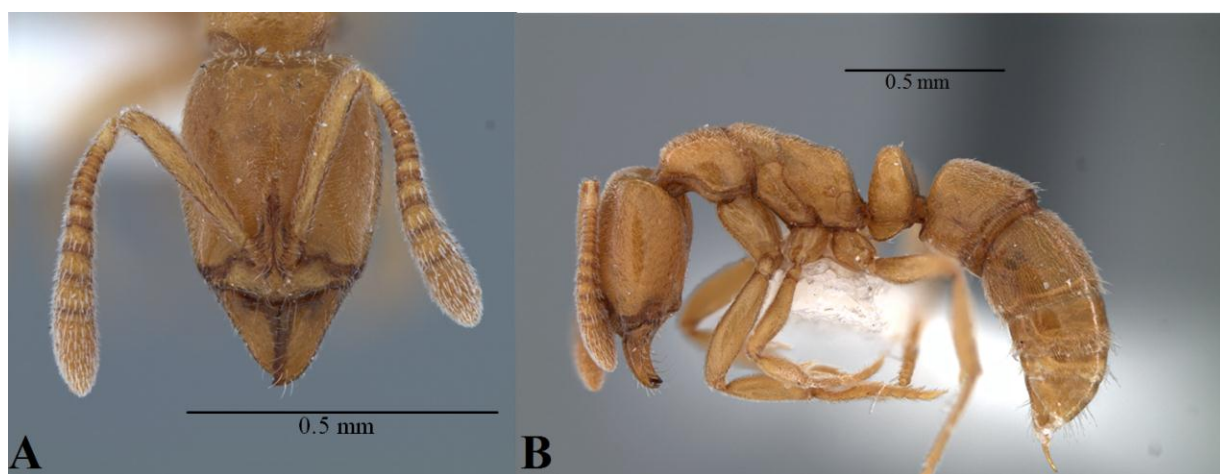
**Natural History.** Unknown.

**Distribution.** Argentina.

**Material examined.**

Type material examined.

[ARGENTINA] Alta Gracia (Bruch) [3 specimens examined I here designated the specimen on the middle (the second) flag as the lectotype following article 74.1-74.3 of the ICZN, this specimen bares a label designating it as a lectotype] (NHMB).



**Figure 80.** *Hypoponera transiens* lectotype. Frontal view (A) and lateral habitus (B).

***Hypoponera trigona*** (Mayr, 1887) Fig. 81

*Ponera punctatissima* var. *trigona* Mayr 1887; 537 Type worker and queen, BRAZIL: St. Catharina [5 specimens examined] (NHMW). Combination in *P. (Hypoponera)*: Santschi, 1938: 79; in *Hypoponera*: Taylor, 1968: 65. Subspecies of *confinis*: Emery, 1895: 64. Raised to species: Forel, 1893: 364; Emery, 1911: 92; Gallardo, 1918: 80.

*Ponera distinguenda* subsp. *vana* Forel, 1909: 245. Types worker, GUATEMALA: [examined] (MHNG). Combination in *Hypoponera*, Kempf, 1972. syn. n.

*Ponera trigona* var. *cauta* Forel, 1912: 56: 40. Type worker, BRAZIL: Rio de Janeiro, Tresopolis, Colonia Alpina [examined] (MHNG). Combination in *Hypoponera* Kempf, 1972. syn. n.

*Ponera collegiana* Santschi, 1925: 64: 5-20. Types Worker, BRASIL: Passa Quatro, Minas Gerais [examined] (NHBM). Combination in *Ponera (Hypoponera)* Santschi, 1938. Combination in *Hypoponera* Kempf, 1972. syn. n.

*Ponera collegiana* var. *paranensis* Santschi, 1925: 64, 9. Types worker (2), BRASIL: Parana Rio Negro [examined] (NHBM). Combination in *Hypoponera* Kempf, 1972. syn. n.

**Diagnosis.** The worker is a medium size species (TL 3.5 mm), that is variable in coloration, ranging from brown to brown with red coloration laterally to most commonly black. The eyes are small with 3–4 partially fused facets. The scapes surpass the posterior margin of the head by an amount equal to the length of at least half the length of the first funicular segment. The promesonotal and mesometanotal sutures are indistinct and not greatly incised, and are normally not incised at all. There are numerous (15–25) erect hairs present on the dorsum of the mesosoma. The dorsal and upper lateral faces of the propodeum have distinct rugo-punctate sculpturing. The petiolar node is scale-like with the anterior and posterior faces converging apically.

**Description.**

**Measurements (mm) of worker. (n=1)** TL 3.5, HL0.67, HW<sub>2</sub> 0.50, CI 74, EL 0.05, EW 0.04, OMD 0.15, SL 0.58, ML 0.78, WbL 0.93, PnL 0.32, PnW 0.35, MsL 0.27, MsW 0.23, DF 0.22, PF 0.35, HF 0.63, PnH 0.45, PtW 0.11, SPtL 0.08, SPtW 0.11, DPtL 0.71, DPtW 0.63, GS1L 0.39, GS1W 0.53, GS2L 0.39, GS2W 0.48.

Medium sized (TL 3.5 mm), coloration variable from brown, black to piceous. Mandibles smooth with few piligerous punctures; apical tooth prominent, 9–11 smaller irregular denticles present. Eyes small, 3–4 poorly defined ommatidia. Scapes surpass posterolateral border of head by at least length of first funicular segment, funicular segments 2–4 about equally broad as long, gently increasing in width distally, forming gradual club, segments 4–11 gently increasing in size to apex; antenna covered in dense appressed hairs. Head covered with appressed hairs, dorsum of head covered in dense hairs. Mesosoma even and continuous; pronotum flat; promesonotal suture distinct, not incised; mesometanotal pleural suture faint, not incised or forming groove; propodeum even with mesonotum. Dorsopropodeum not sloping posteriorly, equal in length to posterior face, posterior face steeply angled but nearly parallel to petiole. Dorsum of mesosoma with numerous (15–25) erect hairs scattered, dense appressed pubescence present. Sides of mesosoma, especially mesopleuron shiny. Dorsolateral surfaces with weak sculpturing. Legs lighter in color than mesosoma, rather shiny, with appressed, decumbent and suberect hairs. Petiole scale-like, basal portion wider than apex. Lateral faces in profile converge dorsally, forming narrow and rounded apex. Subpetiolar process rounded; in dorsal view petiole wider than broad. Gaster of typical form; dorsal surface with dense appressed hairs with numerous erect and suberect hairs gaster shiny.

**Etymology.** Greek *trigonos* meaning triangular in reference to the shape of the petiolar node.

**Discussion.** *Hypoponera trigona* belongs to the *trigona*-species group. *Hypoponera trigona* is most likely to be confused with *H. opacior*, *H. pampana*, *H. viri* and *H. creola*. These species can be separated by the following comparative character states: profile of the mesosoma, sculpturing of the dorsum and sides of the propodeum, and petiolar node thickness. In *H. trigona* the dorsum and lateral portion of the propodeum has rugo-punctate sculpturing whereas in *H. pampana*, *H. opacior*, *H. viri* and *H. creola* the punctae are smaller and do not form a rugo-punctate sculpturing pattern. *Hypoponera*

*trigona*, *H. viri*, and *H. opacior* can be separated from *H. creola* and *H. pampana* as the latter both have uneven profiles in lateral view, meaning the promesonotal suture is incised and the mesometanotal junction forms a groove (groove more developed in *H. creola*); in contrast the mesonotum and dorsum of the propodeum are straight and there is not a groove formed in *H. opacior* and *H. trigona*. The development of the promesonotal suture is variable in *H. trigona* and *H. opacior* but never forms a deep groove as in *H. creola*. The dorsum of the mesosoma in *H. trigona* has numerous (10–23) erect hairs whereas in *H. creola*, *H. pampana*, *H. viri* (with some shorter erect hairs) and *H. opacior* there are limited erect hairs over the dorsum of the mesosoma. *Hypoponera viri* has less overall sculpturing and is more reflective than *H. trigona*. *Hypoponera viri* may also be separated from *H. trigona* as the petiolar node is more strongly converging apically and shorter than in *H. trigona*. See *H. opacior* discussion for further details.

Lectotype worker: Brazil, Santa Catarina designated by Kempf (1962). I have synonymized *H. distinguenda vana* with *H. trigona*, based on similarities between the two taxa. However, there is less developed sculpturing on the propodeum when compared to the types. *Hypoponera trigona* has been reported from across the New World tropics. *Hypoponera trigona*'s distribution is from Costa Rica south into Argentina. However, *Hypoponera trigona* is very different from the once recognized subspecies of *Hypoponera opacior*. This latter species is widely distributed but reports of *Hypoponera trigona* north of Brazil should be taken with caution as these may represent *H. opacior* (Kempf 1962, Longino 2004).

**Natural History.** Unknown.

**Distribution.** Costa Rica south to Brazil, south including Bolivia, Paraguay, and Argentina.

**Material examined.** Type material examined

Lectotype. [BRAZIL]: Santa Catarina, G. Mayr (8 workers) [NHMW];

Nontype material examined.

PARAGUAY: Itapua, San Benito, 29-x-1982, V. Mahnert (1 worker) [AWC].





**Figure 81.** *Hypoponera trigona* nontype specimen. Frontal view (A) and lateral habitus (B).

***Hypoponera vernacula* (Kempf, 1962) Fig. 82**

*Ponera vernacula* Kempf 1962: 13, figs. 13 & 16, paratype worker, BRAZIL: Sao Paulo, Serra da Cantareira mountains (W. W. Kempf and Vitor dos Santos leg) [examined] (MCZC). Combination in *Hypoponera* Kempf, 1972: 124.

**Diagnosis.** *Hypoponera vernacula* can be distinguished based on its size (TL 4.6 mm), scapes which surpass the posterior border of the head, large eyes (41–43 ommatidia), peculiar stair-like mesosomal profile, development of rugulose-punctate sculpturing on the dorsum of the promesonotum and dense punctae on the dorsopropodeum.

**Description.**

**Measurements (mm) of holotype worker (from Kempf 1962).** TL 4.6, HL 1.07, HW<sub>2</sub> 0.88, CI 82, SL 0.91, ML 1.49, PnW 0.67, PnH 0.57, PtW 0.28.

**Measurements (mm) of paratype worker (n=1).** TL 4.5, HL 1.1, HW<sub>2</sub> 0.85, CI 77, OMD 0.25, SL 0.90, SI 105, ML 1.4, WbL 1.7, PnW *obscured by glue*, PnL 0.55, MsL 0.32, MsW 0.31, DF 0.48, PF 0.50, PnH 0.69, PtW 0.28, PtI 56, PeNI 64, DPtW 0.25, DPtL 0.18.

From Kempf (1962). “Dark ferruginous-red; head and appendages slightly lighter in color. Mandibles dorsally smooth and shining, punctae small, appressed pubescence arising from punctae; laterally superficially punctate; chewing (=masticatory margin) border with approximately 8 larger triangular

teeth, between the basal teeth there are minute intercalary denticles. Clypeus oblique in side view; anterior border convex in the middle; standing hairs few on clypeus. Frontal lobes 0.24 mm wide at their maximum expansion, lateral margins punctate. Frontal sulcus reaching back to beyond posterior orbit of eyes. Scape finely punctate yet quite shining, its tip surpassing in repose the occipital border by  $1\frac{1}{2}$  times its maximum thickness, by amount equal to the first funicular segments, funicular segments I, VII-XI longer than broad, II-VI scarcely longer than broad to somewhat transverse, gradual club. Eyes relatively very large with about 8 ommatidia across the greatest diameter, 41–43 total ommatidia, outer marginal ommatidia same color as head, OMD 0.25; eyes clearly visible in frontal view, less lateral than other species. Sides of head gently convex, more constricted in front than behind; occipital border not excised. Dorsum of head subopaque, sharply and densely punctured; sculpture becoming superficial on sides, fading completely on disc of gular face which is highly shining and smooth. Head densely punctulate, punctae set close together, touching. Few standing hairs on anterior border of gula. Hairs scarce and shorter on vertex of head, basal half of dorsum of scape, none on cheeks. Promesonotum conspicuously convex in both directions. Antero-inferior corners of pronotum broadly rounded. Promesonotal suture impressed. Mesonotum almost as broad as long, distinctly bulging, with well delimited and impressed anterior, posterior and lateral borders;” anterior edge higher than posterior edge in profile. “Mesoepinotal constriction pronounced both in profile and as seen from above.” Mesometapleural suture distinct forming thin carinae, nearly reaching mesonotum. In profile propodeum below the level of promesonotum, stair-like. “Basal face of epinotum (= propodeum) transversely convex, not forming a narrow longitudinal ridge; lateral borders of declivous face bluntly marginate,” sides of propodeum converging dorsally but, not distinctly tectiform. Dorsal face of propodeum gently inclined posterior, meeting posteropropodeum in a rounded angle. “Epinotal spiracle (= propodeal spiracle) oval, facing obliquely caudad. Entire thorax (= mesonotum), with the exception of the highly polished and smooth declivous (=dorsal) face, densely rugulose-punctate and subopaque; mesopleuron shinier due to vanishing sculpture on disc.” Mesopleural propodeal pleuron with fine striae crossing over the mesometapleural carinae. “Bottom of posterior portion of sides of thorax with fine horizontal striulae” from spiracle to base of metapleuron. Dorsum of mesosoma densely sculptured; abundant short

(0.09) hairs. Legs finely and superficially punctate, shining. Face of fore coxae, base of flexor face of fore femora with standing long hairs. Petiole rather stout, reticulate-rugose and punctate, sculpture fading becoming shining towards anterior and posteropropodeum. Anterior face vertical below, oblique above, posteropropodeum flat. Antero-basal tooth (= subspiracular process) prominent. Subpetiolar process rounded. Gaster strongly constricted between first and second segments. Tergites I and II dorsally strong, laterally more superficially reticulate-rugulose and punctate; subopaque above, shinier on sides. Stridulatory file on acrotergite II well-developed. Sternites superficially punctate and quite shining. Hair rather abundant but short on dorsum of petiole and gaster. Pubescence golden-brown, less conspicuous on head than on rest of body and appendages, never concealing the integument. Border of frontal lobes conspicuously ciliate.”

**Etymology.** From Latin *vernula* meaning a slave or jester, nescio. In Kempf (1962) no explanation was given for epithet used.

**Discussion.** *Hypoconera vernacula* belongs to the *foreli* -species group. This species is similar in appearance to *H. leninei*, *H. idelettae* and *H. foreli*. *Hypoconera vernacula* can be distinguished from *H. foreli* and *H. idelettae* by the shape of petiolar node. In *H. vernacular* the petiolar node is stout and rectangular with the anterior and posteropropodeums nearly parallel (though the anterior face may bulge), whereas in *H. foreli* and *H. idelettae* the node is scale-like, with the anterior and posteropropodeums converging towards the apex in lateral view. *Hypoconera vernacular* also has larger, conspicuous eyes compared to the smaller eyes of *H. foreli* and *H. idelettae*. Kempf (1962) noted when comparing *H. vernacula* to *H. foreli* that the “funicular segments II-IV not conspicuously longer than broad, propodeum not gable-shape (tectiform), the basal face not reduced to a narrow longitudinal ridge, sides of head and gula without oblique hairs, pubescence less conspicuous.” “The differences from *idelettae* are the following: longer scape, coarser sculpture of body, pronounced gastric constriction, abundant short and erect hairs on dorsum of thorax petiolar node and on gaster” (Kempf 1962). *Hypoconera leninei* is very similar in overall appearance to *H. vernacula*. The profile of *H. vernacula* has a pronounced difference between the promesonotum and propodeum, it distinctly off-set and stair-like whereas in *H. leninei* the propodeum is below the mesonotum but not to the degree as

expressed in the former. The eye of *H. vernacula* is larger with 41–46 distinct ommatidia compared to *H. leninei* which has 8–11 partially fused ommatidia. I do not know how stable this character state is within the context of the specimen from Paraguay.

A specimen photograph on Antweb (<http://www.antweb.org/description.do?subfamily=ponerinae&genus=hypoponera&name=alw12&rank=species&project=worldants>) is listed as *Hypoponera* alw12 but this specimen is in fact *H. vernacula*. This specimen is nearly identical to the paratype I have examined, however the eye is much smaller. This could be explained as the material used for the type series were ergatogynes and the specimen from Paraguay is a worker.

**Natural History.** Kempf and Santos (1962) found a single nest found in a decaying log.

**Distribution.** Brazil at Serra da Cantareira mountains near Sao Paulo and Paraguay.

**Material examined.** PARAGUAY: Concepcion, Arrojo Azotey Cororo, 09-x-1979 C. Dlouhy [Virtual examination see discussion].



**Figure 82.** *Hypoponera vernacula* paratype. Frontal view (A). Lateral habitus (B).

*Hypoponera viri* (Santschi, 1923) Fig. 83

*Ponera viri* Santschi, 1923: 247, worker BRAZIL: St. Catarina, Blumenau, Reichensperger [2 specimens examined] (NHMB). Combination in *Hypoponera*, Kempf, 1972: 124.

**Diagnosis.** *Hypoponera viri* is a medium sized species with yellow-tan to yellow-brown coloration. The eyes are small consisting of 2–4 facets (EL 0.02 mm). The scapes are thick and are expanded toward the apex. The scapes surpass the posterior margin of the head. In lateral view the dorsum of the mesosoma is even and lacks distinct incised promesonotal and mesometanotal sutures. The mesosoma dorsum is mostly lacking erect hairs, but a few short scattered erect hairs may be present. The petiolar node is thin and distinctly converging apically. The node is short and does not reach or barely reaches the level of the propodeum.

**Description.**

**Measurements (mm) of type series workers. (n=2)** TL 2.8–2.9, HL 0.67–0.68, HW<sub>2</sub> 0.50, CI 74–75, HS 0.59, EL 0.02, EW 0.02, OMD 0.10–0.11, SL 0.50, SI, ML 0.67–0.71, WbL 0.89, PnL 0.36, PnW 0.39–0.42, MsL 0.21, MsW 0.28, DF 0.23–0.24, PF 0.32, PnH 0.43 [n=1], PtL 0.32–0.33, PtW 0.14, PtI 43–76, PeNI 33–35, DPtL 0.07–0.09, DPtW 0.25–0.28, SPtL 0.08 [n=1], SPtW 0.11 [n=1], GS1L 0.36–0.39, GS1W 0.46 [n=1], GS2L 0.39, GS2W 0.50–0.53.

Medium size (TL 2.8–2.9 mm) yellow-brownish in coloration. Mandibles triangular slightly lighter yellow than body. Mandibles (MnL 0.22–0.24 mm, MnL<sub>1</sub> 0.32–0.34 mm) with large apical tooth followed by 3 teeth on remainder of masticatory margin; outer border lacking concavity; yellow, lighter in coloration than head, sublucid. Clypeus pale yellow, lighter than head and body, anterior margin straight. Eyes small, 2–4 distinct facets; dorsolateral; visible but not breaking outline of head; far from mandibular edge (OMD 0.10–0.11 mm, OMD<sub>1</sub> 0.11–0.14 mm). Antennae yellow, lighter than head and body; scapes thick, apex distinctly thicker than base; barely surpassing posterior border of head by an amount equal to half of length of first funicular segment; scape covered in appressed pubescence. Club present, funicular segments 2–6 small, about equal in size, slightly enlarging in length apically, segments 7–10 forming gradual club. Head quadrate; sides convex; posterior slightly flat, at most slightly concave. Head punctulate, with short appressed pubescence, sublucid. Pronotum with

puncticulate sculpturing. Mesosomal profile straight, with slight impression at promesonotal and mesometanotal sutures. Mesonotum even with pronotum. Mesonotum slightly rounded in profile; mesonotal-pleural suture present, distinct; mesopleuron with elute puncticulate sculpturing. Mesometanotal suture present, slightly incised. Mesonotum rounded anteriorly, lateral portion short, angled posteriorly in dorsal view. In lateral view dorsopropodeum flat, gradually sloping posteriorly, meeting posterior face in a smooth rounded angle, not forming a sharp angle; posterior face of propodeum nearly vertical, sloping slightly posteriorly from dorsal face. Dorsopropodeum puncticulate, becoming elute on sides; metapleuron with faint costulate sculpturing. Mesosoma dorsum with numerous shallow punctae. Pilosity dense, appressed pubescence, numerous (10–18) short erect hairs present. Petiole thin, scale-like, anterior and posterior faces not strongly converging dorsally; apex rounded; short not reaching or just reaching dorsum of propodeum; spiracular process forming a small reduced lobe. Subpetiolar process rounded, lobate, anterior portion rounded, posterior face forming a sharp angle, raised dorsally at angle; subpetiolar process lacking fenestra or depressions. Petiole narrow in dorsal view. Gaster constriction distinct. Gastric segments puncticulate, dense appressed posteriorly directed pubescence.

**Etymology.** Eponymous.

**Discussion.** *Hypoponera viri* belongs to the *trigona*-species group. *Hypoponera viri* is very similar in appearance to *H. opacior*, the two species may be distinguished based on coloration and petiole shape. *Hypoponera viri* is yellow-brown in color whereas the coloration is brown to dark brown in *H. opacior*. The petiolar node is thinner and more strongly converging apically in *H. viri* in comparison to *H. opacior*. *Hypoponera viri* is also similar to *H. creola*, *H. pampana*, and *H. trigona*. In *H. trigona* the dorsum and lateral portion of the propodeum has rugo-punctate sculpturing whereas in *H. viri* the sculpturing is puncticulate and does not form a rugo-punctate sculpturing pattern. *Hypoponera viri* may also be separated from *H. trigona* by the petiolar node, which is more strongly converging apically and shorter in *H. viri* than in *H. trigona*. *H. viri* can be separated from *H. creola* and *H. pampana* as the latter species both have uneven profiles in lateral view, meaning that the promesonotal suture is incised

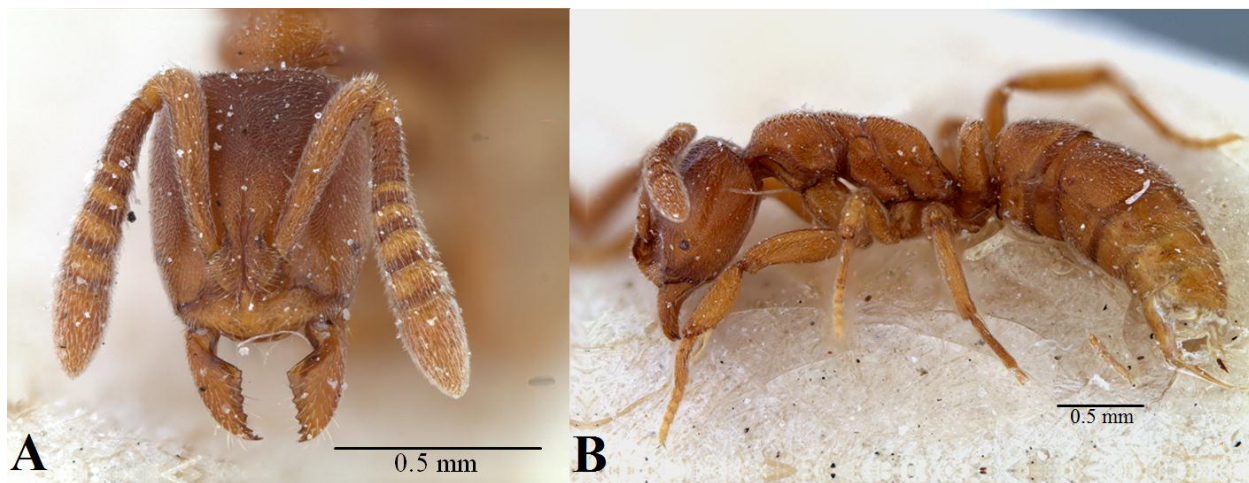
and the mesometanotal junction forms a groove (groove more developed in *H. creola*). *Hypoponera viri* has less overall sculpturing, is lighter in coloration, and is more reflective than *H. trigona*.

**Natural History.** Santschi (1923) reports that Reichensperger found these specimens with termites.

**Distribution.** Known only from type locality of St. Catharina, Blumenau, Brazil.

**Material examined.** Type material examined.

[BRAZIL]St. Catarina, Blumenau, Reichensperger [2 specimens on same pine I here designated the top specimen to be the lectotype following article 74.1-74.3 of the ICZN this pin bares a label designating the top specimen as a lectotype] (NHMB).



**Figure 83.** *Hypoponera viri* lectotype. Frontal view (A) and lateral habitus (B).

## Chapter 4: Conclusions

A fundamental endeavor in biological research is documenting the biodiversity of the planet. As Sharkey (2001) observed, contrary to popular belief, the oldest profession of humans is taxonomy. He cites the bible as stating in Genesis 4:14 that God presented to man the duty of naming all the “beasts of the land, all the fish of the sea, and the birds in the sky.” This naming tradition continued for thousands of years. During the past 246 years (since Linnaeus 1758) taxonomy has become a well-defined science. Even if one does not have a theological obligation toward taxonomy and biodiversity, the fact remains that we are living during a mass extinction and there is a serious need to document species richness (Wilson 2000). To complicate the already immense task, Wilson (2000) noted that there are few expert taxonomists and even fewer new taxonomists entering the field. Limitations in taxonomic research restrict studies of systematics and ecology, as well as conservation efforts. Taxonomy is the foundation for more advanced studies and programs monitoring biodiversity (Wilson 2000). Estimates project that less than ten percent of the species on earth have been described, with less than one percent having more than just a description (Wilson 2005).

The goals of taxonomy are to propose classification, present a hierarchy, construct trees, and suggest and resolve nomenclature within an evolutionary context (Podani 2009). But a series declined in taxonomist is being felt across phyla, Agnarsson and Kuntner (2007), suggest a evolution from classic practices to more intergraded studies are required to contine th goals of taxonomy. To address these tasks two major points need to be addressed: 1) what is the species concept used and 2) what criteria are utilized to evaluate species limits (Wheeler and Meier 2000, de Queiroz 2005 and references therein). One objective of an alpha taxonomist is to determine species boundaries and explore species richness (Mayr and Ashlock 1991). No matter what criteria are used to delimit species, the results allow the documentation of species diversity (Gotelli et al. 2010) and the resulting components of biological study (Fig. 84). The importance of resolving taxonomic conflict or uncertainty comes in its

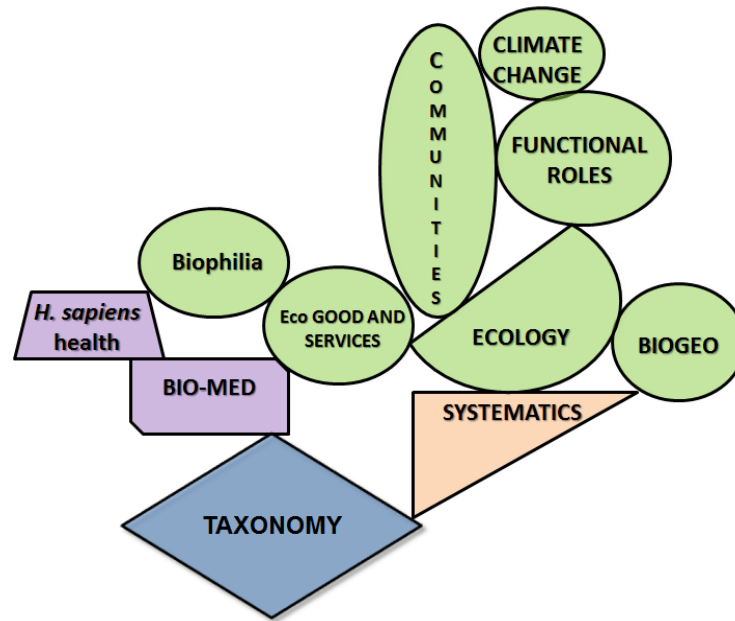


ability to liberate future research in natural history, conservation (Pierre et al. 2008, Cameron 2010, Meyer et al. 2011) and other areas of evolution and ecology (Wilson 2000, 2005, Agnarsson and Kuntner 2007).

Currently the majority of described species have been based solely on morphological details (Wilson 2000, 2005, Wheeler 2005, Blaxter et al. 2005). However, diagnosis and evaluating species boundaries can be done through an examination of characters that fall into four major categories (Mayr and Ashlock 1991, Watson 2005). Characters may be placed in the following classes: morphological (e.g. external/internal appearances), biogeographic (e.g. distributions, habitat selection), behavioral (e.g. niche partitioning, reproductive courtship), and molecular (e.g. genomic sequences and karyotyping) (Simpson 1961, Mayr and Ashlock 1991, Watson 2005, Song and Bucheli 2010). Taxonomic techniques such as the use of molecular characters can help discriminate between cryptic species, especially when one species is ubiquitous whereas the other is in decline. This can be seen in the two English bumblebee species *Bombus ruderalis* and *Bombus hortorum* (Ellis et al. 2006). Molecular methods are also able to link larvae to adults, as in beetles (Caterino and Tishechkin 2006) and can be used to discover new species (Pons et al. 2006, Witt et al. 2006). Each new technique in taxonomy allows the documentation of more species and promotes the movement toward understanding species limits.

Mayr and Ashlock (1991) and Hillis (1988) composed an ontology of the advancement of taxonomic practices. The origin is a typological phase which has not been influenced by the NeoDarwinian movement that resulted in numerous subspecies and varieties, inflating the number of described taxa. This initial phase is followed a post-new synthesis phase; the biological species phase in which the previous taxa are reevaluated and frequently a number of synonymies are made and potentially new species proposed. The final stage in the development of a taxonomic assessment for a group is the phylogenetic phase; when sibling or cryptic species are resolved and new species are

discovered (especially if molecular techniques are used). *Hypoponera* can be considered to be in the biological species phase.



**Figure 84.** The fundamental relationship of taxonomy to various components of biology. Human health=*Homo sapiens* health, biomedical research such as pharmaceutical or bioprospecting, Biogeo=Biogeography, Eco good and services=ecosystems goods and services (such as brown food webs), Functional roles=functional groups, guilds and species interactions.

Please note that I did not have the goal of finding new species in this study. I have employed the biological species concept (as outlined in the methods), even though alpha taxonomic works such as this frequently use the morphological species concept. Such studies, however, also usually use distributional patterns or other components of natural history (Winston 1999). I interpret the morphological species concept as a modification of the biological species concept, i.e. unique (discontinuous) morphological, ecological, or biogeographical characters represent separate lineages (de Queiroz 2005). Disparity of continuous character states suggests an absence of gene flow and therefore such breaks observed in sympatric “species” indicate non-interbreeding lineages or valid species. When clear differentiation is not possible within the context of preexisting species, those specimens are treated as conspecifics of

other known species. This conservative approach guided the designation of novel material. New species were designated only when a suite of diagnostic characters (morphology, behavior or biogeography) distinctly different from other known species was apparent. It is possible that the uniqueness of character suites may be the product of mutation and represent aberrant forms; however I have elected to designate new species from singular specimens that can be further tested for validity in the future. I view species as a hypothesis of unique evolutionary lineages. Moreover, a number of species are known only from partial remains (dinosaurs and other ancient fossilized life forms), sequence data (bacteria and viruses), or from singular specimens. For example, both *Opisthoteuthis chathamensis* (roughy umbrella octopus, O'Shea 1998) and *Opisthoteuthis mero* (Mero's umbrella octopus, O'Shea 1998) were originally described from a single specimen, but additional specimens were discovered after its designation. Additionally, *Protomycena electra* (a fungus in amber, Hibbett et al. 1997), *Chodsigoa salenskii* (Salenski's Shrew, [http://www.edgeofexistence.org/mammals/species\\_info.php?id=61](http://www.edgeofexistence.org/mammals/species_info.php?id=61)), and *Dysmorodrepanis munroi*, (Lāna'i Hookbill, Snetsinger et al. 1998) are all known from a single specimen. While not ideal, it is not an uncommon taxonomic practice to name new species based on limited specimens. Also, considering that we are living during the 6<sup>th</sup> great extinction (Wilson 2000, 2005) some understanding must be given to the documentation of biodiversity. Ideally, before a new species was named all the life stages would be documented, its genome (or at least portions) sequenced, habitat and climatic preferences mapped, distributions documented, and all castes, sexes, and gene-expressions (such as in various instars of sphinx moths) plotted. However, some latitude must be given to taxonomic experts. I am not suggesting that we haphazardly name every variation and let the future sort out the valid taxa, but through expert deduction, evidence (albeit limited) and peer reviewed acceptance new species may be designated without support from all of the scenarios listed above. Taxonomic indexing, an emerging field of bioinformatics rely heavily on expertise of taxonomist

(Patterson et al. 2006), but without resolution of complex taxa or documentation of new species the potential of such new fields may not be realized.

When discussing *Hypoponera*, most myrmecologists wince at the thought of species identification. Dr. Phil Ward noted that *Hypoponera* is “remarkably featureless” and Dr. Longino agreed that the genus is “monotonously uniform in habitus” (Longino 2004). Summing up the collective feelings of contemporary myrmecologists regarding the taxonomy of *Hypoponera*, Dr. Lattke remarked “if one wants to identify some [*Hypoponera*], they should light up a candle and pray to their favorite deity” (Lattke 2003). Evidence of this long standing reputation for *Hypoponera* can be collected from the species names as well as the name of the genus itself, *Hypo* (Greek) for less than, or under and *poneros* (Greek) meaning worthless, bad, or wicked. Santschi (1938) perhaps chose this name in reference to the less developed metanotal groove when compared to that of *Ponera*. However, Santschi could have been a sage, foreseeing the difficulty of the group. I suggest a new interpretation of the Greek composition of *Hypoponera* and create the following common name: “little wicked ants.” In reviewing just a few of the species of *Hypoponera* a similar sentiment from an early taxonomist is discovered: *H. opacior*-derived from: to shade, obscure, *H. inexpedita*- derived from: confused, *H. perplexa*- derived from: confused, entangled, and *H. foeda*- derived from: foul or cruel.

This dissertation represents an ongoing project to revise the New World *Hypoponera*. The aim of my research was to address *Hypoponera* systematics: 1) Does the current taxonomy actually reflect species richness of *Hypoponera*? Addressing taxonomic and systematic trends of *Hypoponera* is fundamental to myrmecology. At the start of this research *Hypoponera* was represented in the New World by 53 taxa (Table 1). The current taxonomy is represented by 47 taxa (refer to status of *Hypoponera*). All but one trinomen has been addressed. *Hypoponera schmalzi paulina* remains because this species is based on reproductive forms and its status is unclear (for full explanation see species profile). The status of four additional taxa remains uncertain because of an inability to examine type material. I have described nine

new species within the context of this work. I have nearly 60 more unique morphospecies that will greatly increase the species richness for the New World. A large percentage of the species in the New World are known only from single specimens or from the type series to insure reference to these specimens Appendix B provides digital micrographs of type material.

Comments on characters that delimitate species of New World *Hypoponera* are required as a number of character states may be confused based on interpretive error. I have included digital micrographs to aid in interpretation of character states (found in Appendix A), for example what I define as scale-like compared to quadrate. My desire is to provide a standard for my application and view of features as a foil for other taxonomists. Characters that are important for species limits include: color, anterior clypeal margin, scape length, eyes parameters, mesosomal profile, development of sutures, including if they are clearly defined, incised, or deep, the petiolar node shape, subspiracular process development, subpetiolar process, and presence or absence of a fenestra or depression. Although color is influenced by age of the specimen, maturity of the specimen (callow individuals), diet and habitat; color in a general sense frequently separates specimens into discrete groups. The anterior margin of the clypeus being expanded or with a medial notch is a useful character as it is only found in a few taxa (mostly larger taxa, but this may be an artifact of scope magnification). Eye size is a useful character for separating species but is somewhat problematic. Given the widespread occurrence of intercastes, the differences in eye size may be a result of ergatoid gynes. Such concerns must be extended to other useful characters of the eyes such as eye position on the head and the ocular mandibular distance. However, the position of the eye relative to the posterior border of the clypeus (ranging from close to far) is somewhat stable and eye size does not greatly affect relative position. Additionally, the number of facets and the distinctiveness of the facets is an important character but this can also be influenced by intercastes. The antennae are useful for the separation of species in that the length of the scape is stable within species and is useful for species separation. The presence of a club and club development also

delimits species. The shape of the head (either quadrate or elongate) is frequently hard to judge and is greatly influenced by the lateral margins. When the margins of the head are convex or straight the head may appear more quadrate or elongate, respectively. The development of mesosomal sutures is useful to discriminate species yet interpretation of the sutures is frequently difficult and is dependent on lighting and magnification. The incision of the mesometanotal suture is constant in some species but is variable within other species, however in when examining a long series a relative view regarding the incision or groove can be interpreted. The dorsopropodeum in dorsal view frequently provides a view of the pleural regions in which nearly all species converge dorsally. Therefore, judging if the dorsopropodeum has a distinct dorsum or is tectiform is also subject to interpretive error. When the sides distinctly and prominently converge, forming a thin dorsum or ridge, the condition is considered to be tectiform. However, there is gradation between character states. The characters of the petiolar node are also frequently confused and some measure of experience examining long series of material is required. Interpretation of the petiolar node shape can be difficult because it may be scale-like, subtriangular, quadrate, or the anterior and posterior faces may distinctly converge, giving it a scale-like appearance. The width of the node may vary but when the sides converge the petiole should not be considered quadrate. The subspiracular process is often hard to see when the petiolar node is not perpendicular to the propodeum. There is some variation within species due to the development of the node. The subpetiolar process has limited variation within species but does vary greatly between species, and two character states have been proposed. It may be quadrate, where the process is short, the anterior face is parallel to the posterior face and the ventral face is flat or nearly so. In contrast, the process may be lobate where the anterior face is expanded, convex and curving with the ventral face meeting the posterior face in a rounded lobe. The development of a fenestra or depression can be viewed as stable, the features are present or absent but not semi-developed. For the features described above there are some stable characters that vary little within species but greatly between species. However, as more

material is examined for larger geographic areas this variation may stabilize or be seen within species. Additional informative characters are pilosity, pubescence and sculpturing. Some other characters that should be explored for useful species level discrimination are characters of the mouth parts although these are hard to evaluate, and subpetiolar sculpturing and pilosity (the majority of material has glue over the subpetiolar process making characters nearly impossible to investigate for most species). Additionally, examination of ventral characters of the mesosoma may yield characters, but requires removal of the legs.

Using virtual media to explore holdings of remote museums and identifying and placing names on specimens is currently being completed. Specimens from Antweb (<http://www.antweb.org/>), Bug guide (<http://bugguide.net/node/view/15740>), The Ants of Costa Rica (<http://academic.evergreen.edu/projects/ants/AntsofCostaRica.html> Longino), and The Ants of Cachoeira Nature Reserve in Brazil (<http://www.ants-cachoeira.net/Home%26News/news.html>) have already been connected with identification information. A number of these sites have completed ecological studies and the compiling of ecological data is in progress. By working with Encyclopedia of Life (<http://www.eol.org/>) and Discover Life (<http://www.discoverlife.org/20/q?search=Formicidae>), portions of my dissertation are being incorporated into those sites. I have also generated a photographic record of the majority of types (Appendix B).

In addition to disseminating information on these platforms an effort to examine biogeographical patterns is being pursued in conjunction with Benoit Guenard of North Carolina State University and Israel Del Toro of the University of Massachusetts, Amherst. The information that has been compiled regarding species distribution is as follows. The New World *Hypoponera* are found mostly in tropical and subtropical climates. Some species such as *H. punctatissima*, *H. opaciceps*, and *H. pampana* have been collected in temperate regions. *Hypoponera punctatissima* even reaches Massachusetts (Harvard Forest, pers. comm. A. Ellison). Species documented in both North and South America include: *H.*

*distinguenda*, *H. opaciceps*, *H. pampana*, *H. parva*, *H. punctatissima*, and *H. trigona*. Given current sampling and examination of material there appears to be two distinct faunal assemblages: 1) Central American and 2) South America. The Central American assemblage contains the following species: *H. creola*, *H. distinguenda*, *H. fallax*, *H. foeda*, *H. inexorata*, *H. nemsisea*, *H. nitidula*, *H. opaciceps*, *H. opacior*, *H. pampana*, *H. parva*, *H. trigona*, and *H. punctatissima*. The South American assemblage is comprised of the following species: *H. agilis*, *H. aliena*, *H. antoniensis*, *H. apateae*, *H. capilosa*, *H. clavatula*, *H. corruptela*, *H. coveri*, *H. distinguenda*, *H. famini*, *H. foreli*, *H. idelettae*, *H. iheringi*, *H. ignigera*, *H. inexpedita*, *H. leninei*, *H. leveillei*, *H. nemsisea*, *H. opaciceps*, *H. pampana*, *H. parva*, *H. perplexa*, *H. promontorium*, *H. punctatissima*, *H. saroltae*, *H. schmalzi*, *H. stoica*, *H. subsarissa*, *H. transiens*, *H. trigona*, *H. vernacula*, and *H. viri*. The species found in the Caribbean (*H. distinguenda*, *H. foeda*, *H. opaciceps*, *H. opacior*, *H. pampana*, *H. punctatissima*, *H. trigona*, *H. subsarissa*, and a few undescribed species) and the Nearctic (*H. foeda*, *H. inexorata*, *H. opaciceps*, *H. opacior*, *H. pampana*, *H. parva*, *H. punctatissima*, and *H. trigona*) are comprised of mostly invasive widespread species. The Caribbean fauna is influenced mostly by species from the South American assemblage. I suggest that the Nearctic is comprised of species that colonized from the Central American assemblage with some species found in the southwest and southeast (e.g., *H. parva* [Texas], and *H. inexorata* [which is across the southwest and southeast into Mexico but not in the Caribbean]) and those species (e.g., *H. foeda*, *H. trigona*, and *H. pampana*) that invaded Florida from the Caribbean and expanded their ranges. The species of *H. punctatissima*, *H. opaciceps*, and *H. opacior* may have invaded via either route or from South America. Schmidt (2009) concluded that *Hypoconera* had an old world origin because the sister taxa are limited to the Ethiopian, Malagasy, and Australasian zoogeographic regions. Given Schmidt's (2009) 65 myo and Moreau et al. (2006) 90 myo lineage branch for *Hypoconera*, these regions and the subsequent regions were separated. These results may be considered puzzling as *Hypoconera* have limited dispersal capabilities. A number of species do not have mating flights and engage in mating



within the nest, and those species that fly tend to be poor fliers (M. Deyrup and L. Davis pers. comm.). The majority of the species (at least in the New World) have been found in hypogenic situations. Species that are noted to be mostly hypogenic tend to have limited dispersal motifs and limited ranges (Hölldobler and Wilson. 1990 and references therein, McGlynn 1999, Fitzpatrick et al. 2006) As noted before, a few species are considered tramp-species and are widely distributed. However, these species distributions have been influenced by anthropomorphic practices such as ship's ballast and the ornamental plant trade. After colonizing new areas, *Hypoponera* may have been able to go through successful radiation events; Fisher (2003) suggested that on Madagascar *Hypoponera* show high levels of adaptive radiation. Yet, the fact that the genus is recorded from the Nearctic, Neotropical, Afrotropical, Malagasy, Palearctic, Indomalaya, Australian, and Oceania bioregions despite their limited dispersal capabilities suggests an earlier date of origin than provided by Schmidt (2009) and Moreau et al. (2006). However, this logic may be flawed since being poor dispersers may be a derived trait or a consequence of a cryptic (hypogenic) lifestyle.

Ants, perhaps more so than many other organisms, are strongly influenced by abiotic factors, which are in a state of flux because of climate change. Climatic dynamics influence colony ecology (e.g., colony development, alate production, foraging rates, colony life span, maturation, thermodynamics, homeostasis, and response to changes in abiotic factors) (Lach et al. 2010). *Hypoponera* has limited distributions in the temperate regions of the Nearctic and Palearctic. For example *H. punctatissima* is limited in the Palearctic region to disturbed and anthropogenic habitats of high temperatures (Seifert 2003). Because *Hypoponera* requires warm temperatures (temperature restricted ranges) for colony life, the genus may prove useful as a metric for assessing the effects of climate change by investigating if distributions are expanding.

One emerging field in myrmecology is ant conservation (Alonso 2010). Alonso (2010) presents criteria for identifying species of conservation concern: rare and endemic, dependent on other species,

major influence on communities, and a phylogenetically distinct or old lineage. These criteria can be applied to *Hypoponera* as the majority of species are known only from their type locality. In addition, *Hypoponera* are dominant components of leaf litter communities, play integral roles in brown food webs, and can be viewed as keystone species. All of these factors make *Hypoponera* of practical conservation interest. Understanding, monitoring, and conserving biodiversity is dependent on repeated inventories and monitoring species interactions (Dunn 2005). As mentioned previously, *Hypoponera* are one of the top 10 (and often within the top 5) ant genera collected in Neotropical regions (Ward 2000, Wetterer and Wetterer 2004, LaPolla et al. 2007). Since *Hypoponera* is a major component of ant assemblages and is commonly found in biodiversity inventories my research plays a major role in addressing conservation of Neotropical ant fauna because it begins to document distribution and resolve the taxonomy of numerous taxa. Systematics provides a path for understanding and addressing conservation issues with documentation of biodiversity and lineage history (Pierre et al. 2008, Commeron 2010, Meyer et al. 2011) Without correct identifications, threatened or vulnerable species populations and distributions may be vastly overestimated, potentially considered common and never given conservation status. This taxonomic impediment is a challenge but for *Hypoponera* a foundation has been laid that will facilitate future work by parataxonomists, ecologists, policy makers and other conservation biologists (Dunn 2005, 2008 Alonso 2010). Additionally, providing a useful framework for the New World *Hypoponera* plays another important role in conservation in the form of biosecurity, i.e. identifying potentially non-native or invasive species (Lach and Hooper-Bui 2010).

To explore the potential of new species I examined three unit trays from the CWEM (Costa Rica and Bolivia) and material sent to me from a study (Wilkie et al. 2009) conducted at the Tiputini Biodiversity Station in Western Amazonian Ecuador, each with 30 specimens were selected arbitrarily. I examined all 90 specimens and placed them into known species or separated those that could not

currently be placed in any taxa. An average of 46% of specimens could not be assigned to a known taxa and this discovery potential is a consistent feature when examining loaned material.

Species richness is potentially much higher than what is suggested in this work. Deriving this assessment required exploration of diagnostic characters. *Hypoponera* workers are widely agreed to lack or have limited autapomorphic or distinguishing characters (Schmidt 2009, Longino 2010, Bolton and Fisher 2011). I have focused on the workers of *Hypoponera* (as the majority of ant taxonomy is based on the worker caste) and briefly addressed the reproductive forms. This approach results from the disparity in diagnostic characters between the workers and reproductive forms. I am confident that an additional study of the male terminalia will resolve some uncertainty of species limits (Song and Bucheli 2010). A detailed and intensive morphological study is required to plot species limits for gynes, males, and reproductive intercastes. The examination of gynes and males is out of the scope of the current study citing limited material of reproductive forms and because those that I do possess do not have associated workers; making an adequate understanding of useful characters and resolution of the alpha taxonomy regarding reproductive forms not possible. Though the reproductive forms were not addressed and a number of undescribed taxa exist, this research establishes the foundation of New World *Hypoponera* taxonomy and allows for more detailed systematic studies. In the future, documentation and description of novel taxa is needed. Additionally, a detailed examination of the sibling species complex of *Hypoponera pampana* in the United States is required. This complex is likely a number of very similar species with notable variation, however, limited specimens have not allowed for an analysis. Also, a lack of specimens and large amount of variation within the species of *H. parva* and *H. distinguenda* allowed for only a limited analysis. More specimens from across the ranges of these two species are needed to plot and explore patterns of variation.

Areas that still need directed research efforts for New World *Hypoponera* include: natural history, molecular sequence documentation, and addressing the status of *incertae sedis* taxa. As

previously outlined, little information on the natural history or autecology of *Hypoponera* species has been compiled. A synthesis of more material into an ecological character matrix is currently being developed and will record parameters such as elevation ranges, habitat preferences, nesting sites, reproductive flight time, and other natural history particularities. In addition to treating the undescribed taxa, additional specimens of recognized taxa are needed to tease apart issues of character variation (especially in *H. distinguenda*, *H. pampana*, *H. parva*, and *H. viri*). A focused study on the phylogenetic status of the genus is also badly needed (see Appendix A).

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## Appendix A

### Results of PAUP\* Analysis

#### BACKGROUND

I have proposed a quasi-stable alpha taxonomy which may provide a context for the inevitable discovery of new species. A more detailed investigation of species-groups and analyses of phylogenetic relationships is the next logical step for *Hypoponera*. Recent molecular phylogenetic reconstructions appear to support *Hypoponera* as a monophyletic lineage within the Ponerinae (Brady et al. 2006, Moreau et al. 2006, Ouellette et al. 2006, Schmidt 2009). These studies utilized one or a combination of the following genes: mtDNA *cox1* (Moreau et al. 2006, Schmidt 2009), 18S rRNA (Brady et al. 2006, Moreau et al. 2006, Schmidt 2009), 28S rRNA (Brady et al. 2006, Moreau et al. 2006, Ouellette et al. 2006, Schmidt 2009), nDNA wingless, nDNA abdominal A (Brady et al. 2006, Moreau et al. 2006, Schmidt 2009), nDNA longwave rhodopsin (Brady et al. 2006, Moreau et al. 2006, Schmidt 2009), and CAD (Schmidt 2009). Some studies indicate that *Hypoponera* is a sister group to a clade that contains *Cryptopone*, *Pachycondyla* and *Diacamma* (Moreau et al. 2006). On the contrary, Brady et al. (2006) and Schmidt (2009) suggest *Hypoponera* forms a sister relationship with a clade containing *Centromyrmex*, *Psalidomyrmex*, *Loboconera* and *Plectroctena*. Varying tree topologies among studies indicate that relationships are not resolved, which may be a result of limited taxon sampling, or the amount and types of available molecular data. Moreau et al. (2006) used one species, *H. inexorata*, whereas Brady et al. (2006) and Schmidt (2009) used *H. opacior* (which I suspect is actually *H. pampana*) and *H. sakalava*. Schmidt (2009) also used three undescribed species from Madagascar. Trees generated by Schmidt (2009) and Brady et al. (2006) display long branch lengths for *Hypoconera* indicating either long divergence time, rapid molecular evolution, or an artifact of limited taxon sampling with a large data set for few taxa (Bergsten 2005).

The relationship between *Hypoconera* and other genera of the Ponerini still needs to be resolved.

Morphological characters that separate allied taxa can provide some insight on phylogenetic

relationships, yet they are limited. *Pachycondyla* and *Cryptopone* are very similar to *Hypoponera* yet were previously separated on the basis of having two metatibial spurs (Schmidt 2009, Bolton and Fisher 2011). Bolton and Fisher (2011) noted that some species of Afrotropical *Pachycondyla* lack a tibial spur but may be separated from *Hypoponera* by a palpal formula of 3:3 instead of 1:1, 1:2. *Ponera* and *Hypoponera* in molecular reconstructions are never within the same clade or close clades, indicating that while they are phenetically extremely similar, they are not closely related. Schmidt (2009) suggested that Ponerini is a paraphyletic tribe, with *Ponera* found within one clade and *Hypoponera* found within the other paraphyletic lineage. As *Ponera* is not basal to *Hypoponera* and is in a distinct lineage deciphering the character evolution for the fenestra is not simply answered by a plesiomorphic explanation. The hypothesis that some features such as the fenestra are plesiomorphic is not resolved. The relative relationship of *Ponera* and *Hypoponera* in respect to other Ponerini genera or poneromorph genera suggests that some morphological features such as the fenestra are likely results of parallelisms or plesiomorphic. Character evolution for *Hypoponera* has been suggested to be reductive (Schmidt 2009) following an evolutionary response to the natural selective pressures (Brown and Wilson 1956, Barluenga et al. 2006) of a cryptic life style. *Hypoponera* displays a predicted set of character displacements based on observed themes of selective outcomes across cryptobiotic ants (Hölldobler and Wilson 1990). Detailed morphometric studies of the genus are needed but are severely limited by a lack of characters (Ahrens and Ribera 2009) of *Hypoponera* workers. Taxa with limited characters impose serious constraints on resolution of character evolution (Kim et al. 2010). The next step needed to analyze character evolution is to use a combination of morphometric data and new genetic information to correlate features such as fenestra development, reduction of eye size and number of facets of the eye with a reduction in body size.

The former idea of *Ponera* being easily separated based on a fenestra and posteriorly directed teeth must be examined closely. A number of *Hypoponera* species have a fenestra or poorly developed

pit, but they lack two posteriorly directed teeth. However, some species such as *H. coveri* and *H. subsarissa* do have subpetiolar carinae, potentially confusing the taxa. In combination with the posteriorly directed teeth of the subpetiolar process *Ponera* may be separated by having 2 segmented maxillary palps. Bolton and Fisher (2011) conclude that the fenestra in these taxa is a convergent character, yet as previously mentioned, a number of poneromorphs from across tribes and subfamilies have fenestra including some *Pachycondyla* (=Emeryopone) and *Gnamptogenys* (Ectatomminae) suggesting that the plesiomorphic explanation is the most parsimonious. Further investigation of the fenestra across developmental patterns and poneromorph taxa is needed.

## METHODS

Taxon sampling included 39 ingroup taxa and 7 outgroup taxa (selected based on the sister relationships suggested by Moreau et al. 2006, Brady et al. 2006 and Schmidt 2009). A total of 42 characters were used, and 39 of these were found to be parsimony informative.

To infer relationships among *Hypoponera*, phylogenetic analyses using maximum parsimony (MP) optimality criterion were performed on 42 multistate morphological features (Table 6) coded for 39 of the *Hypoponera* species treated here and outgroup taxa. Analyses were completed using PAUP\* 4.0b (Swofford 2002). Outgroup taxa were included to help ensure proper polarization of ingroup characters. Outgroups (*Cryptopone gilva*, *Pachycondyla stigma*, *Pachycondyla apicalis*, *Centromyrmex alfaroi*, *Plectroctena cristata*, *Ponera pennsylvanica*, and *Diacamma intricatum*) were chosen because they were suggested to be closely related to *Hypoponera* based on molecular evidence (Moreau et al. 2006, Brady et al. 2006, Schmidt 2009), or because they were morphologically very similar (*Ponera*). Because the analyses were taxon-rich relative to data, characters were successively weighted (Ferris 1969) after each analysis by the maximum value of rescaled consistency indices. The heuristic search algorithm was used with tree bisection reconnection branch swapping and random stepwise additions options. The analyses were constrained so that the ingroup was monophyletic in relation to outgroup

taxa. The constraint was added because these analyses were intended to provide a preliminary phylogenetic hypothesis for the ingroup, as opposed to testing the monophyly of the ingroup, and because sufficient generic-level morphological features that might support the monophyly of *Hypoconera* with respect to chosen outgroup taxa were not fully developed. Node support was calculated by 100 bootstrap pseudoreplicates. In the interpretation of the MP trees, I applied the widely accepted node support threshold of  $> 70\%$  to be considered well supported nodes.

### **Character Matrix**

A collection of 42 morphological characters were utilized to generate a character matrix (Table 6). Character scoring is unordered and when more than one character state was present a “?” was used. A “-” was used when the character was not present in that taxon. All specimens were scored based on material available.

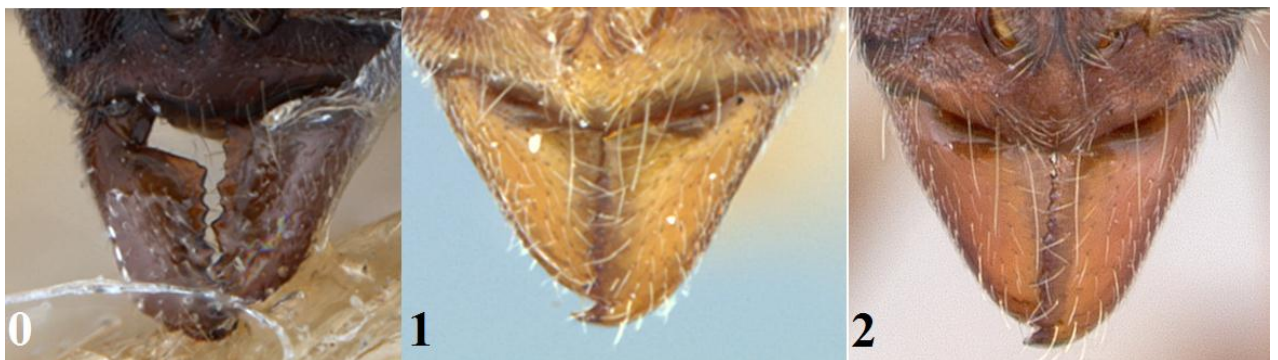
#### **Head.**

1. *Total length*: (0) tiny (TL 1.0–2.5 mm ), (1) small (TL 2.6–3.5 mm), (2) medium (TL 3.6–4.5 mm ), (3) large (TL 4.6–6.5 mm )
2. *Overall Color*: (0) black, (1) brown, (2) red-brown, (3) orange-yellow, (4) yellow, (5) pale yellow



**Figure 85.** Color variation in *Hypoponera*: *H. nitidula* (0), *H. clinei* (1), *H. foreli* (2), *H. vernacula* (3), *H. coveri* (4), *H. agilis* (5). Each number corresponds to a character state.

3. *Masticatory margin*: (0) teeth entire margin, (1) denticulate entire margin, (2) teeth to midmargin, denticulate remainder.



**Figure 86.** Develop of dentition on mandibles of *Hypoponera*: *H. iheringi* (0), *H. transiens* (1), *H. foreli* (2). Each number corresponds to a character state.



4. *Outer border of mandible concavity*: (0) absent (1) present.



**Figure 87.** Outer border of mandibles in *Hypoponera*: lacking a concavity in *H. leveillei* (0) and the outer border with a concavity in *H. inexorata* (1). Each number corresponds to a character state.

5. *Anterior margin of clypeus*: (0) evenly convex, (1) notched



**Figure 88.** Anterior margin of clypeus showing presence or absence of a medial notch: the anterior margin evenly convex and lacking a medial notch in *H. foreli* (0), or the anterior margin with a medial notch in *H. impartergum* (1). Each number corresponds to a character state.

6. *Eye size*: (0) large (EL 0.10–0.20 mm), (1) small (EL 0.01–0.09 mm)



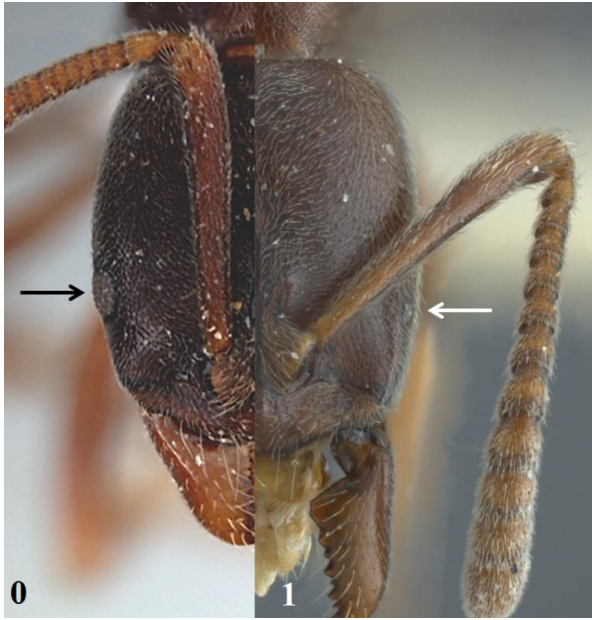
**Figure 89.** Variation in eye length (EL): the eye being large as in *H. vernacula* (0) or small as in *H. pampana* (1). Each number corresponds to a character state.

7. *Eye position on head:* (0) lateral, (1) dorsolateral



**Figure 90.** Eye position of side of head: lateral in position as in *H. foeda* (0) or more dorsolateral as in *H. corruptela* (1). Each number corresponds to a character state.

8. *Eye breaking outline of head*: (0) present, (1) absent



**Figure 91.** Eye position on side of head breaking outline of lateral margin or close to integument: eyes breaking the lateral outline as in *H. corruptela* (0), or not breaking the lateral outline of the head as in *H. impartergum* (1). Each number corresponds to a character state.

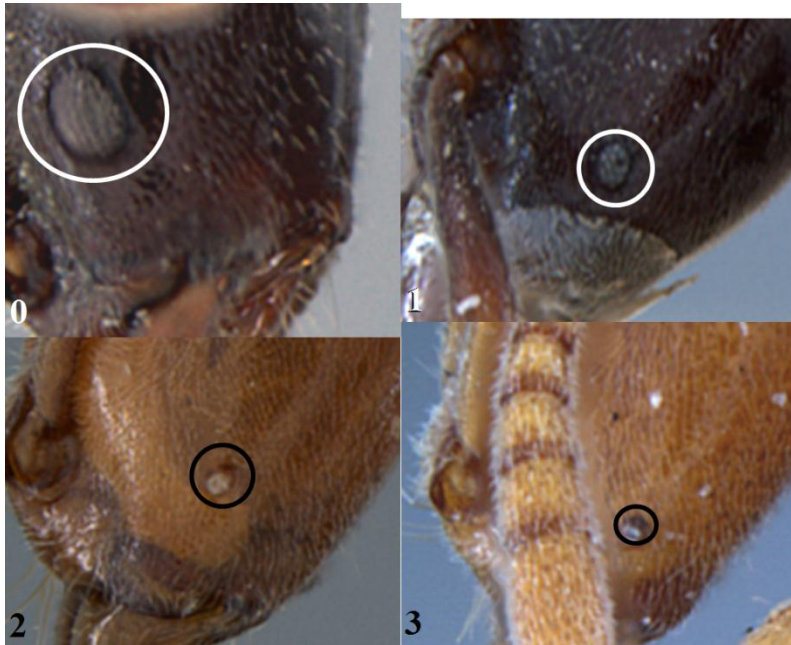
9. *Ocular Mandibular Distance* (eye close or far from posterior clypeal margin): (0) close, distance equal or not greater than EL, (1) far, distance greater than EL





**Figure 92.** Ocular mandibular distance, in lateral view the distance between the eye and posterior margin of the clypeus: close as in *H. famini* (0), or far as in *H. corruptela* (1). Each number corresponds to a character state.

10. *Number of facets*: (0) 30+, (1) 16–30, (2) 6–15, (3) 1–5



**Figure 93.** Eye size based on the number of individual facets comprising the compound eye: 30 or more facets as in *H. corruptela* (0), eyes comprised of 16–30 facets as in *H. iheringi* (1), eyes comprised of 6–15 facets as in *H. apateae* (2), and eyes with only 1–5 facets as in *H. agilis* (3). Each number corresponds to a character state.

11. *Facets*: (0) distinct, (1) partially fused, (2) fused



**Figure 94.** Variation of facet fusion or facet distinction: distinct facets as in *H. iheringi* (0), partially fused as in *H. clavatula* (1), and fused facets as in *H. famini* (2) Each number corresponds to a character state.

12. *Scape length*: (0) short not reaching posterior margin, (1) reaching or surpassing posterior margin by < first funicular segment, (2) surpassing by > first funicular



**Figure 95.** Variation of scape length in relation to posterior margin of the head: short, not reaching posterior margin as in *H. punctatissima* (0), reaching or just surpassing posterior margin as in *H. creola* (1), and surpassing the posterior margin by more than the length of the first funicular segment as in *H. impartergum* (2). Each number corresponds to a character state.

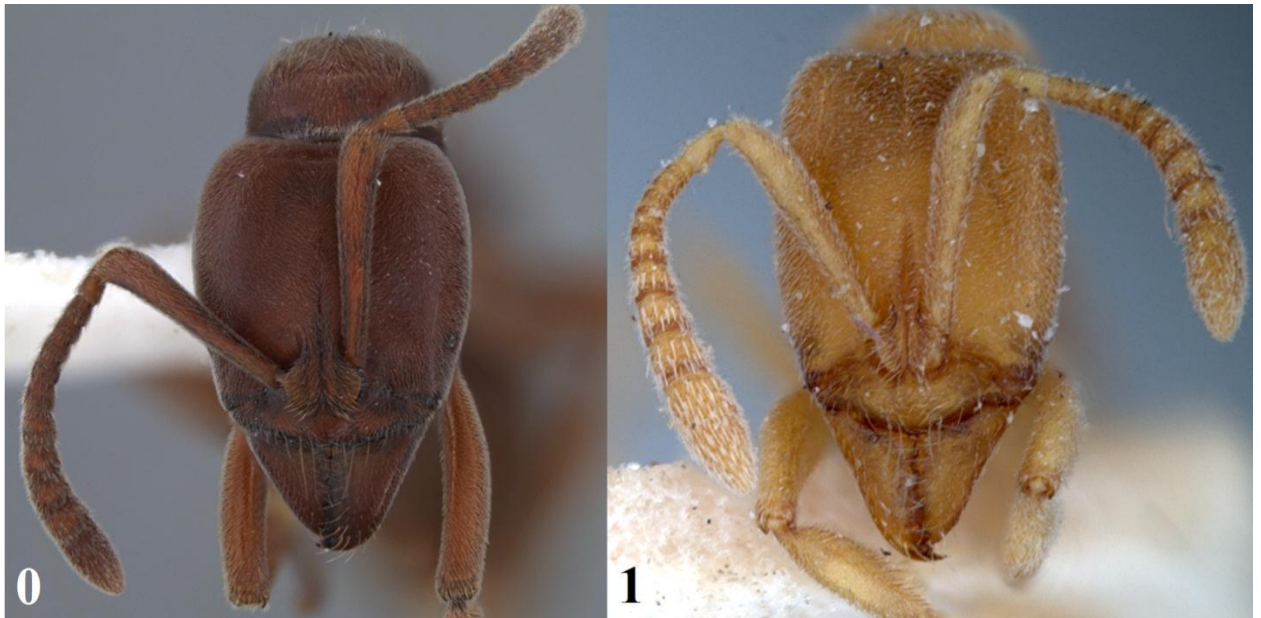
13. *Funicular segments forming*: (0) no club, (1) gradual club, (2) distinct club.



**Figure 96.** Funicular segment developed into a club or filliform: no club as in *H. impartergum* (0), gradual club as in *H. iheringi* (1), and with a distinct club as in *H. clavatula* (2). Each number corresponds to a character state.



14. *Head shape in frontal view: (0) quadrate, (1) elongate*



**Figure 97.** In frontal view the differing shapes of the head: quadrate as in *H. leveillei* (0) or elongate as in *H. fallax* (1). Each number corresponds to a character state.

15. *Posterior of head: (0) concavity, (1) even, lacking concavity (2) convex*



**Figure 98.** Posterior margin of the head: with concavity as in *H. inexorata* (0), even or flat, lacking a concavity as in *H. impartergum* (1) and posterior margin convex as in *H. iheringi* (2). Each number corresponds to a character state.

## Mesosoma.

16. *Mesosomal profile*: (0) even, (1) sutures incised, (2) uneven sutures distinctly incised, forming grooves



**Figure 99.** Lateral view of mesosomal profile: even as in *H. inexpedita* (0), mesosoma uneven at incised sutures as in *H. opaciceps* (1), and distinctly incised grooves of sutures as in *H. nemsisea* (2). Each number corresponds to a character state.

17. *Mesonotal-pleural suture*: (0) present, (1) absent
18. *Mesonotal-pleural suture*: (0) distinct, (1) faint
19. *Mesometanotal suture*: (0) present, (1) absent
20. *Mesometanotal suture*: (0) faint, (1) incised, (2) groove
21. *Propodeum below mesonotum*: (0) absent, (1) present



**Figure 100.** Dorsopropodeum position in relation to mesonotum: propodeum even with mesonotum as in *H. corruptela* (0) and with the propodeum below the level of the mesonotum as in *H. foreli* (1). Each number corresponds to a character state.

- 22. *Dorsopropodeum inclined*: (0) present, (1) absent
- 23. *Dorsopropodeum*: (0) distinct dorsum, (1) tectiform

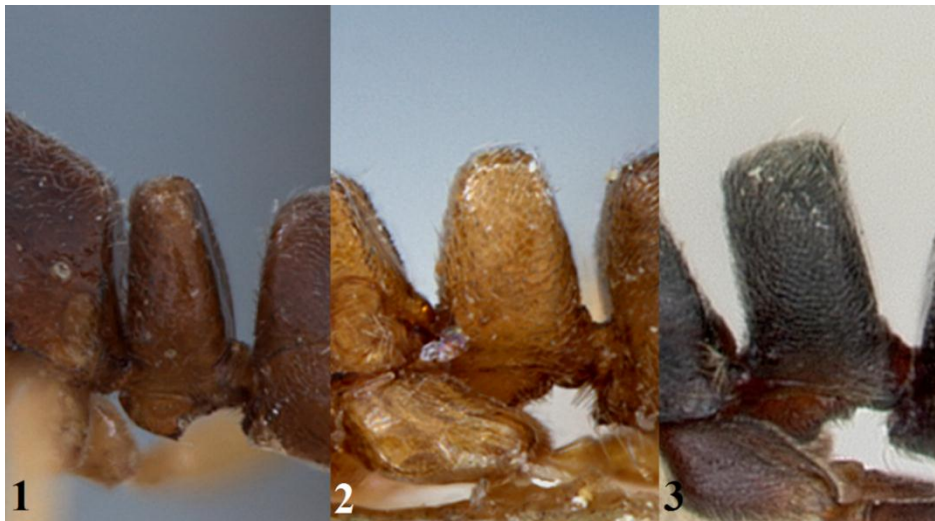




**Figure 101.** Dorsal view of dorsopropodeum showing extent of lateral area convergence: distinct dorsum as in *H. coveri* (0) and distinctly tectiform as in *H. promontorium* (1). Each number corresponds to a character state.

#### Petiole.

24. *Petiole node*: (0) scale-like, (1) subtriangular, (2) quadrate



**Figure 102.** Variation of petiole node shape: scale-like as in *H. opacior*, subtriangular as in *H. antoniensis*, and quadrate as in *H. opaciceps*. Each number corresponds to a character state.

25. *Petiolear squamiform*: (0) thin, (1) moderately thin, (2) thick



**Figure 103.** Variation of scale-like petiole width: thin as in *H. creola* (0), moderately thin as in *H. coveri* (1), and thick as in *H. capilosa* (2). Each number corresponds to a character state.

26. *Petiolear node height*: (0) low (not reaching dorsopropodeum), (1) high (reaching or extending past dorsopropodeum)
27. *Petiolear faces*: (0) converging, (1) slightly converging, (2) straight
28. *Petiole apex*: (0) round, (1) flat
29. *Spiracular process*: (0) reduced, (1) lobe-like, (2) tooth-like
30. *Subpetiolear process*: (0) quadrate, (1) lobate



**Figure 104.** Shape of subpetiolear process: quadrate as in *H. distinguenda* or lobate as in *H. creola*. Each number corresponds to a character state.

- 31. *Fenestra*: (0) absent, (1) present
- 32. *Subpetiolar depression*: (0) absent, (1) present
- 33. *Petiole node dorsum*: (0) thin, (1) quadrate



**Figure 105.** Subpetiolar process with a fenestra (character 31) [*H. coveri* holotype] or with depression (character 32) [*H. distinguenda*]. Each number corresponds to a character state.

- 34. *Mesosomal dorsum pilosity*: (0) erect hairs, (1) no erect hairs
- 35. *Mesosomal dorsum erect hairs length*: (0) short (0.001–0.05 mm), (1) long (0.06–0.09 mm)

#### **Gaster.**

- 36. *Gastral constriction (cinctus)*: (0) apparent, (1) not distinct

#### **Outgroup characters.**

- 37. *Hind tibial spurs*: (0) two, (1) one
- 38. *Propodeal Spiracle*: (0) slit-shaped, (1) round or ovoid
- 39. *Mesotibiae*: (0) lacking stout traction setae, (1) abundant stout traction setae
- 40. *Frontal lobes*: (0) not expanded, (1) expanded
- 41. *Dorsum of petiole*: (0) lacking posterior spines, (1) posterior spines present
- 42. *Posterior face of subpetiolar process*: (0) lacking teeth, (1) with teeth

**Table 6.** Character matrix for New World *Hypoconera* based on a suite of 42 characters. Outgroup taxa were selected from sister groups suggested by the phylogenies of Moreau et al. 2006, Brady et al. 2006, and Schmidt 2009.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
<i>H. agilis</i>	1	4	2	0	0	1	1	1	0	3	1	2	0	?	1	1	0	0	0	1	0
<i>H. aliena</i>	0	?	1	0	0	1	0	1	0	-	0	1	2	0	1	2	1	1	0	2	0
<i>H. antoniensis</i>	0	?	1	0	0	1	1	1	0	3	2	1	1	0	0	1	0	0	0	2	1
<i>H. apateae</i>	2	4	2	0	0	1	0	1	1	2	1	2	0	?	1	2	0	?	1	2	1
<i>H. capilosa</i>	2	?	1	0	0	1	1	1	1	3	2	1	0	1	0	2	0	0	0	0	1
<i>H. clavatula</i>	0	4	1	0	0	1	0	1	0	2	1	0	2	0	0	1	1	0	1	1	0
<i>H. clinei</i>	2	?	1	0	1	1	1	1	1	2	0	1	0	0	0	2	0	0	1	1	1
<i>H. corruptela</i>	2	?	2	0	0	0	0	0	1	0	0	2	0	0	1	1	0	0	0	1	0
<i>H. coveri</i>	1	4	2	0	0	0	1	0	0	2	0	2	0	0	0	1	0	0	0	2	0
<i>H. creola</i>	1	1	1	0	0	1	1	1	0	2	0	1	1	0	0	2	0	0	0	2	1
<i>H. distinguenda</i>	2	?	0	?	0	1	1	0	0	2	0	1	2	0	1	1	0	1	0	1	0
<i>H. fallax</i>	?	?	2	1	0	1	1	1	0	3	2	1	0	1	1	0	0	1	0	0	0
<i>H. famini</i>	1	3	?	0	0	1	0	1	0	2	2	0	1	1	1	0	0	0	1	0	0
<i>H. foeda</i>	1	?	0	0	0	1	1	1	0	3	2	0	2	1	0	0	0	1	1	0	0
<i>H. foreli</i>	2	?	1	0	0	0	1	0	1	1	0	2	0	1	2	2	0	0	0	2	1
<i>H. idelettae</i>	2	?	1	0	0	1	1	1	1	3	-	1	0	1	1	2	0	0	0	1	1
<i>H. iheringi</i>	3	?	0	0	1	?	1	0	1	1	0	1	0	0	1	2	0	0	0	1	1
<i>H. impartergum</i>	2	4	2	0	0	0	1	1	1	2	0	2	0	2	1	2	0	1	0	1	1
<i>H. inexorata</i>	1	?	1	1	0	1	0	1	1	3	1	1	1	0	0	1	0	?	0	1	0
<i>H. inexpedita</i>	1	2	2	0	?	1	1	1	0	3	1	0	1	0	0	1	0	0	1	?	1
<i>H. leninei</i>	3	1	1	0	0	1	1	0	1	2	1	2	0	1	?	2	0	0	0	2	1
<i>H. leveillei</i>	3	?	0	0	1	1	1	1	1	2	0	2	0	0	0	2	0	0	0	2	1
<i>H. nemsisea</i>	2	4	2	0	0	1	1	1	0	1	1	2	0	0	1	2	0	0	0	2	1
<i>H. nitidula</i>	?	0	2	0	0	0	1	0	0	1	0	2	0	0	0	1	0	0	?	?	1
<i>H. opaciceps</i>	1	?	2	0	?	1	1	0	0	?	0	?	0	0	0	1	0	?	0	1	0
<i>H. opacior</i>	?	?	1	0	1	1	0	1	1	3	2	1	1	0	?	0	0	0	0	0	0
<i>H. pampana</i>	1	?	1	0	0	1	1	1	0	2	2	1	?	0	0	1	0	?	0	2	0
<i>H. parva</i>	0	5	1	0	0	1	0	1	0	?	2	0	1	1	0	1	1	1	0	0	0
<i>H. perplexa</i>	2	1	2	0	0	1	1	1	1	2	1	2	0	0	0	1	0	?	0	2	1
<i>H. promontorium</i>	1	5	1	0	0	1	1	0	0	2	2	0	2	0	0	0	0	1	1	0	0
<i>H. punctatissima</i>	1	?	1	0	0	1	0	1	0	?	1	0	1	0	0	1	1	1	0	1	0
<i>H. saroltae</i>	1	4	0	0	0	1	0	1	0	2	2	0	0	0	0	0	0	0	0	0	0
<i>H. schmalzi</i>	2	1	1	0	1	0	1	0	0	0	0	1	0	0	2	1	0	0	0	1	1
<i>H. stoica</i>	1	4	2	0	0	1	0	1	0	3	0	0	1	0	1	2	0	0	0	1	0
<i>H. subsarissa</i>	1	0	1	0	0	1	1	0	1	2	1	2	0	?	1	2	0	0	0	1	1
<i>H. transiens</i>	1	?	1	0	0	1	1	1	0	3	0	0	1	0	0	0	0	1	0	?	0
<i>H. trigona</i>	1	?	1	0	1	0	1	1	1	3	1	1	0	0	1	0	0	0	0	0	0
<i>H. vernacula</i>	3	?	0	0	0	0	1	1	1	0	0	2	0	0	1	2	0	0	0	2	1
<i>H. viri</i>	1	4	2	0	0	1	1	1	1	3	1	1	2	0	0	1	0	0	0	2	0
<i>Cryptopone gilva</i>	3	4	0	0	0	1	0	1	0	3	1	0	0	0	0	1	?	0	0	1	0
<i>Pachycondyla stigma</i>	3	?	0	0	0	1	0	1	0	2	0	1	0	0	0	1	0	0	0	1	1
<i>Pachycondyla apicalis</i>	3	0	0	0	0	0	2	0	1	0	0	2	0	1	1	2	0	0	0	1	1
<i>Centromyrmex alfaroi</i>	2	3	0	0	0	1	-	1	0	-	-	1	0	0	0	0	0	?	?	0	0
<i>Plectroctena cristata</i>	3	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	1	0	0
<i>Ponera pennsylvanica</i>	?	?	1	0	0	1	0	1	0	2	0	1	2	0	0	0	0	0	0	1	1
<i>Diacamma intricatum</i>	3	0	0	0	0	0	2	0	1	0	0	2	0	1	2	0	0	0	0	0	0

Table 6. continued

	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
<i>H. agilis</i>	1	4	2	0	0	1	1	1	0	3	1	2	0	?	1	1	0	0	0	1	0
<i>H. aliena</i>	0	?	1	0	0	1	0	1	0	-	0	1	2	0	1	2	1	1	0	2	0
<i>H. antoniensis</i>	0	?	1	0	0	1	1	1	0	3	2	1	1	0	0	1	0	0	0	2	1
<i>H. apateae</i>	2	4	2	0	0	1	0	1	1	2	1	2	0	?	1	2	0	?	1	2	1
<i>H. capilosa</i>	2	?	1	0	0	1	1	1	1	3	2	1	0	1	0	2	0	0	0	0	1
<i>H. clavatula</i>	0	4	1	0	0	1	0	1	0	2	1	0	2	0	0	1	1	0	1	1	0
<i>H. clinei</i>	2	?	1	0	1	1	1	1	1	2	0	1	0	0	0	2	0	0	1	1	1
<i>H. corruptela</i>	2	?	2	0	0	0	0	0	1	0	0	2	0	0	1	1	0	0	0	1	0
<i>H. coveri</i>	1	4	2	0	0	0	1	0	0	2	0	2	0	0	0	1	0	0	0	2	0
<i>H. creola</i>	1	1	1	0	0	1	1	1	0	2	0	1	1	0	0	2	0	0	0	2	1
<i>H. distinguenda</i>	2	?	0	?	0	1	1	0	0	2	0	1	2	0	1	1	0	1	0	1	0
<i>H. fallax</i>	?	?	2	1	0	1	1	1	0	3	2	1	0	1	1	0	0	1	0	0	0
<i>H. famini</i>	1	3	?	0	0	1	0	1	0	2	2	0	1	1	1	0	0	0	1	0	0
<i>H. foeda</i>	1	?	0	0	0	1	1	1	0	3	2	0	2	1	0	0	0	1	1	0	0
<i>H. foreli</i>	2	?	1	0	0	0	1	0	1	1	0	2	0	1	2	2	0	0	0	2	1
<i>H. idelettae</i>	2	?	1	0	0	1	1	1	1	3	-	1	0	1	1	2	0	0	0	1	1
<i>H. iheringi</i>	3	?	0	0	1	?	1	0	1	1	0	1	0	0	1	2	0	0	0	1	1
<i>H. impartergum</i>	2	4	2	0	0	0	1	1	1	2	0	2	0	2	1	2	0	1	0	1	1
<i>H. inexorata</i>	1	?	1	1	0	1	0	1	1	3	1	1	1	0	0	1	0	?	0	1	0
<i>H. inexpedita</i>	1	2	2	0	?	1	1	1	0	3	1	0	1	0	0	1	0	0	1	?	1
<i>H. leninei</i>	3	1	1	0	0	1	1	0	1	2	1	2	0	1	?	2	0	0	0	2	1
<i>H. leveillei</i>	3	?	0	0	1	1	1	1	1	2	0	2	0	0	0	2	0	0	0	2	1
<i>H. nemsisea</i>	2	4	2	0	0	1	1	1	0	1	1	2	0	0	1	2	0	0	0	2	1
<i>H. nitidula</i>	?	0	2	0	0	0	1	0	0	1	0	2	0	0	0	1	0	0	?	?	1
<i>H. opaciceps</i>	1	?	2	0	?	1	1	0	0	?	0	?	0	0	0	1	0	?	0	1	0
<i>H. opacior</i>	?	?	1	0	1	1	0	1	1	3	2	1	1	0	?	0	0	0	0	0	0
<i>H. pampana</i>	1	?	1	0	0	1	1	1	0	2	2	1	?	0	0	1	0	?	0	2	0
<i>H. parva</i>	0	5	1	0	0	1	0	1	0	?	2	0	1	1	0	1	1	1	0	0	0
<i>H. perplexa</i>	2	1	2	0	0	1	1	1	1	2	1	2	0	0	0	1	0	?	0	2	1
<i>H. promontorium</i>	1	5	1	0	0	1	1	0	0	2	2	0	2	0	0	0	0	1	1	0	0
<i>H. punctatissima</i>	1	?	1	0	0	1	0	1	0	?	1	0	1	0	0	1	1	1	0	1	0
<i>H. saroltae</i>	1	4	0	0	0	1	0	1	0	2	2	0	0	0	0	0	0	0	0	0	0
<i>H. schmalzi</i>	2	1	1	0	1	0	1	0	0	0	0	1	0	0	2	1	0	0	0	1	1
<i>H. stoica</i>	1	4	2	0	0	1	0	1	0	3	0	0	1	0	1	2	0	0	0	1	0
<i>H. subsarissa</i>	1	0	1	0	0	1	1	0	1	2	1	2	0	?	1	2	0	0	0	1	1
<i>H. transiens</i>	1	?	1	0	0	1	1	1	0	3	0	0	1	0	0	0	0	1	0	?	0
<i>H. trigona</i>	1	?	1	0	1	0	1	1	1	3	1	1	0	0	1	0	0	0	0	0	0
<i>H. vernacula</i>	3	?	0	0	0	0	1	1	1	0	0	2	0	0	1	2	0	0	0	2	1
<i>H. viri</i>	1	4	2	0	0	1	1	1	1	3	1	1	2	0	0	1	0	0	0	2	0
<i>Cryptopone gilva</i>	3	4	0	0	0	1	0	1	0	3	1	0	0	0	0	1	?	0	0	1	0
<i>Pachycondyla stigma</i>	3	?	0	0	0	1	0	1	0	2	0	1	0	0	0	1	0	0	0	1	1
<i>Pachycondyla apicalis</i>	3	0	0	0	0	0	2	0	1	0	0	2	0	1	1	2	0	0	0	1	1
<i>Centromyrmex alfaroi</i>	2	3	0	0	0	1	-	1	0	-	-	1	0	0	0	0	0	?	?	0	0
<i>Plectroctena cristata</i>	3	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	1	0	0
<i>Ponera pennsylvanica</i>	?	?	1	0	0	1	0	1	0	2	0	1	2	0	0	0	0	0	0	1	1
<i>Diacamma intricatum</i>	3	0	0	0	0	0	2	0	1	0	0	2	0	1	2	0	0	0	0	0	0

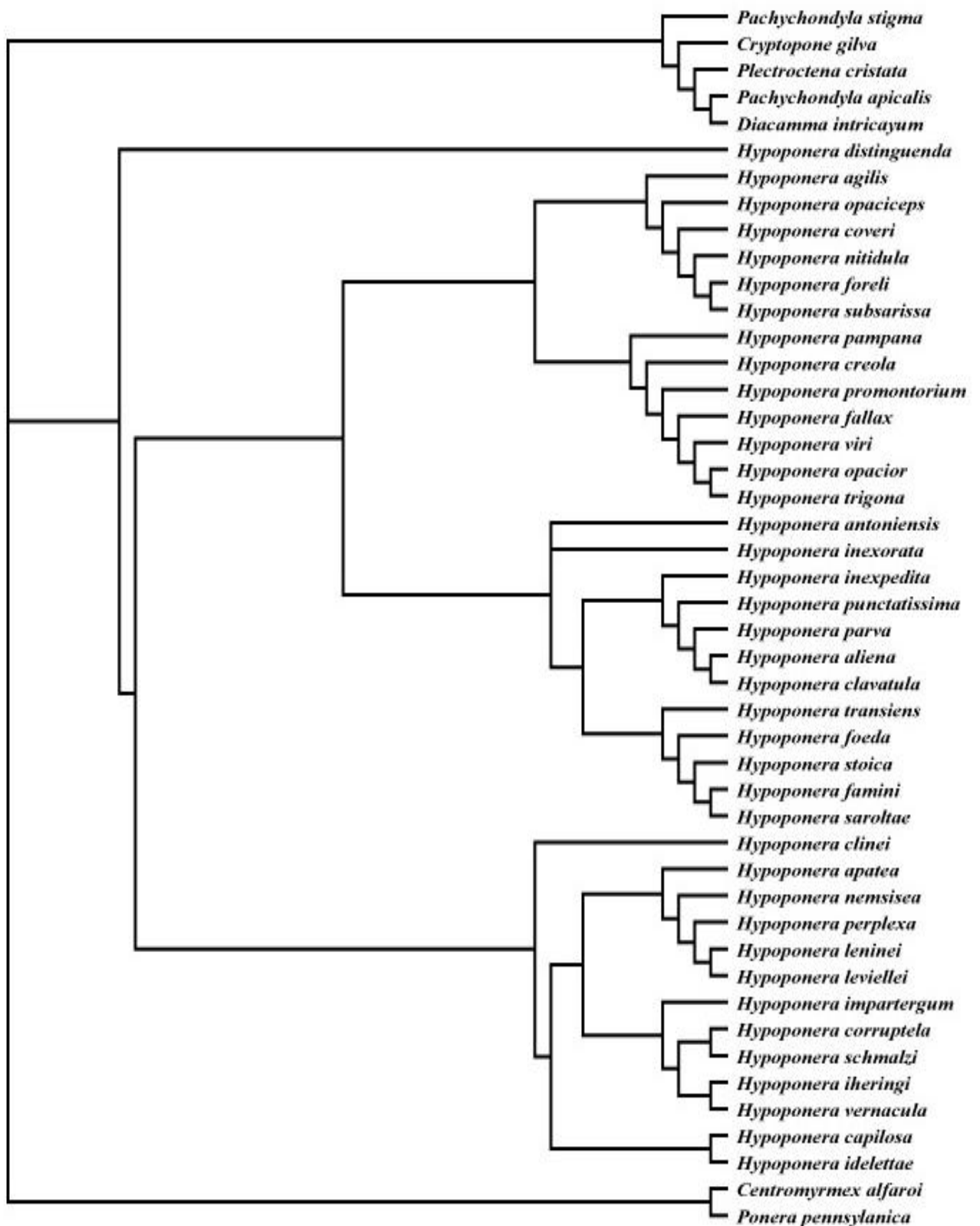
## RESULTS AND DISCUSSION

Maximum parsimony analyses produced 3 equally parsimonious trees as preliminary phylogenetic estimates (Table 7, Fig. 106), the tree lengths were 30.26. The strict consensus tree consists of three clades subtended by *H. distinguenda*. One grouping that was suggestive of hypothesized relationships was a clade that included the *trigona*-group membership of *H. pampana*, *H. opacior*, *H. creola*, *H. viri*, and *H. trigona* as well as *H. fallax* (*foeda*-group) and *H. promontorium* (*parva*-group). This grouping may be a result of linkage based on petiolar node shape (squamiform), scale thickness, scape length, and color. The remaining hypothesized species groups were only partially supported in these analyses. For example, the *distinguenda*-group was not maintained and species from the same group are found among branches. *Hypoponera distinguenda* is sister to the remaining *Hypoponera*. This result may be an artifact of *H. distinguenda* having many multistate features. The remainder of the species in the *distinguenda*-group cluster with members of the *foreli*, *leveillei* and *opaciceps* species groups. A mixture of taxa is observed throughout the tree suggestion no group is valid and represent artificial groups, that may have not phologenetetic importance but serve a limited a taxonomic purpose of sorting and organizing species (Watson 2005).

**Table 7.** Heuristic tree scores for Consistency Index (CI), Retention (RI), Rescale Consistency (RC), Homoplasy Index (HI), and length values.

	Tree 1	Tree 2	Tree 3
CI	0.38	0.38	0.38
RI	0.64	0.64	0.64
RC	0.24	0.24	0.24
HI	0.62	0.62	0.62

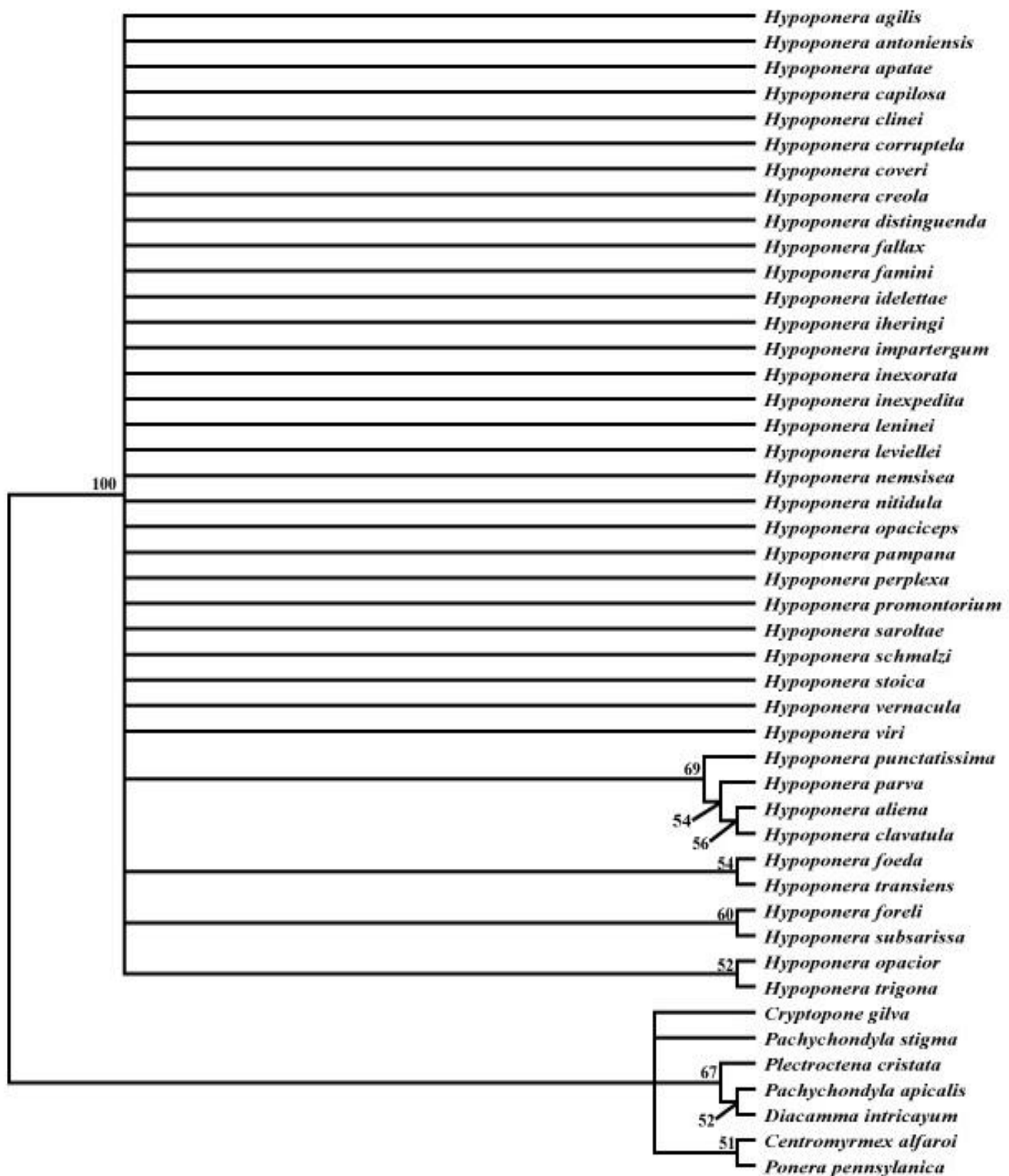




**Figure 106.** Maximum parsimony cladogram (strict consensus of 3 equally parsimonious trees) resulting from analysis of 42 morphological characters. Summation of minimum of possible lengths 11.55 and summation of maximum of possible lengths 63.18.

Bootstrap analyses indicate that there is little support for the majority of the nodes of the tree, resulting in a large polytomy (nodes with less than 50% support were collapsed) with a few poorly supported small clades (Fig. 107). No bootstrap values were above 70, although some phylogenetic signal is seen for the *parva*-group (*H. parva*, *H. aliena*, *H. clavatula*) and potential sister relationships between *H. foeda* and *H. transiens* as well as *H. foreli* and *H. subsarissa*. The lack of bootstrap support is unsurprising given the relatively large number of taxa with respect to limited character data, and a very small number of distinctive synapomorphies that might support species-groups. The species-group designations were made to facilitate taxonomic sorting and identification, and were not *a priori* expected to represent monophyletic clades. Group formation was on the basis of overall similarity but these phenetic groupings have overlapping character states (Table 6) and no distinctive autapomorphic or synapomorphic characters for a group. One potential reason that a polytomy was recovered is the limited characters used in the analysis. Based on the widely accepted rule that at least 1.5 to 2 times as many characters are needed than in and outgroup taxa, a polytomy is not surprising. Additionally, some characters may be taxonomically useful, but not good phylogenetic characters. The suite of characters potentially does not fit the criteria of homology, as they may be homoplastic (Table 7) and character variation is not always greater between taxa than within taxa. Also, high homoplasy is anticipated among taxa that are species rich, but morphologically homogenous, particularly where plesiomorphic, or morphologically reductive, features are evident. A number of characters also depend on other character states and are not independent. The recovered tree topology could have also been an artifact of inadequate sampling.





**Figure 107.** Bootstrap 50% majority-rule consensus tree of 3 equally parsimonious trees. Numbers above branches are bootstrap support values in percent (100 pseudoreplicates). Nodes with less than 50% bootstrap support were collapsed into polytomies. Length 48.5, CI 0.238, RI 0.283, RC 0.07, HI 0.76.

Future phylogenetic work will need to rely heavily on molecular techniques. As has been demonstrated (Figs. 106 and 107), morphology alone does not provide enough characters for resolution of relationships. As suggested in the introduction, *Hypoponera* morphology is reductive as a result of the lineage becoming hypogenic, and the genus has lost synapomorphies of phylogenetically close genera. The variation within the genus is likely due to ecology and behavioral components, resulting in parallelisms that currently cannot be resolved using classic techniques (Wheeler and Meier 2000, Wheeler 2005). Focused phylogenetic research on the ecology coupled with molecular and, to a lesser extent, morphological characters of the world taxa may produce a better hypothesis of relationships within *Hypoponera*.

## Appendix B

### Photographic atlas and type documentation of New World *Hypoponera*

#### *DISTINGUENDA*-GROUP.



**Figure 108.** *Hypoponera capilosa* (holotype) in frontal view of head and lateral habitus.



**Figure 109.** *Hypoponera coveri* (head is a paratype, lateral view is from holotype) in frontal view of head and lateral habitus.



**Figure 110.** *Hypoponera distinguenda* (paratype) in frontal view of head and lateral habitus.



**Figure 111.** *Hypoponera perplexa* (lectotype) in frontal view of head and lateral habitus.



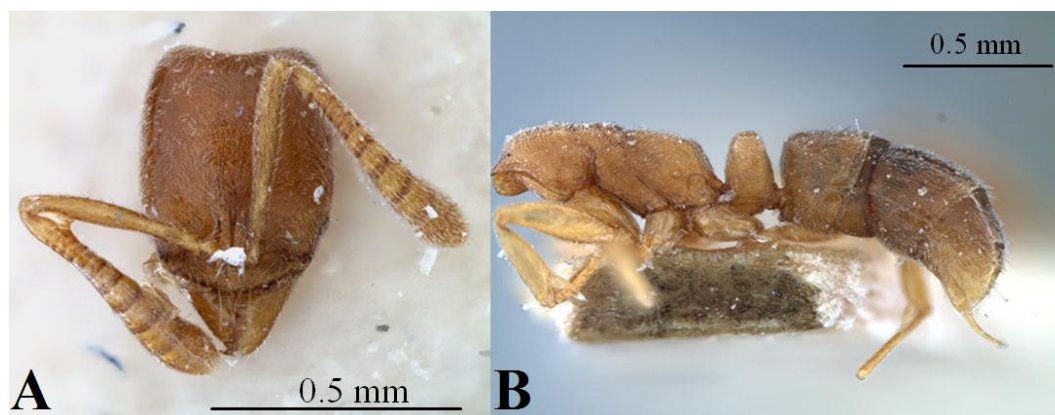
**Figure 112.** *Hypoponera schmalzi* (lectotype) in frontal view of head and lateral habitus.



**FOEDA-GROUP**



**Figure 113.** *Hypoponera agilis* (lectotype) in frontal view of head and lateral habitus.



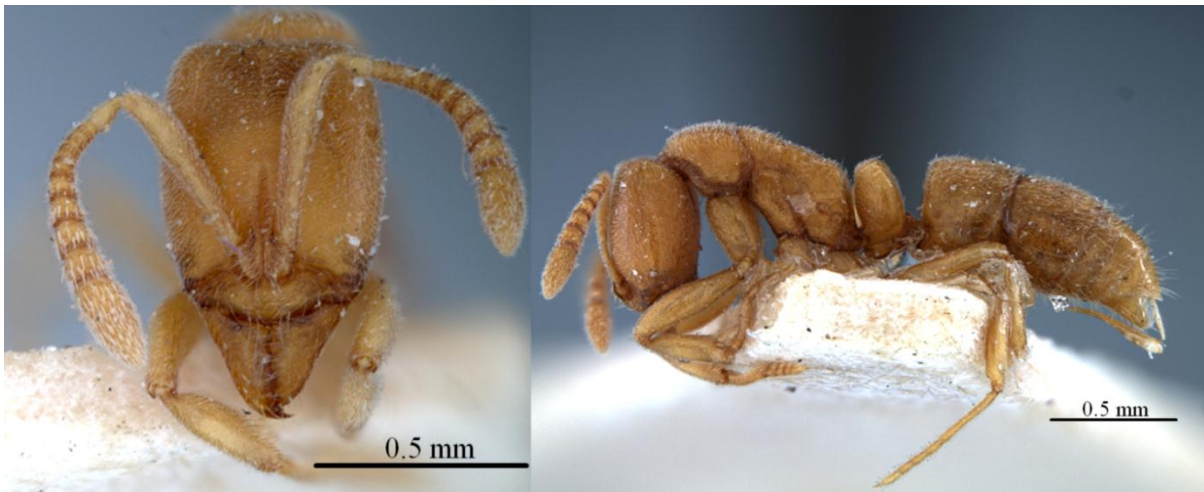
**Figure 114.** *Hypoponera antoniensis* (holotype) in frontal view of head and lateral habitus.



**Figure 115.** *Hypoponera fallax* (lectotype) in frontal view of head and lateral habitus.



**Figure 116.** *Hypoponera famini* (holotype) in frontal view of head and lateral habitus.



**Figure 117.** *Hypoponera foeda* (lectotype) in frontal view of head and lateral habitus.

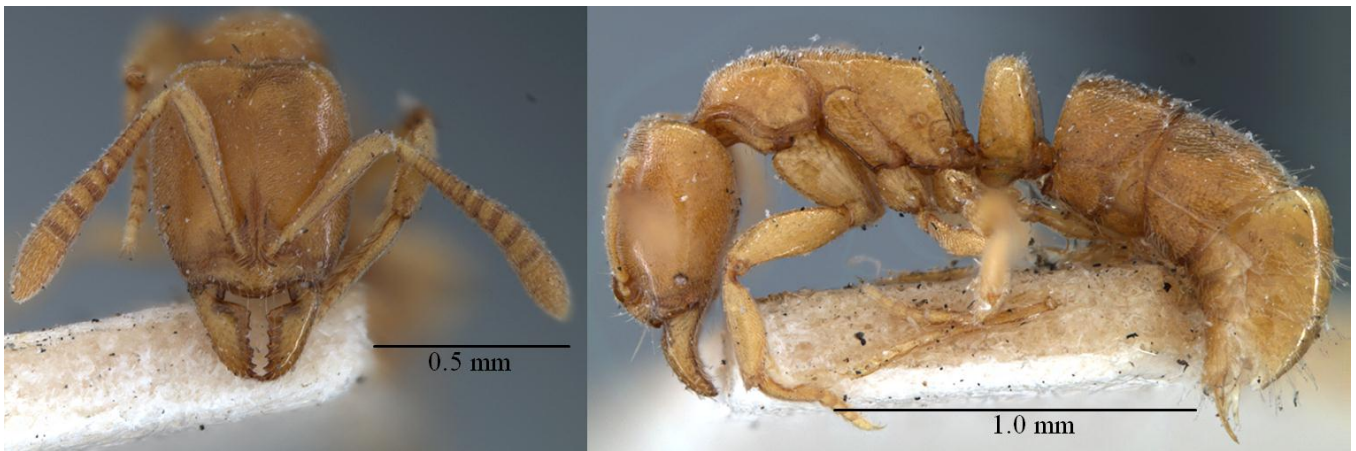


**Figure 118.** *Hypoponera inexorata* (non-type courtesy of A. Noble & B. Fisher [ww.antweb.org](http://www.antweb.org)). in frontal view of head and lateral habitus.





**Figure 119.** *Hypoponera inexpedita* (lectotype) in frontal view of head and lateral habitus.



**Figure 120.** *Hypoponera saroltae* (lectotype) in frontal view of head and lateral habitus.



**Figure 121.** *Hypoponera stoica* (holotype) in frontal view of head and lateral habitus.



**Figure 122.** *Hypoponera transiens* (lectotype) in frontal view of head and lateral habitus.



**FORELI-GROUP.**



**Figure 123.** *Hypoponera apateae* (paratype) in frontal view of head and lateral habitus.



**Figure 124.** *Hypoponera foreli* (non-type courtesy of A. Noble & B. Fisher [www.antweb.org](http://www.antweb.org)) in frontal view of head and lateral habitus.



**Figure 125.** *Hypoponera idelettae* (paratype) in frontal view of head and lateral habitus.



**Figure 126.** *Hypoponera impartergum* (holotype) in frontal view of head and lateral habitus.



**Figure 127.** *Hypoponera leninei* (paratype) in frontal view of head and lateral habitus.





**Figure 128.** *Hypoponera nemsisea* (nontype) in frontal view of head and lateral habitus.



**Figure 129.** *Hypoponera nitidula* (nontype courtesy of A. Noble & B. Fisher [www.antweb.org](http://www.antweb.org)) in frontal view of head and lateral habitus.



**Figure 130.** *Hypoponera subsarissa* (holotype) in frontal view of head and lateral habitus.



**Figure 131.** *Hypoponera vernacula* (paratype) in frontal view of head and lateral habitus.

**LEVEILLEI-GROUP.**



**Figure 132.** *Hypoponera clinei* (non-type courtesy of J. Longino) in frontal view of head and lateral habitus.



**Figure 133.** *Hypoponera iheringi* (lectotype) in frontal view of head and lateral habitus.



**Figure 134.** *Hypoponera leveillei* (non-type material) in frontal view of head and lateral habitus.



**OPACICEPS-GROUPS.**



**Figure 135.** *Hypoponera corruptela* (holotype) in frontal view of head and lateral habitus.



**Figure 136.** *Hypoponera opaciceps* (non-type courtesy of A. Noble & B. Fisher [www.antweb.org](http://www.antweb.org)) in frontal view of head and lateral habitus.

**PARVA-GROUP**



**Figure 137.** *Hypoponera clavatula* (lectotype) in frontal view of head and lateral habitus.

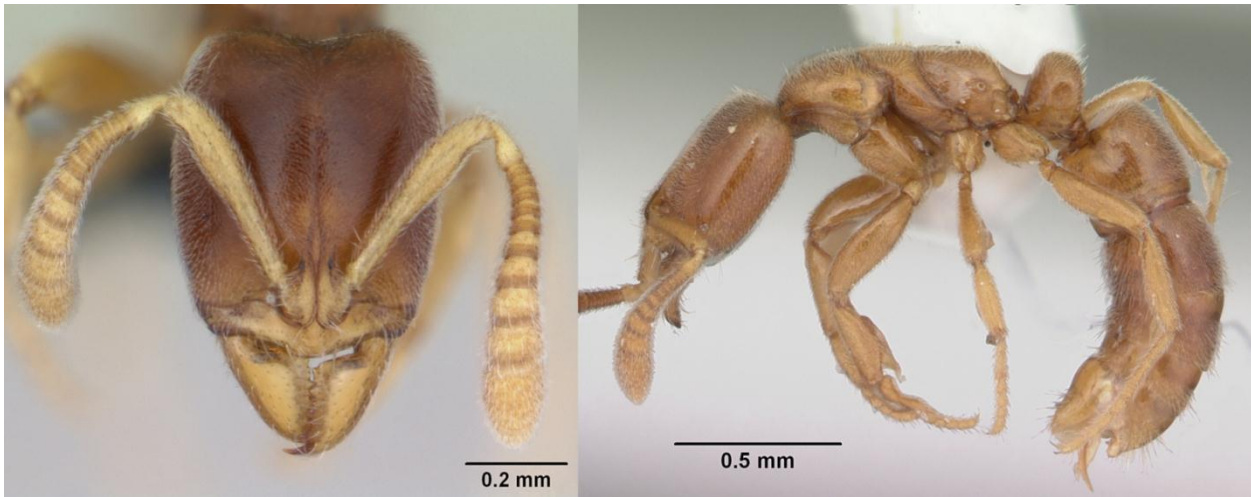


**Figure 138.** *Hypoponera parva* (nontype material) in frontal view of head and lateral habitus.



**Figure 139.** *Hypoponera promontorium* (holotype) in frontal view of head and lateral habitus.

**PUNCTATISSIMA-GROUP**



**Figure 140.** *Hypoponera punctatissima* (non-type courtesy of A. Noble & B. Fisher [www.antweb.org](http://www.antweb.org) in frontal view of head and lateral habitus).



**TRIGONA-GROUP**



**Figure 141.** *Hypoponera creola* (lectotype) frontal view of head and lateral habitus.



**Figure 142.** *Hypoponera opacior* (paralectotype) frontal view of head and lateral habitus.



**Figure 143.** *Hypoponera pampana* (lectotype) in frontal view of head and lateral habitus.



**Figure 144.** *Hypoponera trigona* (non-type courtesy of A. Noble & B. Fisher [www.antweb.org](http://www.antweb.org)) in frontal view of head and lateral habitus.



**Figure 145.** *Hypoponera viri* (lectotype) in frontal view of head and lateral habitus.

## Vita

Dr. Shawn T. Dash showed an interest in natural history and biology from an early age, exploring the varied habitats of Maryland. His interests in science were refined during high school and he graduated as the only student to have taken all of the science courses offered by the Baltimore County school district. As an undergraduate, Shawn double majored in entomology and wildlife ecology, with a minor in biological science at the University of Delaware, where he graduated with honors. While at the University of Delaware, he participated in research ranging from the mating habitats of cucumber beetles to box turtle home range, honey bee colony health and white-tailed deer birthing studies, as well as the effects of forest fragmentation on ant communities. Shawn also started a research program to document Delaware's ant biodiversity, a study that continues today and has been expanded to include Maryland and Virginia. After receiving his bachelor's degree, Shawn enrolled in the master's program at Louisiana State University. During his tenure at LSU he surveyed the ant fauna of the entire state of Louisiana. This research resulted in a number of publications including a book on pest ants. Shawn started his doctoral research at UTEP in 2005. His research has focused on the systematics of a neglected ant genus, *Hypoponera*, the "little wicked ants." His research represents the first time any scientist has investigated the evolutionary relationships of these ants. Shawn has presented his findings at both regional and national meetings; winning the 2010 President's Prize in Taxonomy and Systematics at the national meeting of the Entomological Society of America. Shawn's studies have discovered over 40 new species, unraveled the natural history of many other species, and resolved decades of confused taxonomy. The results of his research can be found in numerous publications as well as the monograph that he is still editing. In addition to his research on *Hypoponera*, Shawn has been involved in a number of projects focused on ant ecology and has published his findings in peer-reviewed journals. During his doctoral program Shawn has been a mentor for a number of undergraduate students, aiding them in their projects and helping them to publish their research results. Shawn has a strong commitment to education and has served as an instructor for a number of courses at UTEP. He has expanded and updated the laboratories for Ecology and Entomology and coauthored a laboratory manual for introductory biology. He has also taught two 12 day field-based courses exploring the

ecology of North American deserts. In all of his courses he melds his research experience and passion for academics to create challenging and educational opportunities. While completing his doctoral research he simultaneously taught at El Paso Community College, where he has been nominated for the outstanding adjunct faculty member award. Shawn's future goals are to set up a research program focused on the biology and taxonomy of ants and continue his teaching career.

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