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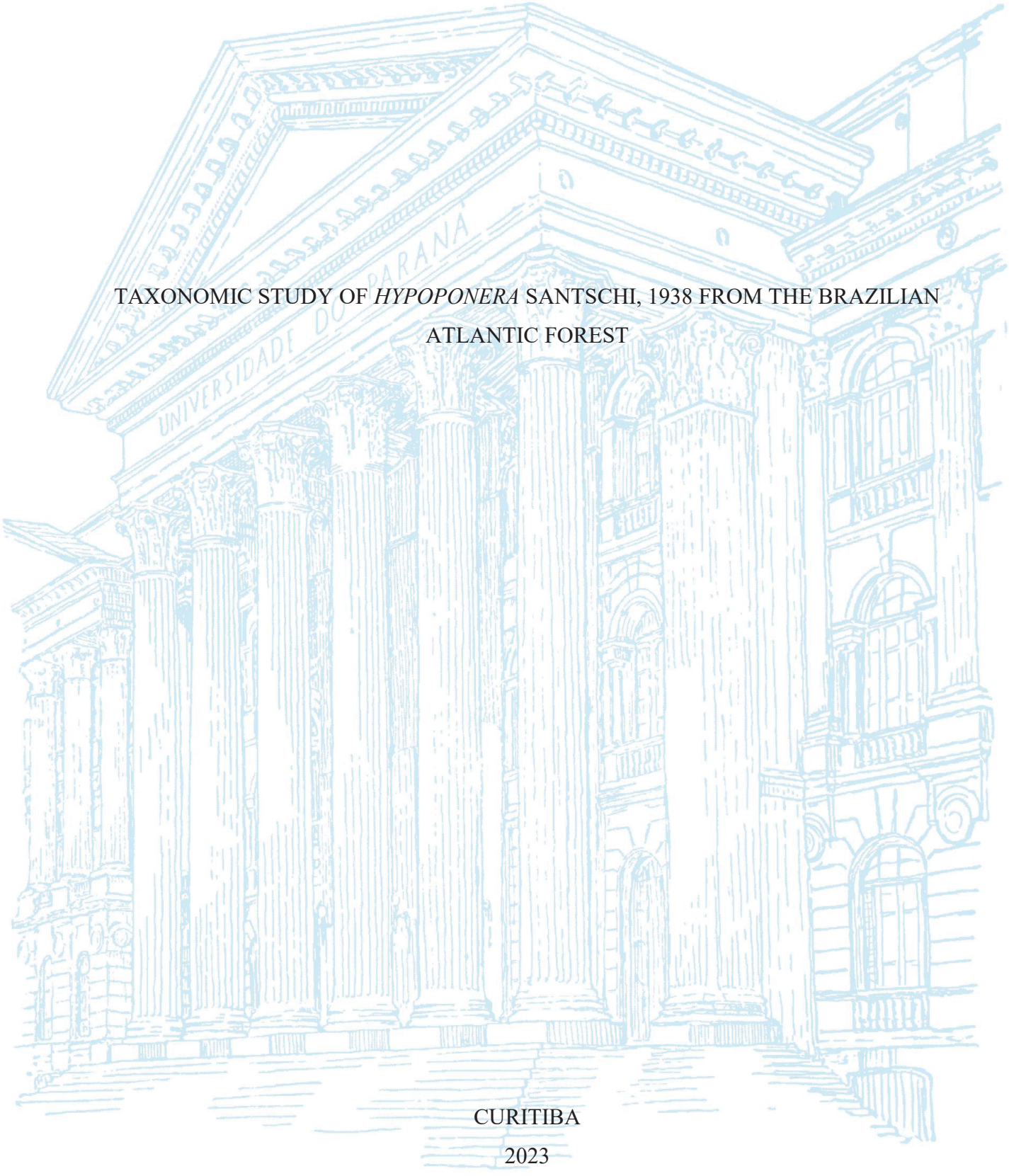
AMANDA MARTINS DIAS



TAXONOMIC STUDY OF *HYPOPONERA* SANTSCHI, 1938 FROM THE BRAZILIAN ATLANTIC FOREST

CURITIBA

2023

AMANDA MARTINS DIAS

TAXONOMIC STUDY OF *HYPOPONERA* SANTSCHI, 1938 FROM THE BRAZILIAN ATLANTIC FOREST

Tese apresentada ao curso de pós-graduação em Entomologia, setor de Ciências Biológicas, Universidade Federal do Paraná, como requisito parcial à obtenção do título de Doutora em Entomologia.

Orientador: Prof. Dr. Rodrigo M. Feitosa

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TERMO DE APROVAÇÃO

Os membros da Banca Examinadora designada pelo Colegiado do Programa de Pós-Graduação CIÊNCIAS BIOLÓGICAS (ENTOMOLOGIA) da Universidade Federal do Paraná foram convocados para realizar a arguição da tese de Doutorado de **AMANDA MARTINS DIAS** intitulada: **Taxonomic study of *Hypoponera Santschi*, 1938 from the Brazilian Atlantic Forest**, sob orientação do Prof. Dr. RODRIGO DOS SANTOS MACHADO FEITOSA, que após terem inquirido a aluna e realizada a avaliação do trabalho, são de parecer pela sua APROVAÇÃO no rito de defesa.

A outorga do título de doutora está sujeita à homologação pelo colegiado, ao atendimento de todas as indicações e correções solicitadas pela banca e ao pleno atendimento das demandas regimentais do Programa de Pós-Graduação.

CURITIBA, 18 de Agosto de 2023.

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“O mundo era tão recente que muitas coisas careciam de nome, e
para mencioná-las era preciso apontar com o dedo”

Gabriel García Márquez, na obra Cem anos de Solidão

RESUMO

O gênero *Hypoponera* é o segundo mais diverso em espécies dentro de Ponerinae e o mais comumente coletado em amostras de serapilheira. Apesar de sua relevância, a taxonomia do grupo é historicamente negligenciada, e não há nenhuma revisão formalmente publicada para o Brasil, onde espécimes têm se acumulado sem nome em coleções. Com o intuito de começar a preencher essa lacuna, propomos neste trabalho realizar um estudo taxonômico das espécies de *Hypoponera* que ocorrem na Mata Atlântica brasileira. Examinamos mais de 5.800 operárias, em sua maioria depositados na Coleção Entomológica Padre Jesus Santiago Moure e no Museu de Zoologia da Universidade de São Paulo. Como resultado, encontramos 32 espécies, dentre as quais 20 são aqui descritas pela primeira vez. Também propomos sete sinonímias. Finalmente, fornecemos uma chave de identificação ilustrada, mapas de distribuição e imagens de alta resolução para todas as espécies. Embora acreditemos ter avançado substancialmente no conhecimento sobre a taxonomia de *Hypoponera*, a expansão da cobertura geográfica em futuros estudos deverá melhorar ainda mais o conhecimento sobre a variação morfológica e distribuição das espécies.

Palavras-chave: América do Sul; classificação; entomologia; formigas.

ABSTRACT

The genus *Hypoponera* is the second most diverse in number of species within the Ponerinae and the most commonly collected in litter samples. Despite its relevance, the taxonomy of the group is historically neglected, and there is no formally published studies for Brazilian species, where specimens have accumulated without names in collections. In order to fill this gap, we propose in this work to carry out a taxonomic study of the *Hypoponera* species that occur in the Brazilian Atlantic Forest. We examined more than 5,800 workers, most of them deposited in the Padre Jesus Santiago Moure Collection (DZUP) and in the Museum of Zoology of the University of São Paulo (MZSP). As a result, we found 32 species, among which 20 are described here for the first time. We also propose seven synonyms. Finally, we provide an illustrated identification key, distribution maps and high-resolution images for all species. Although we believe to have substantially advanced in the knowledge of *Hypoponera* taxonomy, the expansion of geographical coverage in future studies should further enhance our understanding of morphological variation and species distribution.

Keywords: South America; classification; entomology; ants.

SUMÁRIO

1 Introdução

A subfamília Ponerinae é a terceira maior de Formicidae, com quase 1.300 espécies válidas e distribuição Pantropical (Janicki et al. 2016, Guénard et al. 2017, Bolton 2023). Esse grupo se destaca por apresentar características plesiomórficas, como a casta operária monomórfica, o baixo dimorfismo entre rainhas e operárias e colônias de tamanho reduzido (Schmidt & Shattuck 2014). Dos 50 gêneros viventes, quatro representam juntos mais de 50% do número total de espécies em Ponerinae: *Leptogenys* Roger, 1861 (316 espécies), *Hypoponera* Santschi, 1938 (154 espécies), *Anochetus* Mayr, 1861 (115 espécies) e *Odontomachus* Latreille, 1804 (73 espécies) (Bolton 2023).

De todos os gêneros de Ponerinae, *Hypoponera* é o mais amplamente distribuído, ocorrendo em todos os continentes, exceto na Antártida (Schmidt & Shattuck 2014, Ward 2000, Bolton & Fisher 2011). Essas formigas também estão entre as mais abundantes em amostras de serrapilheira e podem representar mais de 60% do número total de indivíduos de Ponerinae coletados neste estrato (Belshaw & Bolton 1994, Bolton & Fisher 2011). É possível que *Hypoponera* seja o gênero mais diverso da subfamília, mas o número de espécies é subestimado devido à falta de ferramentas de identificação e revisões taxonômicas para a maior parte do mundo (Schmidt & Shattuck 2014).

Indivíduos de *Hypoponera* são geralmente criptobióticos, isto é, vivem em micro-hábitats com pouca luz e espacialmente restritos (Andersen & Brault 2010). Morfologicamente, o gênero costuma apresentar olhos muito pequenos, corpo pequeno e alongado, ausência de espinescência, pernas curtas e robustas e metatíbia com esporão único (Andersen & Brault 2010, Schmidt & Shattuck 2014, Wong & Guénard 2017). *Hypoponera* também é frequentemente caracterizada por sua baixa variabilidade morfológica (Lattke 2003, Bolton & Fisher 2011).

O gênero carece de qualquer autapomorfia óbvia, o que sugere que *Hypoponera* pode não ser um grupo natural (Schmidt & Shattuck 2014). Devido à morfologia criptobiótica, as operárias de *Hypoponera* podem ser muito semelhantes às de outros gêneros de Ponerinae, como *Ponera* Latreille, 1804. Embora ainda não haja nenhuma grande análise filogenética incluindo espécies representativas de todas as biorregiões do mundo, até o momento a monofilia de *Hypoponera* tem sido suportada por dados moleculares (Brady et al. 2006, Ouellette et al. 2006, Schmidt 2013). Segundo Schmidt (2013), o clado irmão de *Hypoponera* é composto pelos gêneros *Centromyrmex* Mayr, 1866, *Psalidomyrmex* André, 1890, *Loboponera* Bolton & Brown, 2002 e *Plectroctena* Smith, 1858.

Pouco se sabe sobre os hábitos de vida de *Hypoponera*. São predadoras generalistas que vivem em colônias com menos de 100 operárias em ninhos no solo, serrapilheira, madeira em decomposição ou sob pedras (Yamauchi et al. 1996, Foitzik et al. 2010, Fernandes et al. 2012, Schmidt & Shattuck 2014). A maioria dos estudos sobre o grupo está relacionada às suas características reprodutivas (Schmidt & Shattuck 2014). Diferentes tipos de formas reprodutoras são conhecidas, como rainhas e machos ápteros (Yamauchi et al. 1996, Yamauchi et al. 2001, Foitzik et al. 2010). A ocorrência dessas formas pode confundir a classificação do grupo, uma vez que reprodutores sem asas podem ser descritos como operárias de outras espécies (Bolton & Fisher 2011).

Estudos taxonômicos sobre *Hypoponera* são escassos. Por ser altamente abundante e diverso, esse gênero pode ser uma das principais fronteiras para o entendimento da diversidade de Ponerinae. Feitosa et al. (2022) destacam que mais de 80% dos registros de *Hypoponera* em estudos de diversidade de formigas estão associados a códigos de morfoespécies, ou seja, não são identificados em nível de espécie. Desde a descrição por Santschi (1938) como um subgênero de *Ponera* Latreille, 1804, e posterior elevação ao nível de gênero por Taylor (1967), a taxonomia do gênero foi revisada apenas para as faunas da Polinésia (Wilson & Taylor 1967) e das regiões Afrotropical e do Oeste Paleártico (Bolton & Fisher 2011).

Outras publicações taxonômicas incluem principalmente as chaves de identificação regionais para Cuba (Alayo 1974), Suíça (Kutter 1977), Rússia europeia (Arnol'di & Dlussky 1978), Península Balcânica (Agosti & Collingwood 1987), Japão (Morisita et al. 1989), Turquemenistão (Dlussky et al., 1990), Bulgária (Atanassov & Dlussky 1992), China (Wu & Wang 1995), Arábia Saudita (Collingwood & Agosti 1996), Coreia (Kim et al. 1998), Taiwan (Terayama 2009), Sudoeste da Austrália (Heterick 2009), Fiji (Sarnat & Economo 2012), Índia (Bharti et al. 2015), Colômbia (Dash e Mackay, 2019) e Grécia (Borowiec & Salata 2022).

No Brasil, onde não há nenhuma ferramenta de identificação formalmente publicada para o gênero, há pelo menos 31 espécies e subespécies registradas, das quais 30 ocorrem na Mata Atlântica, o bioma que concentra o maior número de coletas (Janicki et al. 2016, Guénard et al. 2017, Divieso et al. 2020). No entanto, como já mencionado, a maioria das espécies de *Hypoponera* em estudos ecológicos realizados neste bioma não são nominalmente identificadas (por exemplo, Silva et al. 2007, Silva et al. 2022). Portanto, neste trabalho realizamos um estudo taxonômico das espécies de *Hypoponera* que ocorrem na Mata

Atlântica brasileira, a fim de acessar as principais questões nomenclaturais que afetam sua identidade e explorar sua morfologia, melhorando a delimitação e identificação das espécies.

2 Introduction

The ant subfamily Ponerinae is the third largest of Formicidae, with almost 1,300 valid species and a pantropical distribution (Janicki et al. 2016, Guénard et al. 2017, Bolton 2023). Among ants, this group stands out for presenting plesiomorphic characteristics, such as the monomorphic worker caste, the low dimorphism between queens and workers, and the reduced colony size (Schmidt & Shattuck 2014). Of the 50 extant genera of the subfamily, four represent together more than 50% of the total species number in Ponerinae: *Leptogenys* Roger, 1861 (316 species), *Hypoponera* Santschi, 1938 (154 species), *Anochetus* Mayr, 1861 (115 species), and *Odontomachus* Latreille, 1804 (73 species) (Bolton 2023).

Of all Ponerinae genera, *Hypoponera* is the most widely distributed, occurring in all continents, except for Antarctica (Schmidt & Shattuck 2014, Ward 2000, Bolton & Fisher 2011). These ants are also one the most abundant in leaf-litter samples and may represent more than 60% of the total number of Ponerinae individuals collected (Belshaw & Bolton 1994, Bolton & Fisher 2011). In fact, *Hypoponera* can be the most diverse genus of the subfamily, but the number of species is underestimated due to the lack of identification tools and taxonomic reviews for most parts of the world (Schmidt & Shattuck 2014).

Hypoponera individuals are usually cryptobiotic, which is referred here as ants which live in low light and spatially restricted microhabitats (Andersen & Brault 2010). Morphologically, the genus usually presents very small eyes, small and elongated body, absence of spinescence, short and robust legs, and metatibia with a single spur (Andersen & Brault 2010, Schmidt & Shattuck 2014, Wong & Guénard 2017). *Hypoponera* is also often characterized by its low morphological variability (Lattke 2003, Bolton & Fisher 2011).

The genus lacks any obvious autapomorphy, which could suggest that *Hypoponera* is not a natural group (Schmidt & Shattuck 2014). Because of the cryptobiotic morphology, *Hypoponera* workers can be very similar to other Ponerinae genera, such as *Ponera* Latreille, 1804. However, studies using molecular data confirm *Hypoponera* monophyly so far, although a large phylogenetic analysis including representative species from all world's bioregions is lacking (Brady et al. 2006, Ouellette et al. 2006, Schmidt 2013). According to Schmidt (2013), the genus forms a clade, which is the sister to a clade formed by the genera *Centromyrmex* Mayr, 1866, *Psalidomyrmex* André, 1890, *Loboponera* Bolton & Brown, 2002, and *Plectroctena* Smith, 1858.

Little is known about the life habits of *Hypoponera.* They are generalist predators and live in small colonies with less than 100 workers on the ground, litter, decaying wood, or

under rocks (Yamauchi et al. 1996, Foitzik et al. 2010, Fernandes et al. 2012, Schmidt & Shattuck 2014). Most studies on the group are related to their reproductive traits (Schmidt & Shattuck 2014). Different types of reproductive forms have been observed, such as wingless queens and males (Yamauchi et al. 1996, Yamauchi et al. 2001, Foitzik et al. 2010). The occurrence of these forms may confuse the classification of the group since wingless reproductives can be described as workers of other species (Bolton & Fisher 2011).

Taxonomic studies on *Hypoponera* are scarce. Since it is highly abundant and diverse, this genus can be one of the main frontiers for understanding the diversity of Ponerinae. Feitosa et al. (2022) highlighted that more than 80% of *Hypoponera* records in ant diversity studies are associated with morphospecies codes, that is, they are not identified at the species level. From the description by Santschi (1938) as a subgenus of *Ponera* Latreille, 1804, and posterior elevation to genus level by Taylor (1967), taxonomic revisions were carried for the fauna of Polynesia (Wilson & Taylor 1967) and the Afrotropical and West Palearctic regions (Bolton & Fisher 2011).

Other taxonomic publications include mainly the regional identification keys for Cuba (Alayo 1974), Switzerland (Kutter 1977), European Russia (Arnol'di & Dlussky 1978), Peninsula Balkan (Agosti & Collingwood 1987), Japan (Morisita et al. 1989), Turkmenistan (Dlussky et al., 1990), Bulgaria (Atanassov & Dlussky 1992), China (Wu & Wang 1995), Saudi Arabia (Collingwood & Agosti 1996), Korea (Kim et al. 1998), Taiwan (Terayama 2009), South West Australia (Heterick 2009), Fiji (Sarnat, E.M.; Economo 2012), India (Bharti et al. 2015), Colombia (Dash and Mackay, 2019), and Greece (Borowiec & Salata 2022).

In Brazil, where there is no identification tool formally published for the genus, there are at least 31 species and subspecies recorded, of which 30 occur in the Atlantic Forest, the best-sampled biome (Janicki et al. 2016, Guénard et al. 2017, Divieso et al. 2020). However, as already mentioned, most *Hypoponera* species in ecological studies carried out in this biome are not namely identified (*e.g.*, Silva et al. 2007, Silva et al. 2022). Therefore, in this work we provide a taxonomic study of *Hypoponera* species that occur in the Brazilian Atlantic Forest, in order to access the main nomenclatural issues that affect their identity and explore their morphology, improving species delimitation and identification.

3 Methods

We examined 5,812 specimens personally in museums and four specimens through images available on AntWeb.org and in Dash (2011) dissertation. Below are listed repositories of the ants included in this study:

DZUP - Departamento de Zoologia da Universidade Federal do Paraná, Coleção Entomológica Padre Jesus Santiago Moure, Curitiba, Brazil

MHNG - Musée d'Histoire Naturelle, Geneva, Switzerland

MZSP - Museu de Zoologia da Universidade de São Paulo, Brazil

NHMB - Naturhistorisches Museum, Augustinergasse 2, Basel, Switzerland

NHMW – Naturhistorisches Museum Wien, Vienna, Austria.

MSNG - Museo Civico di Storia Naturale "Giacomo Doria.", Genoa, Italy

All the specimens from NHMB, except by CASENT0915296 (https://www.antweb.org/specimenImages.do?name=CASENT0915296), were examined in person at the University of Texas at El Paso (UTEP), United States, to which these types were loaned.

We used the comprehensive delimitation of the Atlantic Forest proposed by Muylaert et al. (2018), which considers all areas from the main delimitation maps used in Brazil. The map below illustrates the distribution of all Atlantic Forest *Hypoponera* specimens examined in this study.

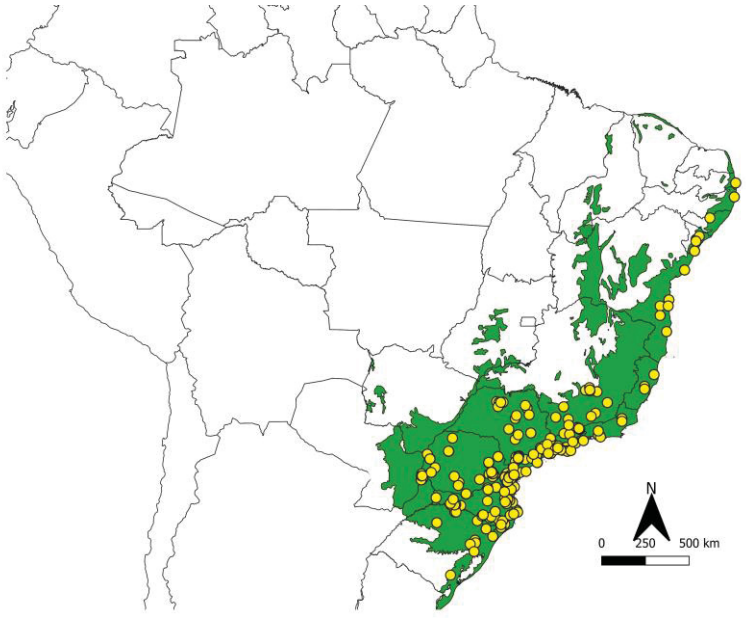

Figure 1. Distribution of *Hypoponera* in the Brazilian Atlantic Forest based on the specimens examined in this study.

Given the large number of examined specimens, and advocating for a way to provide specimens data in an easier format to recover information, in the main text of this paper we are providing only an abstract of distribution, with cities listed on the topic "distribution". All examined species are listed in supplementary material 1.

We emloyed here Mayr's concept of species: groups of interbreeding populations reproductively isolated from other groups (Mayr 1942). The main evidence we used to infer this isolation was morphology, but, when possible, we used ecological information. We considered as a species a group of ants sharing characteristics that are discontinuous in relation with other groups (species). This morphological discontinuity is evidence of reproductive isolation.

Whenever possible, measures were taken from at least 10 specimens of each species, in order to cover the entire distribution of species. Measures were mostly based on Bolton & Fisher 2011, with additions we judged could be useful in species delimitation, and are given in mm. A spreadsheet with all measurements and indices is available in supplementary material 2. The term "NA" (Not Applicable) was used in cases where it was not possible to clearly visualize a structure and measure it. Abbreviations of measures taken (Fig. 2) and indices are listed below:

HL Head length in full-face view. A median longitudinal line traced from anterior margin of clypeus to posterior margin of head.

HW Maximum width of the head in full-face view. The longer transversal line traced on head, without eyes.

ML Mandible length. In full-face view, a line traced from apical tooth to the external articulation with clypeus.

SL Maximum scape length. Maximum length of first antennomere, without the basal constriction.

PrW Pronotal width. In dorsal view, the maximum width of pronotum.

MeL Mesonotum length. In dorsal view, the maximum length from promesonotal suture to metanotal sulcus, when visible.

WL Weber's length or mesosomal length. In lateral view, a line traced from transition between anterior and dorsal surfaces of pronotum to the posteroventral limit of mesosoma.

HFL Hind femur length. Maximum length of posterior leg femur, from the articulation with trochanter to the articulation with tibia.

HBL Hind basitarsus length. Maximum length of basal tarsus of posterior leg, from the articulation with tibia to its apical limit.

PeL Petiolar node length. In lateral view, the maximum length of petiolar node, without the anterior tubercle.

PeH Petiolar node height. In lateral view, the maximum height of petiolar node, excluding petiolar sternite.

PeW Petiolar node width. In dorsal view, the maximum width of petiolar node.

PS Petiolar size. (PeL+PeH+PeW)/3.

Indices:

CI Cephalic index: (HL/HW)*100

MI Mandibular index: (ML/HL)*100

SI Scape index: (SL/HL)*100

PeI Petiole node index: (PeW/PrW)*100

LPeI Lateral Petiole index: (PeL/PeH)*100

DPeI Dorsal Petiole index: (PeW/PeL)*100

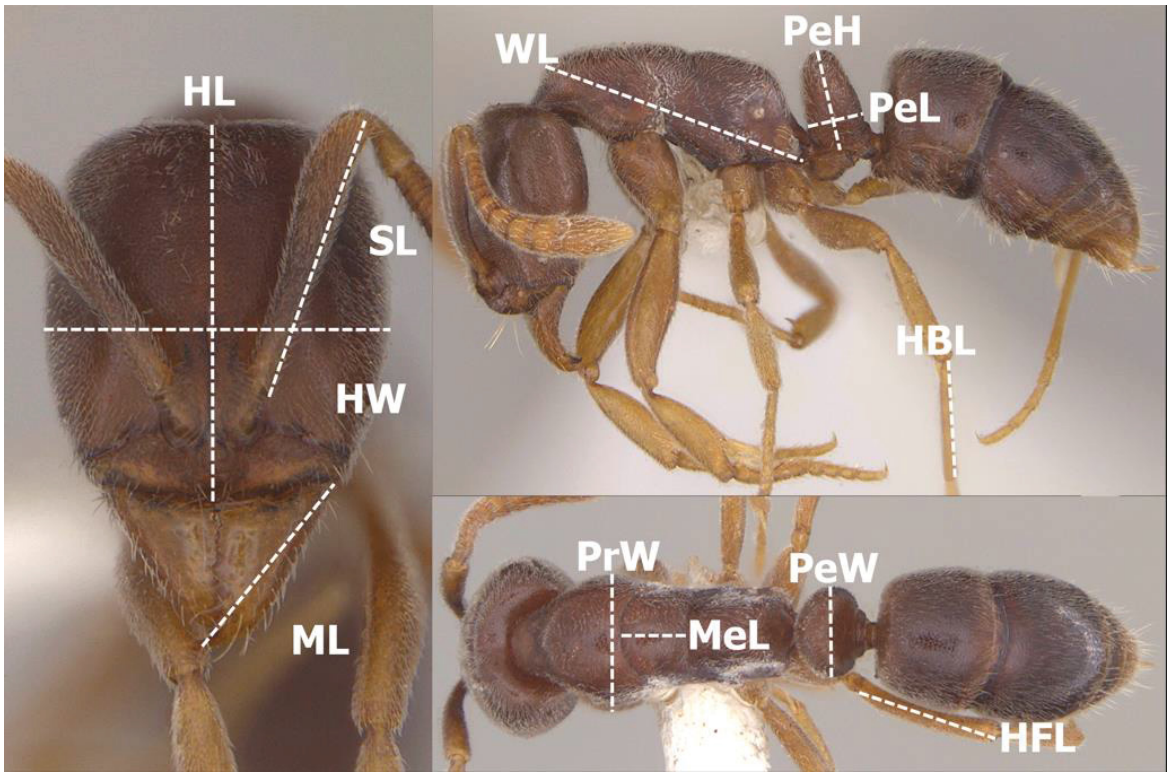

Figure 2. Measurements taken for *Hypoponera* in the present study. *Hypoponera pampana* (Santschi, 1925).

The terminology used in the descriptions and redescriptions followed Bolton & Fisher (2011) and Borowiec (2016) for external morphology, Harris (1979) for body surface sculpturing, and Wilson (1955) for pilosity. Since ants have bilateral symmetry, we used all terms in singular.

In sculpturing descriptions (punctuation), we opted to use the terms “sparse” when the distance between punctae is greater than their diameter, and “dense” when the distance between punctae is equal or less than their diameter.

For instances where we refer to the degree of convexity of the clypeus in full-face view, we use three categories to describe it: (i) strongly concave, when it is bilobed (Fig. 3A); (ii) slightly concave, when the margin seems almost convex, but has a shallow concavity or small notch (Fig. 3B); and (iii) convex, when it is continuous, without any notch (Fig. 3C).

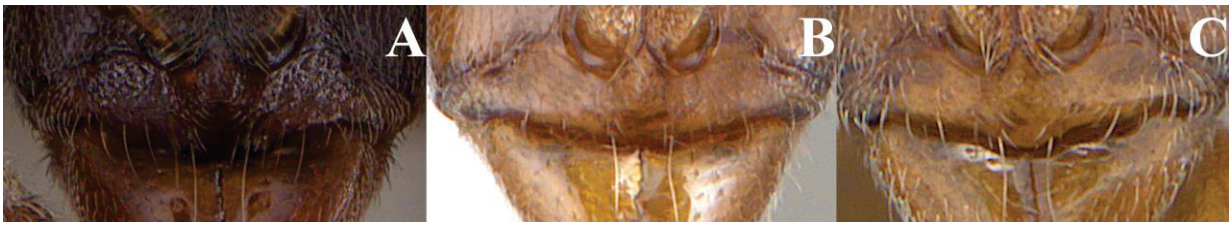

Figure 3. Anterior margin of clypeus. A: bilobate; B: slightly concave; c: convex.

To categorize the distance of the eye in relation to the posterior margin of the clypeus in lateral view, we calculated the ratio by dividing the distance between the anterior margin of the eye and the posterior margin of the clypeus by the distance between the posterior margin of the clypeus and the posterior margin of the head. When the result is equal to or greater than 0.15, the eye is classified as "distant" from the posterior margin of the clypeus (Fig. 4A). Conversely, when the result is less than 0.15, the eye is described as "close" to the posterior margin of the clypeus (Fig. 4B).

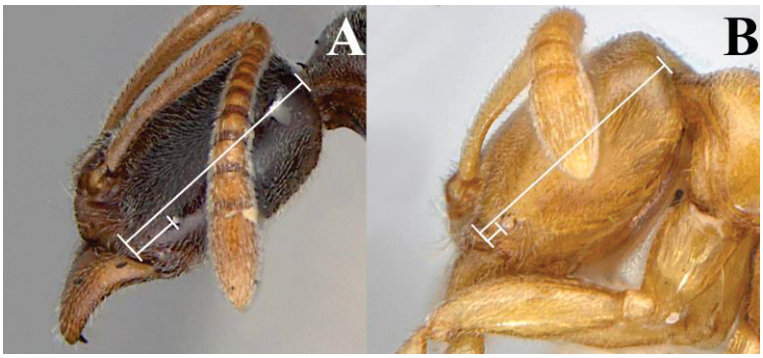

Figure 4. Distance between eye and posterior margin of clypeus. A: distant; B: close.

The anterior margin of the mesopleuron is categorized based on the angle formed by its upper and lower portions, which can meet in two ways: (i) forming an "acute angle", when this meeting is discontinuous and forms an angle less than or equal to 90º (Fig. 5A); or (ii)

forming an "obtuse angle", when this meeting is continuous or forms an obtuse angle (Fig. 5B).

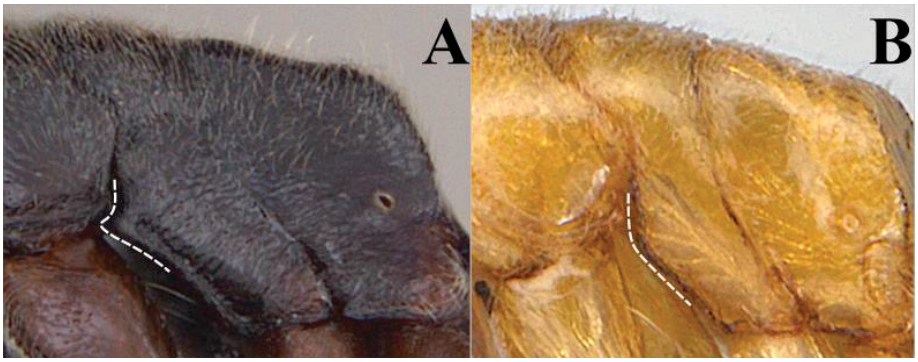

Figure 5. Meeting between upper and lower anterior margins of mesopleuron. A: acute; B: obtuse.

When we refer to the declivitous margin of the propodeum in relation to the metapleural gland opening, its margin can be: (i) "notched," when the gland opening clearly interrupts the declivitous margin of the propodeum (Fig. 6A); (ii) "slightly concave," when the propodeum is slightly concave at the point where the gland opens (Fig. 6B); or (iii) “continuous,” when the opening of the metapleural is continuous with the declivitous margin of the propodeum, and does not form any concavity (Fig. 6C).

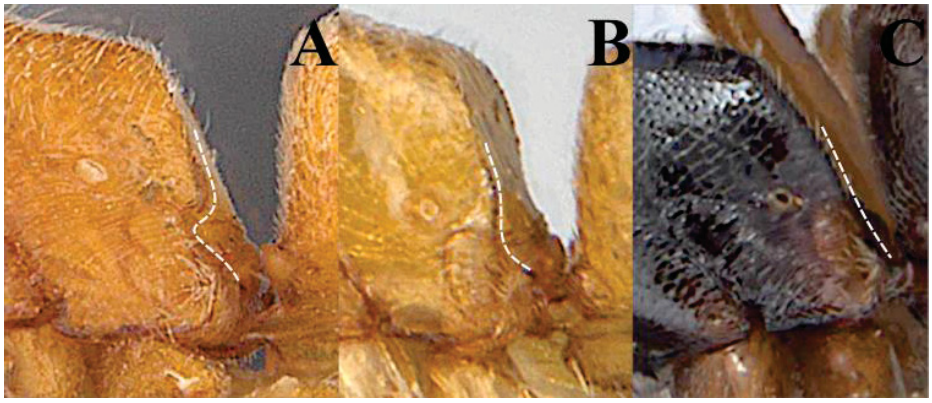

Figure. 6. Declivitous margin of propodeum. A: notched; B: slightly concave; C: continuous.

Species were photographed using a Zeiss Stereo Discovery V20 stereo microscope with a Zeiss Axiocam 305 color video camera. All images of the Forel types were made available on Antweb.org. Image stacking was carried out using Combine ZP, while frames for each species were constructed using the software GIMP 2.10.8. Each frame includes photographs of the species in full-face, lateral, and dorsal views. Additionally, each frame contains a distribution map representing all specimens examined in this study. The maps were generated using QGIS 3.20.3, utilizing the original coordinates or, when the coordinates were missing in the labels, a center point of the geopolitical location.

4 Results

Genus *Hypoponera* Santschi, 1938

Hypoponera Santschi, 1938: 79 (as subgenus of *Ponera*). Type-species: *Ponera abeillei* André, 1881: 61 and xlviii, by original designation. [Raised to genus: Taylor, 1967: 9.]

Diagnosis of Brazilian species. Small Ponerinae (WL<2.1 mm) with triangular mandible, single pectinate spur on meso- and metatibia, meso- and metabasitarsus lacking stout traction setae, pretarsal claws simple, body densely punctate and covered by white pubescence.

Redescription of Brazilian species. Very small to medium-sized Ponerinae (WL<2.1 mm); body varying from yellow to dark brown.

Head. In full-face view, varying from rounded to subquadrate, posterior margin concave to convex. Mandible triangular, virtually edentate to multidenticulate. Clypeus narrowly inserted between frontal lobes; anterior margin of clypeus strongly concave to convex. Frontal lobe covering most of antennal insertion. Eye varying from very reduced, with one ommatidium, to very large, with more than 30 ommatidia; always placed on anterior half of head, often on the anterior third, and reaching the lateral margin of head. Antenna with 12 articles; scape surpassing or not the posterior margin of head; funiculus filiform, not clubbed. Mandible variably punctate; shiny. Frons and gena punctate, rarely rugulose-punctate; subopaque to shiny. Head ventrum smooth to punctate; shiny. Head covered by appressed to decumbent pubescence; long pilosity usually present only on clypeus, labium and maxilla.

Mesosoma. In lateral view, anteroventral corner of pronotum rounded, rarely toothed; promesonotal junction forming or not a sulcus that interrupts dorsal margin of mesosoma; dorsal margin of pronotum broadly convex. Notopleural suture between mesonotum and mesopleuron well-marked to absent; junction of upper and lower portions of the anterior margin of the mesopleuron forming an acute to obtuse angle; dorsal margin of mesonotum flat to convex, at the same level to higher than pronotum. Metanotum varies from inconspicuous to forming a deep sulcus. Propodeum with dorsal margin at the same level to very lower than mesonotum; concave to broadly convex. Propodeal declivitous margin usually without projections; metapleural gland usually opening directly on declivitous margin

or on a concavity that interrupts the declivitous margin. Propodeal spiracle varying from slit-shaped to rounded. Protibial apex with a stout seta close to pectinate spur on larger specimens; on small ants, this seta is absent or vestigial. Meso- and metatibia with a single spur, which is pectinate (although sometimes a stout seta basal to pectinate spur may be confused with a simple spur). Meso- and metatibia and meso- and metabasitarsus lacking stout traction setae. Pretarsal claws simple. Mesosoma usually mostly punctate and shiny; sometimes subopaque or silky; mesopleuron varying from smooth to entirely punctate or rugulose; metapleuron always with longitudinal strigulae; declivitous surface usually sparsely punctate to smooth, shiny. Mesosoma covered by appressed to decumbent pubescence; long pilosity usually absent.

Metasoma. Petiolar node in lateral view subtriangular, subrectangular or rectangular; when subtriangular, sometimes curved forward or backward. Petiolar sternite varying in shape, without a posteroventral projection (as seen in *Ponera*); anterior fenestra absent. Petiole punctate and shiny; rarely silky. Prora well-developed to reduced. Girdling constriction of abdominal segment IV with very fine transversal strigulae and sometimes with the posterior region cross-ribbed; stridulatory file inconspicuous. Gaster usually punctate and shiny; sometimes silky; covered by dense pubescence appressed to decumbent; long pilosity sparse to absent. Sting well-developed.

Remarks. *Hypoponera* is difficult to characterize because it has several characteristics converging with other genera that also have a cryptic lifestyle. Due to the lack of clear autapomorphies, the monophyly of the group was questioned by Schmidt e Shattuck (2014). However, previous phylogenies, based on a limited number of species, indicate that *Hypoponera* is a natural group (Brady et al. 2006; Ouellette et al., 2006; Schmidt 2013). Another study, still in progress, included a large number of species with vast morphological variability and corroborates the monophyly of *Hypoponera* (Longino et al., *in prep.*).

The most similar genus, *Ponera* Latreille, 1804, differs by having a maxillary palp with two articles, and a petiolar sternite with an anterior fenestra and a pair of sharp teeth at the posteroventral angle. We were not able to examine the palps of many *Hypoponera* specimens due to its size and position, but when possible, we corroborate Bolton & Fisher (2011), who counted only one article in *Hypoponera*. The most conspicuous and irrefutable character is the presence of the two teeth in the petiolar sternite of *Ponera*, which is completely absent in *Hypoponera* (Bolton & Fisher 2011). Furthermore, *Ponera* is absent from South America.

Some *Hypoponera* specimens may have a stout seta on the metatibia apex that can be confused with a simple spur, which can cause specimens to be misidentified as *Pachycondyla* Smith, 1858. However, this error can be avoided by noting that the *Hypoponera* stout seta is located basally in relation to the pectinate spur, and not to its side, as observed in *Pachycondyla* (Fig. 7).

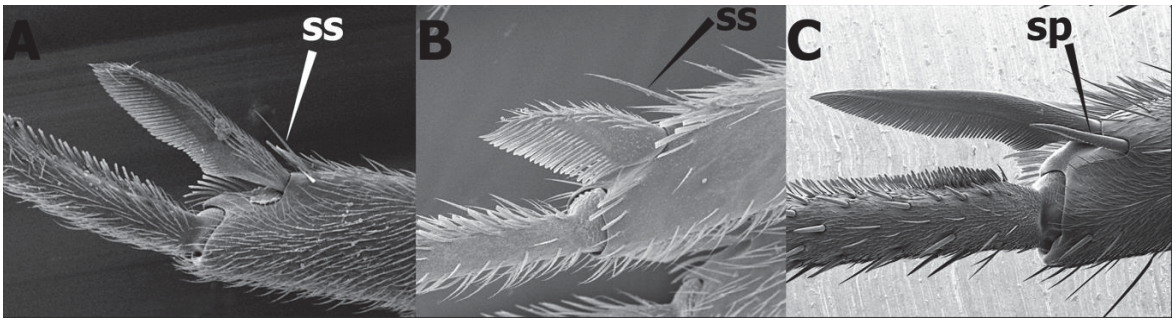

Figure 7. Metatibial apex of *Hypoponera schmalzi* (A), *Hypoponera* AMD_L (B) and *Pachycondyla crassinoda* (ANTWEB1008563) (C); ss: stout seta; sp: simple spur.

Natural history. *Hypoponera* is known by its cryptic lifestyle because its morphology is associated with low-light and spatially restricted microhabitats. These features include reduced eyes, small size, elongated body, reduction or absence of spinescence, short and robust legs, and metatibia with a single spur (Seifert 2009, Andersen & Brault 2010, Schmidt & Shattuck 2014). The microhabitats vary from twigs at leaf litter, under rocks, or underground cavities (Fellers & Fellers 1982, Soares & Schoereder 2001, da Silva et al. 2016). Some species, such as *H. ragusai* (Emery, 1894), preferentially inhabit cave environments (Tinaut 2001). In Europe, the tramp species *H. punctatissima* (Roger, 1859) has been recorded inside warm environments, such as mounds of heat-producing organic material and human buildings, or in more exposed open places (Harris 2003, Seifert 2013). While most species are found in soil, we find through label information that some individuals of *H. schmalzi* (Emery, 1896) forage, and maybe nest, on trees. Colonies usually are small, with the number of individuals varying from a few dozens to just over two hundred (Hashimoto et al. 1995). Polydomous colonies are known for *H. opacior* (Forel, 1893) (Foitzik et al. 2002).

The genus is present in almost all environments, from well-preserved forests to pastures (Fellers & Fellers 1982, Braga et al. 2010, Herrera-Rangel et al. 2015). Some species, such as *H. punctatissima*, *H. eduardi* (Forel, 1894), *H. ragusai*, *H. opacior,* and *H. opaciceps* (Mayr, 1887) are demonstrating strong dispersal capacity and have been introduced in several places (Nuhn & Charles 1979, Fellers & Fellers 1982, Delabie & Blard 2002, Wetterer & Wetterer 2004, Bolton & Fisher 2011, Herrera et al. 2014). All these species have

a worker-queen intercaste and wingless males, suggesting that the unusual mating strategies may improve the capacity to colonize new environments (Bolton & Fisher 2011).

Although wingless males occur in several species, they play different mating strategies in *Hypoponera*. In *H. punctatissima* there are dimorphic wingless males, with majors and minors occurring simultaneously at the nest. Both males can mate with the alate and wingless queens, and majors tend to fight with other majors, but never with minors, because the latter mimic females (Yamauchi et al. 1996).

While in *H. punctatissima* there are no alate males known, in *H. opacior*, a single colony may have alate and wingless males and queens (Foitzik et al. 2002). Typically, alate males leave the nest for the nuptial flight in early summer. This is the outbreeding stage of the colony, which is, when there is a dispersal of alate males that will likely mate with queens from other nests. After this, in late summer, there is a stage of interbreeding mating, when wingless males emerge and mate with sister females on nest (Foitzik et al. 2010).

Different from *H. punctatissima*, wingless males of *H. opacior* do not fight and mate with the queen still in the pupal stage (Foitzik et al. 2002). After copulation, the wingless male guards queen pupa to avoid its insemination by other males. This guard can last for hours and vary according to the number of males competing by queens on the nest (Kureck et al. 2011, Kureck et al. 2013a).

Although ants, like other hymenopterans, have an haplodiploid system of sexual determination, endogamy favors the emergence of diploid males (Foitzik et al. 2011, Kureck et al. 2012, Kureck et al. 2013b). This is because sex determination locus in heterozygosity originates females and in hemizygosity (as in haploid males) or recessive homozygosity originate males (Zayed & Packer 2005). However, while in most Hymenoptera those diploid males fail to reach adulthood, have a shorter life, or are sterile, in *H. opacior* they can reproduce (Zayed & Packer 2005, Kureck et al. 2013b). Kureck et al. (2013b) demonstrates that not only they have the same morphological features as haploids, but also have the same lifetime and the same reproductive capacity. The brood of a diploid father, however, is always sterile and is triploid. Triploid females are always workers and play the same tasks as the diploid workers within the nest (Kureck et al. 2013b).

High endogamy rates are usually correlated with a decrease in colony fitness, either because of deleterious genes or the production of males that are not engaged in colony work (Zayed & Packer 2005, Kureck et al. 2012). However, endogamy can be predominant in *H. opacior* colonies, and this does not affect the reproductive success of this species (Rüger et al. 2005, Kureck et al. 2012).

Hypoponera colonies can be polygynous (Hashimoto et al. 1995; Yamauchi et al. 1996). In *H. opacior*, a newly fertilized queen may either remain within the nest or leave to fund its own colony (Yamauchi et al. 1996). When a fertilized female leaves the nest to establish a new colony, it is followed by some workers from the original nest (Foitzik et al. 2011a, Foitzik et al. 2011b). Queens may compete for workers through dominance fights, while workers, on the other hand, can choose which queen to follow based on its fertility, perceived through cuticular hydrocarbon profile (Foitzik et al. 2011b).

Larval cannibalism was observed in *H. opacior* and *H. punctatissima* (Rüger et al. 2008). This could be explained by the small dimorphism between workers and reproductive females, because a slightly more enriched diet could already promote the development of the larva into a fertile queen. To avoid larval cannibalism, workers keep them separated in the nest (Rüger et al. 2008). In addition, *Hypoponera* larvae possess two pairs of sticky tubercles that are used to attach on the nest walls, which may serve as a means to further separate the larvae (Rüger et al. 2008, Schmidt & Shattuck 2014).

Diet is probably omnivorous, but records are scarce (Bolton & Fisher 2011). They were recorded preying on small invertebrates, such Diptera larvae and termites (Lemaire et al. 1990, Harris 2003), and feeding on seeds (Corff & Horvitz 1995). As expected for Ponerinae, *Hypoponera* usually exhibits solitary foraging behavior. However, once the prey is so large that a single worker cannot carry it, a worker can recruit others by tandem to break it down (Agbogba 1984).

Taxonomic Synopsis of Brazilian Atlantic Forest *Hypoponera*

Hypoponera aliena (Smith, 1858)
Hypoponera argentina (Santschi, 1922)
Hypoponera cauta (Forel, 1912) **New Status**
= *Hypoponera collegiana* (Santschi, 1925) **New synonym**
= *Hypoponera collegiana paranensis* (Santschi, 1925) **New synonym**
Hypoponera distinguenda dispar (Santschi, 1925)
Hypoponera foreli (Mayr, 1887)
Hypoponera idelettae (Santschi, 1923)
Hypoponera inexpedita (Forel, 1911) **New Status**
= *Hypoponera foeda saroltae* (Forel, 1912) **New synonym**
Hypoponera leninei (Santschi, 1925)

Hypoponera leveillei (Emery, 1890)

= *Hypoponera iheringi* (Forel, 1908) **New synonym**

Hypoponera neglecta (Santschi, 1923)

Hypoponera opaciceps (Mayr, 1887)

= *Hypoponera opaciceps gaigei* (Forel, 1914) **New synonym**

Hypoponera opacior (Forel, 1893)

Hypoponera pampana (Santschi, 1925) **New Status**

Hypoponera reichenspergeri (Santschi, 1923)

Hypoponera schmalzi (Emery, 1896)

= *Hypoponera distinguenda histrio* (Forel, 1912) **New synonym**

= *Hypoponera schmalzi fugitans* (Forel, 1912) **New synonym**

Hypoponera schmalzi paulina (Forel, 1913)

Hypoponera schwebeli (Forel, 1913)

Hypoponera trigona (Mayr, 1887)

Hypoponera vernacula (Kempf, 1962)

Hypoponera viri (Santschi, 1923)

Hypoponera wilsoni (Santschi, 1925)

Hypoponera AMD_A **New Species**

Hypoponera AMD_B **New Species**

Hypoponera AMD_C **New Species**

Hypoponera AMD_D **New Species**

Hypoponera AMD_E **New Species**

Hypoponera AMD_F **New Species**

Hypoponera AMD_G **New Species**

Hypoponera AMD_H **New Species**

Hypoponera AMD_I **New Species**

Hypoponera AMD_J **New Species**

Hypoponera AMD_K **New Species**

Hypoponera AMD_L **New Species**

Hypoponera AMD_M **New Species**

Hypoponera AMD_N **New Species**

Hypoponera AMD_O **New Species**

Hypoponera AMD_P **New Species**

Hypoponera AMD_Q **New Species**

Hypoponera AMD_R **New Species**

Hypoponera AMD_S **New Species**

Hypoponera AMD_T **New Species**

Key to workers of *Hypoponera* from Brazilian Atlantic Forest

1A. In lateral view, propodeal declivitous margin crenulate. Petiolar node sub triangular and anteriorly curved (Fig. 8A) ……..… **AMD_H New Species** (Alagoas and Paraná)

1B. In lateral view, propodeal declivitous margin smooth, never crenulate. Petiolar node of variable shape and not curved anteriorly (Fig. 8B) …….……. 2

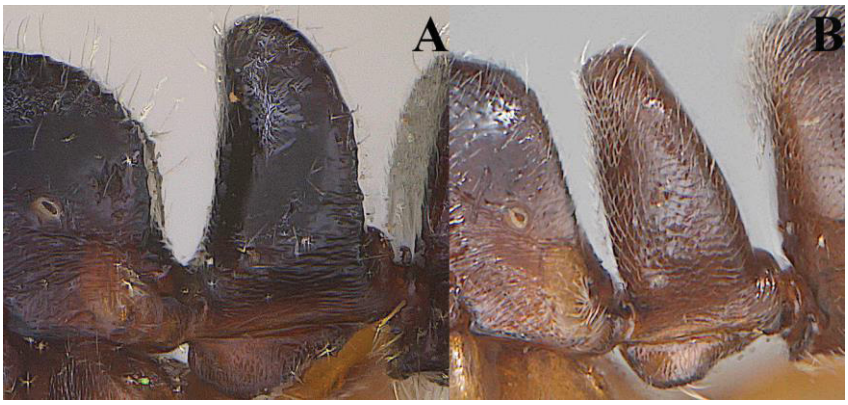

Figure 8. Detail of propodeal declivitous margin and petiolar node in lateral view. A: *Hypoponera* AMD_H New Species. B: *Hypoponera opacior* (Forel, 1893).

2A. Declivitous margin of propodeum with a small subtriangular projection (Fig. 9A). In lateral view, dorsal margin of propodeum at a level clearly lower than mesonotum ……..…..…… **AMD_G New Species** (Bahia and Sergipe)

2B. Declivitous margin of propodeum without a subtriangular projection (Fig. 9B). In lateral view, dorsal margin of propodeum varying from even to clearly lower than mesonotum ….. 3

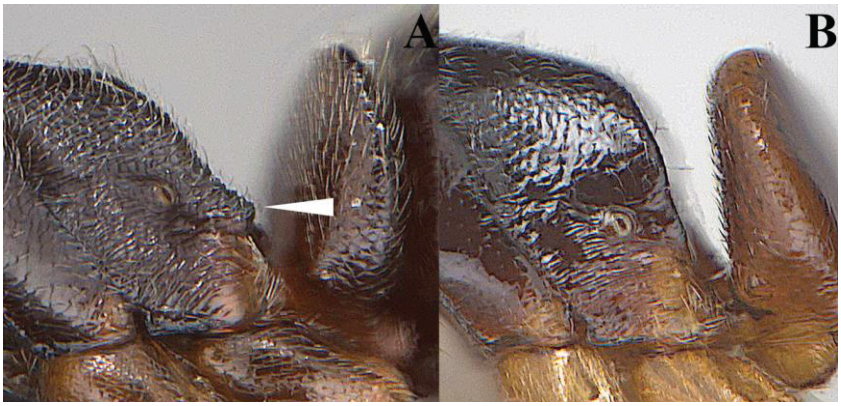

Figure 9. Detail of propodeal declivitous margin in lateral view. A: *Hypoponera* AMD_G New Species. B: *Hypponera* AMD_T.

3A. Large-sized ants (WL>1.3 mm). In lateral view, petiolar node subrectangular and thick. Dorsal margin of propodeum at a level clearly lower than mesonotum (Fig. 10A) …….. ……..……. ***vernacula*** (São Paulo and Paraná)

3B. Differs from any of the above mentioned characteristics (Figs. 10B, 10C) …….. 4

Figure 10. Detail of dorsal margin of mesosoma and thickness of the petiolar node in lateral view. A: *Hypoponera vernacula* (Kempf, 1962). B: *Hypoponera* AMD_P New Species. C: *Hypoponera foreli* (Mayr, 1887).

4A. In lateral view, petiolar node with anterior and posterior margins subparallel (Fig. 11A). Anterior margin of clypeus strongly concave in full-face view (Fig. 11C). Head and mesosoma subopaque ……..…….…….. ***opaciceps*** (widely distributed)

4B. Differs from any of the above mentioned characteristics (Fig. 11B, 11D) ……..….. 5

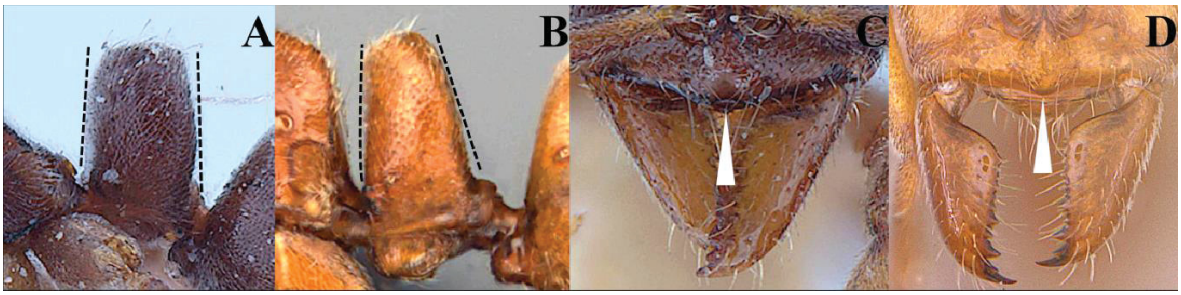

Figure 11. A-B: Detail of petiolar node in lateral view. C-D: Detail of median portion of anterior clypeal margin. A, C: *Hypoponera opaciceps* (Mayr, 1887). B: *Hypoponera idelettae* (Santschi, 1923). D: *Hypoponera* AMD_P New Species.

5A. Eye well-developed, with at least seven very distinct ommatidia (Figs. 12A, 12B). Medium to large ants (WL> 1mm) ……..…… 6

5B. Eye poorly developed, with six or less ommatidia usually partially fused and difficult to count (Figs. 12C, 12D). Small to large ants ……..…… 9

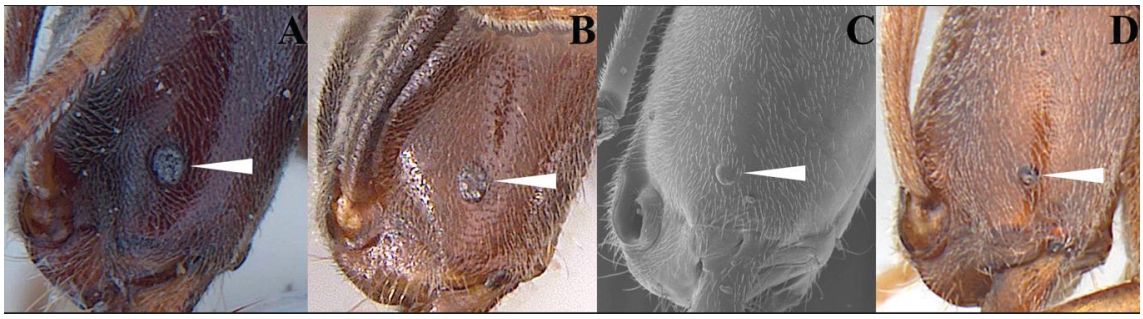

Figure 12. Detail of eye. A: *Hypoponera leveillei* (Emery, 1890). B: *Hypoponera* AMD_G New Species. C: *Hypoponera pampana* (Santschi, 1925). D: *Hypoponera* AMD_R New Species.

6A. In lateral view, petiolar node subtriangular. Dorsal margin of propodeum at a level clearly lower than mesonotum (Fig. 13A) ……. ***foreli*** (widely distributed)

6B. In lateral view, petiolar node subrectangular. Dorsal margin of propodeum at the same level to slightly lower than mesonotum (Fig. 13B) …….…. 7

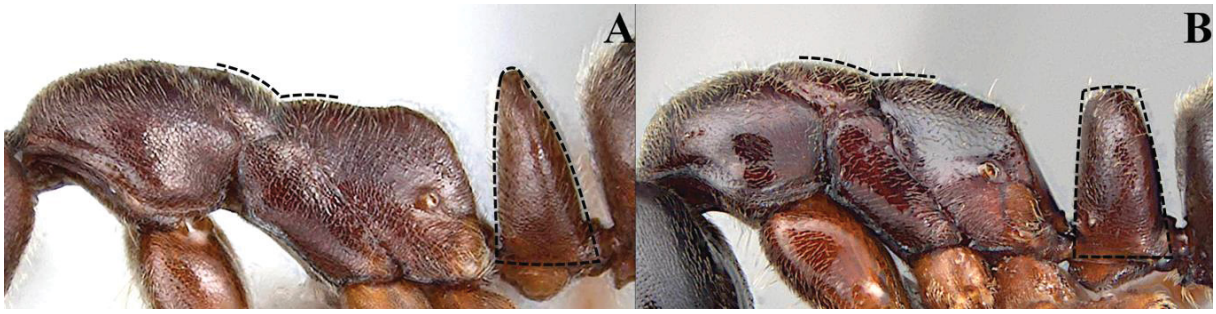

Figure 13. Detail of dorsal margin of propodeum and petiolar node shape in lateral view. A: *Hypoponera foreli* (Mayr, 1887). B: *Hypoponera schmalzi* (Emery, 1896).

7A. Very large ants (WL>1.55 mm) ……. ***leveillei*** (widely distributed)

7B. Medium to large size ants (WL<1.5 mm) ……..……..…….. 8

8A. Head distinctly long (CI>120) (Fig. 14A). In lateral view, petiolar sternite evenly rounded (Fig. 14C). In full-face view, anterior margin of clypeus usually convex (Fig. 14A, arrow) …….. ***leninei*** (Rio de Janeiro to Santa Catarina)

8B. Head sub quadrate (CI<120) (Fig. 14B). In lateral view, petiolar sternite with posterior margin concave (Fig. 14C). In full-face view, anterior margin of clypeus concave (Fig. 14B, arrow) ……..…….. ***schmalzi*** (widely distributed)

Figure 14. A-B: Head shape and detail of anterior margin of clypeus in full-face view. C-D: detail of petiolar node shape in lateral view. A, C: *Hypoponera leninei* (Santschi, 1925). B, D: *Hypoponera schmalzi* (Emery, 1896).

9A. Very small yellow ants (WL<0.6 mm). Notopleural suture between mesonotum and mesopleuron inconspicuous (Fig. 15A) …….. 10

9B. Small to large-sized ants of variable color (WL>0.6 mm). Notopleural suture between mesonotum and mesopleuron usually conspicuous (Fig. 15B-C) ….…….. 11

Figure 15. Detail of mesosoma in lateral view, with the arrow pointing to the notopleural suture. A: *Hypoponera* AMD_M New Species. B: *Hypoponera idelettae* (Santschi, 1923). C: *Hypoponera* AMD_J New Species.

10A. Petiolar sternite with a small notch on posteroventral angle (Fig.16A). Girdling constriction of abdominal segment IV clearly cross-ribbed posteriorly (Fig. 16B). In full-face view, scape fails to reach posterior margin of head (Fig. 16E) ……..
……...……. **AMD_M New Species** (widely distributed)

10B. Petiolar sternite without a posteroventral notch (Fig. 16C). Girdling constriction of abdominal segment IV with posterior cross-ribs inconspicuous or at most with a very thin

band cross-ribbed posteriorly (Fig. 16D). In full-face view, scape reaches posterior margin of head (Fig. 16F) ……..…….... **AMD_N New Species** (widely distributed)

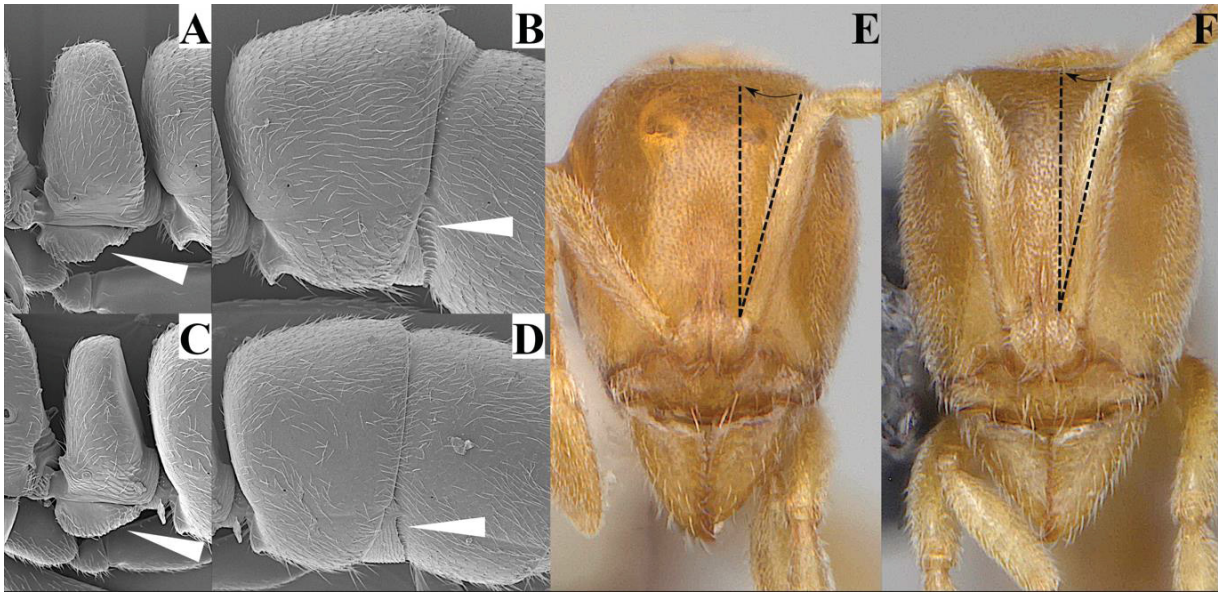

Figure 16. A,C: detail of petiolar sternite. B,D: detail of girdling constriction of abdominal segment IV. E,F: scape length in full-face view. A, B, E: *Hypoponera* AMD_M New Species. C, D, F: *Hypoponera* AMD_N New Species.

11A. In lateral view, eye placed close to posterior margin of clypeus (Fig. 17A). Petiolar node subrectangular …… 12

11B. In lateral view, eye placed distant from posterior margin of head (Fig. 17B). Petiolar varying from subtriangular to rectangular ……..……. 16

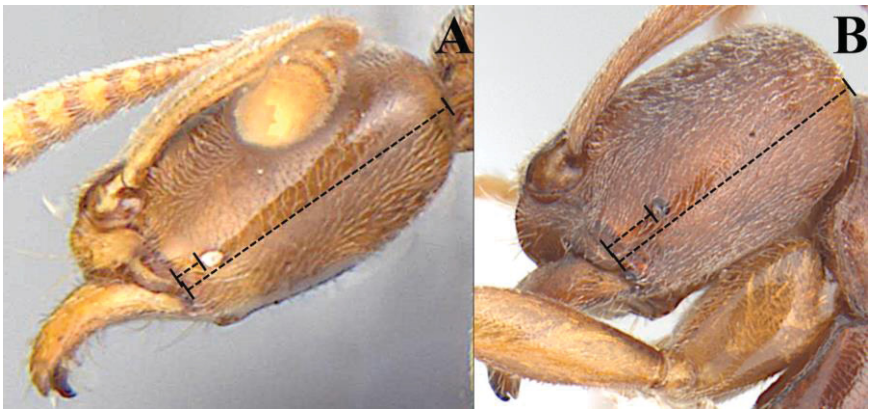

Figure 17. Detail of distance between eye and posterior margin of clypeus in lateral view. A: *Hypoponera* AMD_B New Species. B: *Hypoponera* AMD_R New Species.

12A. In full-face view, scape not reaching posterior margin of head (Fig. 18A) …….. …… **AMD_L New Species** (Minas Gerais to Santa Catarina)

12B. In full-face view, scape reaching and surpassing posterior margin of head (Fig. 18B) ……..…… 13

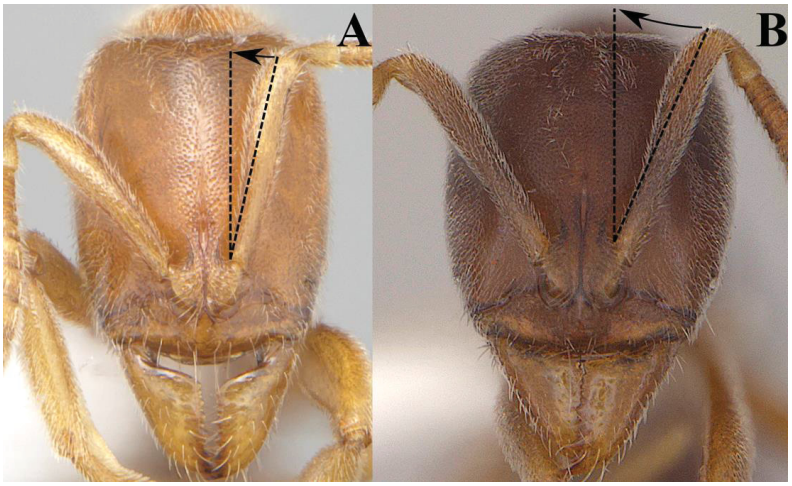

Figure 18. Detail of scape length in full-face view. *Hypoponera* AMD_L New Species. *Hypoponera pampana* (Santschi, 1925).

13A. In lateral view, metanotum inconspicuous or, at most, forming a faint line (Fig. 19A) ……..……..……..……..… ***inexpedita*** **New Status** (widely distributed)

13B. In lateral view, metanotum conspicuous and usually forming a small sulcus that interrupts the dorsal margin of mesosoma (Fig. 18B) …… 14

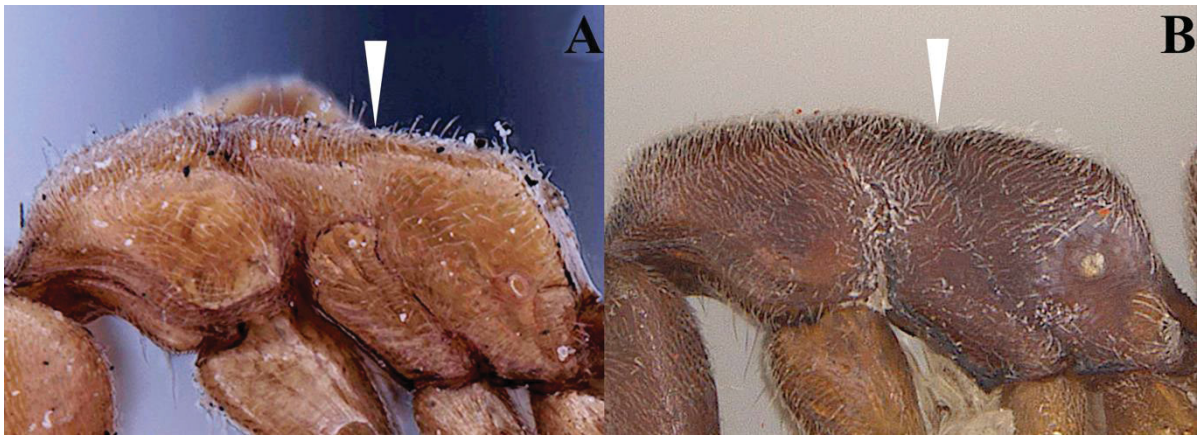

Figure 19. Detail of mesosoma in lateral view, with the arrow pointing to metanotum. A: *inexpedita* (Forel, 1911). B: *Hypoponera pampana* (Santschi, 1925).

14A. In lateral view, petiolar sternite gradually diminishing in height posteriorly (Fig. 20A). Petiolar node thick (LPeI>60) …… **AMD_B New Species** (Bahia)

14B. In lateral view, petiolar sternite with antero- and posteroventral angles virtually even (Fig. 20B). Petiolar node slender (LPeI<60) ……..…….. 15

Figure 20. Detail of petiolar sternite in lateral view. A: *Hypoponera* AMD_B New Species. *Hypoponera* AMD_D New Species.

15A. Integument subopaque (Fig. 21A) ..... ***pampana*** **New Status** (Widely distributed)

15B. Integument shiny (Fig. 21B)..…… **AMD_D New Species** (Sergipe)

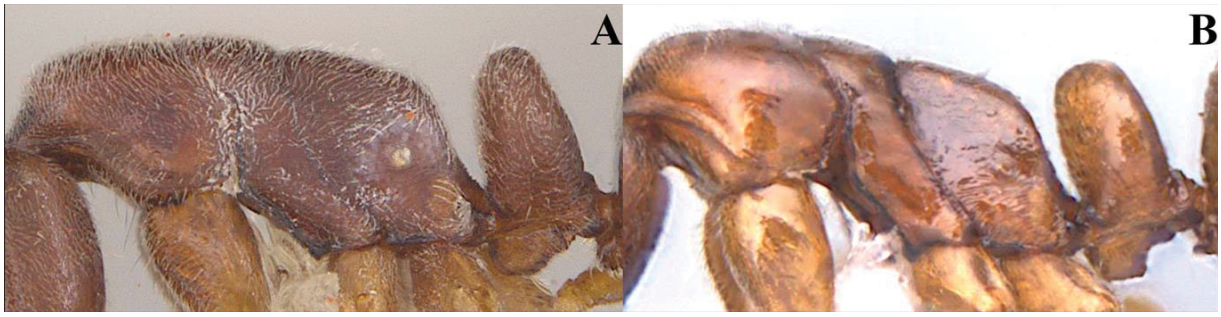

Figure 21. Detail of mesosoma brightness. A: *Hypoponera pampana* (Santschi, 1925). *Hypoponera* AMD_D New Species.

16A. Petiolar sternite with anteroventral angle sharp and posteroventral angle rounded (Fig. 22A) ……..…….. **AMD_R New Species** (widely distributed)

16B. Petiolar sternite different from above (Fig. 22B) ……..…… 17

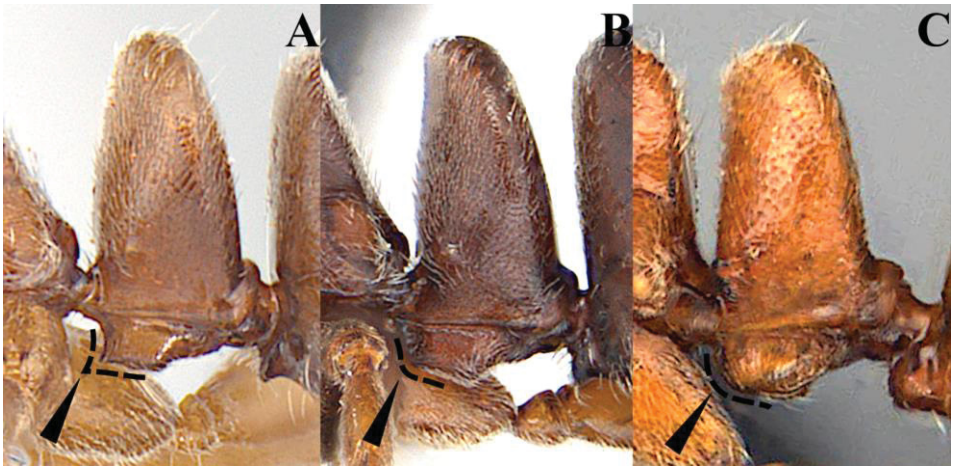

Figure 22. Detail of petiolar sternite in lateral view. A: *Hypoponera* AMD_R New Species. B: *Hypoponera* AMD_Q New Species. C: *Hypoponera idelettae* (Santschi, 1923).

17A. Medium-sized ants (WL>1 mm). In lateral view, petiolar node with anterior margin straight and posterior margin broadly convex and curving anteriorly (Figs. 23A). Metanotum forming a shallow sulcus. Propodeum usually at the same level as mesonotum in lateral view ……... **AMD_Q New Species** (Minas Gerais to Santa Catarina)

17B. Differs from any of the above mentioned characteristics (Figs. 23B-C) ……..…… 18

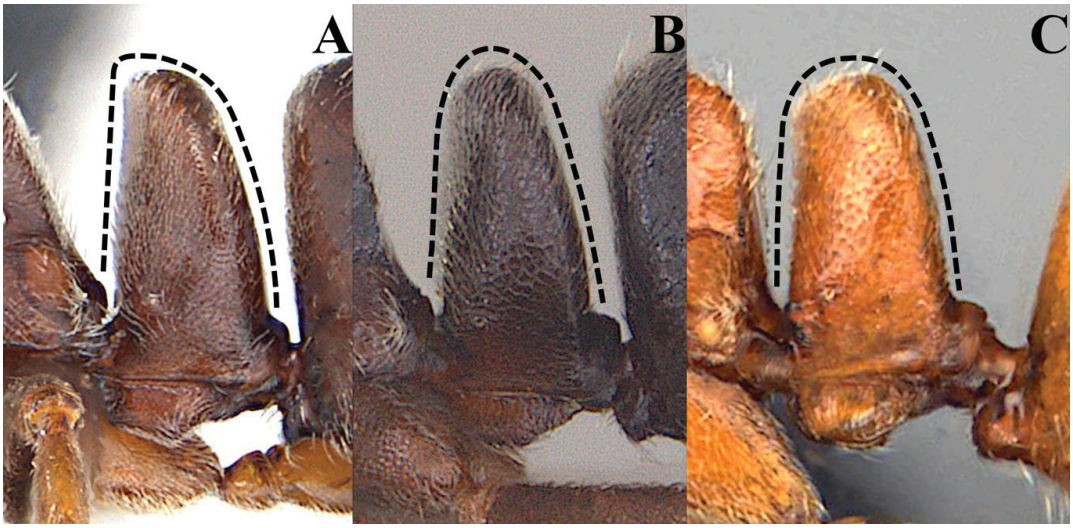

Figure 23. Detail of petiolar node shapes in lateral view. A: *Hypoponera* AMD_Q New Species. B: *Hypoponera cauta* (Mayr, 1887). C: *Hypoponera idelettae* (Santschi, 1923).

18A. In full-face view, anterior margin of clypeus strongly concave (Fig. 24A). In lateral view, petiolar node subtriangular. Propodeum coarsely punctate, with space between punctae usually inconspicuous ...…….……....…. ***cauta*** **New Status** (Widely distributed)

18B. In full-face view, anterior margin of clypeus usually convex (Fig. 24B); sometimes slightly concave. In lateral view, petiolar node varying from subtriangular to rectangular. Propodeum punctae small, with space between them conspicuous …… 19

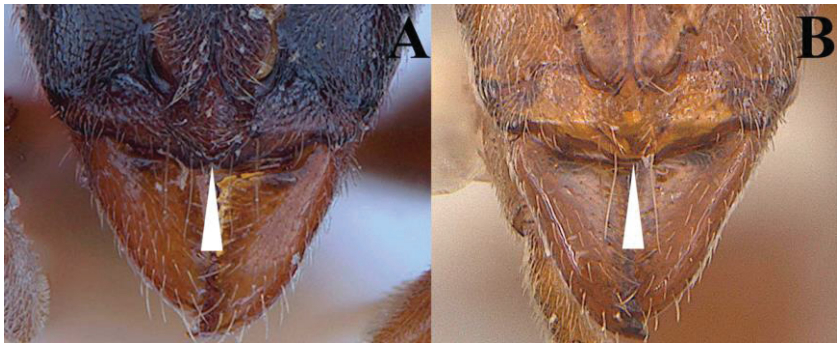

Figure 24. Detail of anterior margin of clypeus in full-face view. A: *Hypoponera cauta*: (Forel, 1912). B: *Hypoponera* AMD_I New Species.

19A. Metanotum forming a sulcus that clearly interrupts the dorsal margin of mesosoma in lateral view (Fig. 25A) ……..……..…….……..…. 21

19B. Metanotum not forming a sulcus, or at most, forming a shallow sulcus that does not clearly interrupts dorsal margin of mesosoma in lateral view (Fig. 25B) …….…….. 24

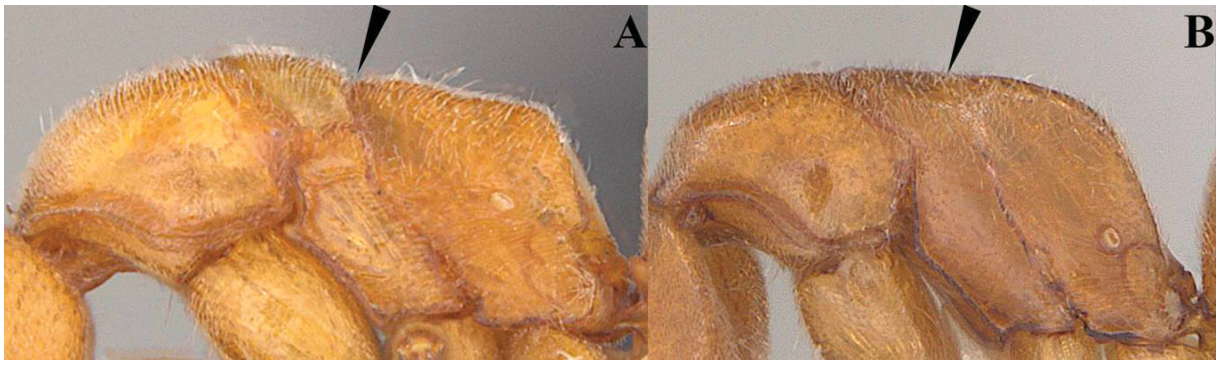

Figure 25. Detail of mesosoma in lateral view, with the arrow pointing to metanotum. A: *Hypoponera* AMD_P New Species. B: *Hypoponera* AMD_F New Species.

20A. In lateral view, petiolar node subtriangular (Fig. 26A). Gaster coarsely punctate ……..……..……. **AMD_C New Species** (Santa Catarina)

20B. In lateral view, petiolar node subrectangular (Fig. 26B-C). Gaster finely punctate … 22

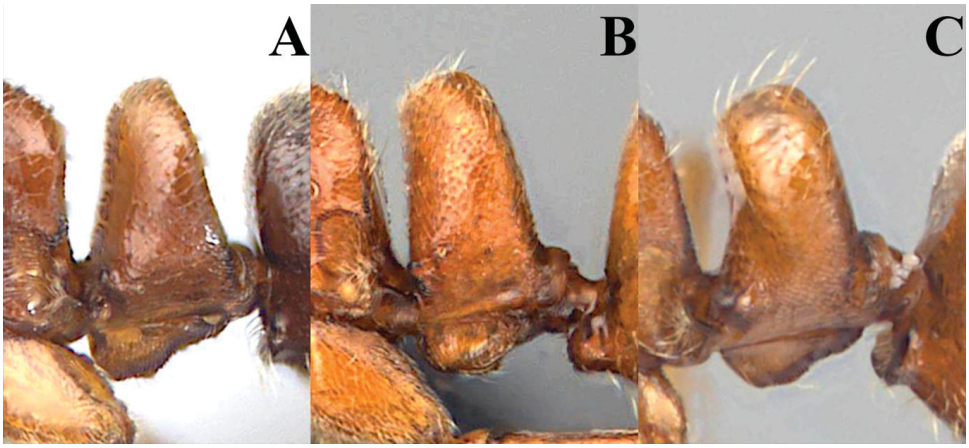

Figure 26. Detail of petiolar node shapes in lateral view. A: *Hypoponera* AMD_C New Species. B: *Hypoponera idelettae* (Santschi, 1923). C: *Hypoponera* AMD_O New Species.

21A. In lateral view, metanotal sulcus very deep and wide, forming a concavity (Fig. 27A) .. ……..…..……. **AMD_I New Species** (São Paulo and Santa Catarina)

21B. In lateral view, metanotal sulcus not forming a concavity (Fig. 27B-C) ..……. 23

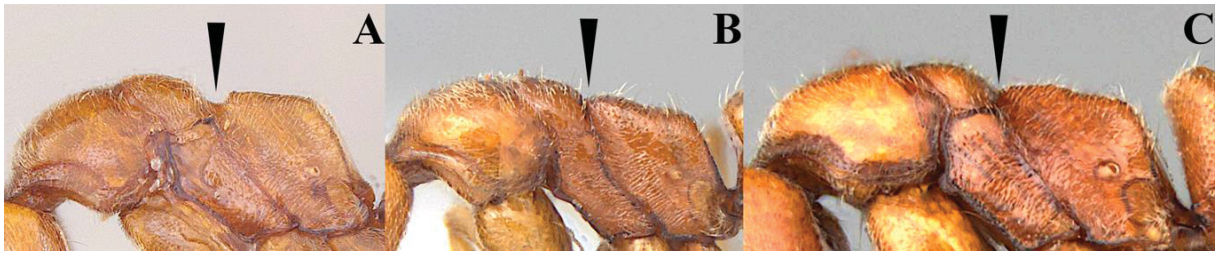

Figure 27. Detail of mesosoma in lateral view, with the arrow pointing to metanotum.

22A. In lateral view, declivitous margin of propodeum interrupted by metapleural gland opening (Fig. 28A). Petiolar node with anterior margin concave or straight. Girdling constriction of abdominal segment IV clearly cross-ribbed posteriorly ……..… 23

22B. In lateral view, declivitous margin of propodeum continuous (Fig. 28B). Petiolar node with anterior margin broadly convex. Girdling constriction of abdominal segment IV at most with a thin band cross-ribbed. …….. ***idelettae*** (São Paulo to Santa Catarina)

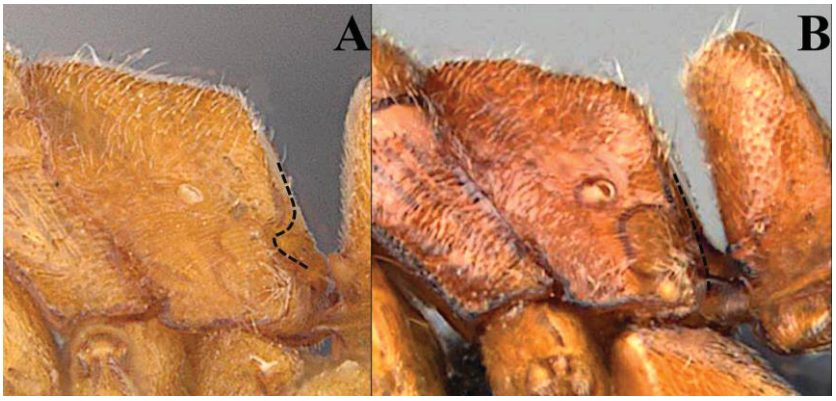

Figure 28. Detail of propodeal declivitous margin in lateral view. A: *Hypoponera* AMD_P New Species. B: *Hypoponera idelettae* (Santschi, 1923).

23A. In lateral view, petiolar node with anterior and posterior margins subparallel (Fig. 29A). Declivitous margin of propodeum strongly notched. Gena with dense pubescence around eye ……..…… **AMD_P New Species** (São Paulo to Santa Catarina)

23B. In lateral view, petiolar node with anterior margin concave (Fig. 29B). Declivitous margin of propodeum slightly concave. Gena with sparse pubescence around eye ……..…….. **AMD_O New Species** (Rio de Janeiro)

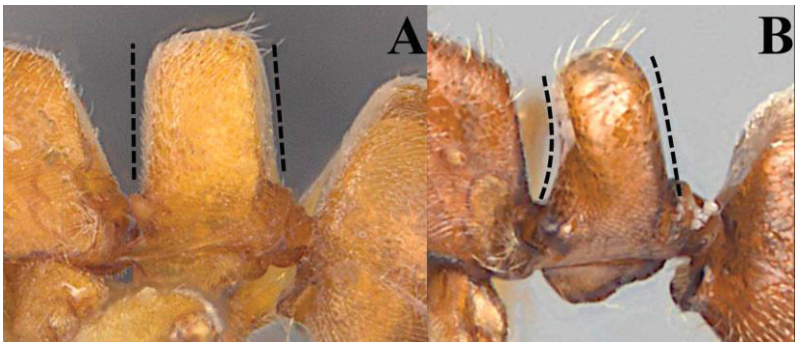

Figure 29. Detail of petiolar node shapes in lateral view. *Hypoponera* AMD_P New Species. *Hypoponera* AMD_O New Species.

24A. In lateral view, petiolar node subtriangular (Fig. 30A). In lateral view, junction between upper and lower margins of mesopleuron forming an obtuse angle (Fig. 30C) ……...…… 25

24B. In lateral view, petiolar node subtriangular to subrectangular (Fig. 30B). In lateral view, junction between upper and lower margins of mesopleuron forming an acute angle (Fig. 30D) ……..…… 26

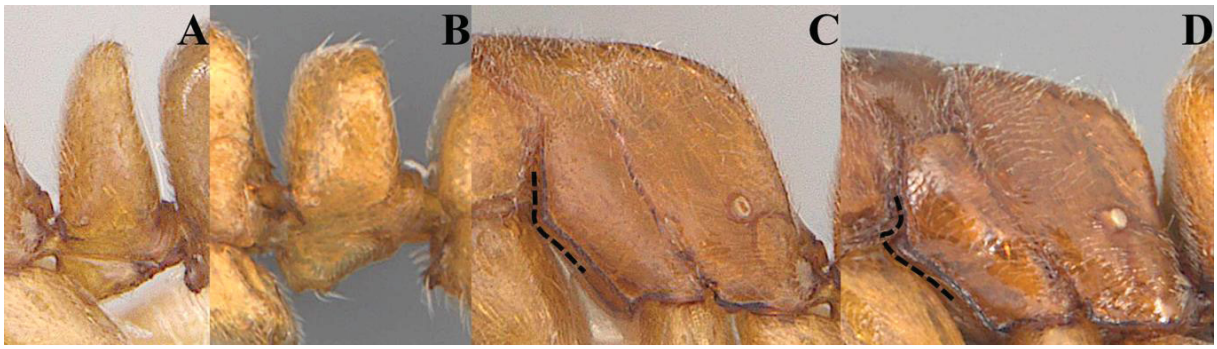

Figure 30. A-B: detail of petiolar node shapes in lateral view. C-D: detail of anterior margin of mesopleuron in lateral view. A, C: *Hypoponera* AMD_F New Species. B: *Hypoponera* AMD_J New Species. D: *Hypoponera argentina* (Santschi, 1922).

25A. In full-face view, scape fails to reach posterior margin of head (Fig. 31A). In lateral view, metanotum weakly marked (Fig. 31C). Petiolar node usually slightly curved posteriorly ……..…….. **AMD_F New Species** (Paraíba to Bahia)

25B. In full-face view, scape reaching posterior margin of head (Fig. 31B). In lateral view, metanotum well-marked, slightly interrupting dorsal margin of mesosoma (Fig. 3D). Petiolar node not curved. ……..……..... **AMD_E New Species** (Espírito Santo to Santa Catarina)

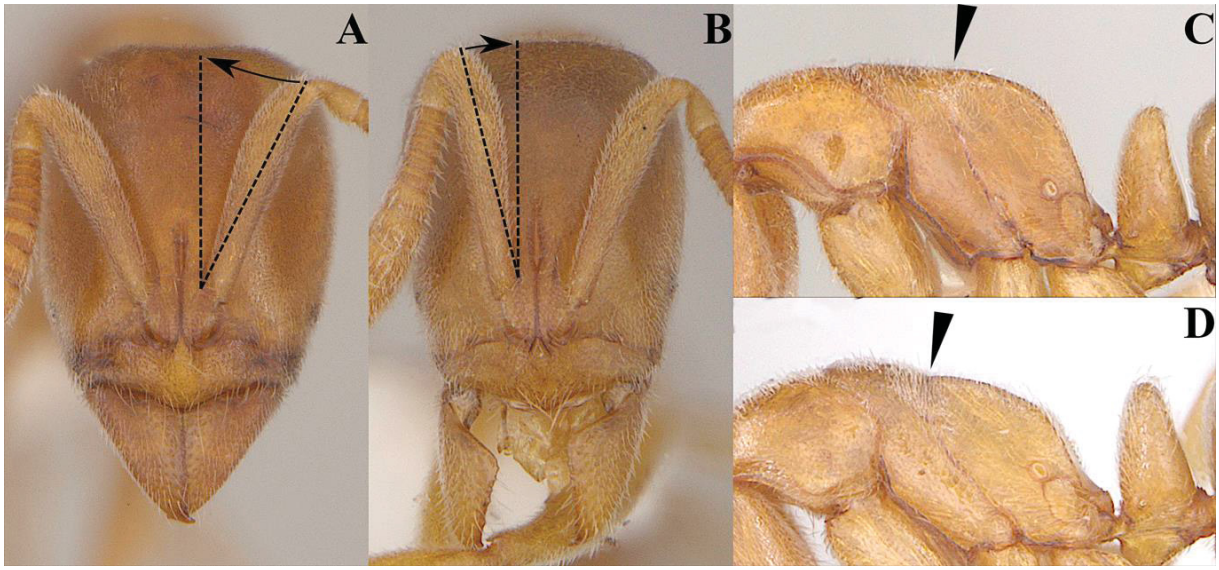

Figure 31. A-B: detail of scape length in full-face view. C-D: detail of mesosoma in lateral view, with the arrow pointing to metanotum. A, C: *Hypoponera* AMD_F New Species. B, D: *Hypoponera* AMD_E New Species.

26A. In full-face view, scape fails to reach posterior margin of head (Fig. 32A) ..…….. ……...……. **AMD_J New Species** (Paraná and Santa Catarina)

26B. In full-face view, scape reaching and usually surpassing posterior margin of head (Fig. 32B) ……. 27

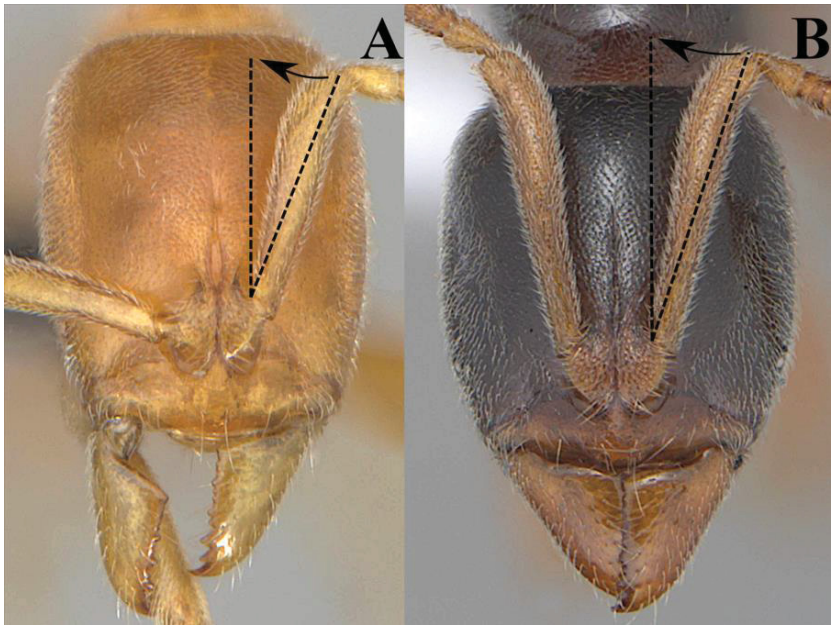

Figure 32. Detail of scape length in full-face view. A: *Hypoponera* AMD_J New Species. *Hypoponera opacior* (Forel, 1893).

27A. In lateral view, petiolar node subtriangular. Petiolar sternite diminishes in height posteriorly, with irregular ventral margin (Fig. 33A) …… **AMD_A New Species** (Paraná)

27B. Differs from any of the above mentioned characteristics (Fig. 33B-C) ……. 28

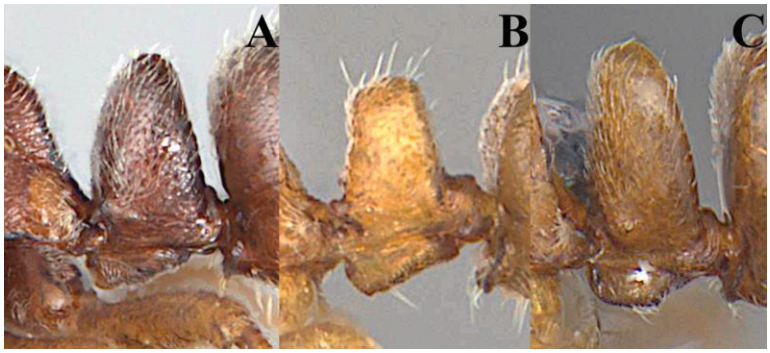

Figure 33. Detail of petiolar node shapes in lateral view. A: *Hypoponera* AMD_A New Species. B: *Hypoponera* AMD_K New Species. C *Hypoponera* AMD_S New Species.

28A. In lateral view, petiolar node subrectangular (Fig. 34A). Girdling constriction of abdominal segment IV clearly cross-ribbed posteriorly on tergite and sternite. Declivitous margin of propodeum slightly concave ……..…….….. **AMD_K New Species** (Paraná)

28B. Differs from any of the above mentioned characteristics (Fig. 34B) ….……...……. 29

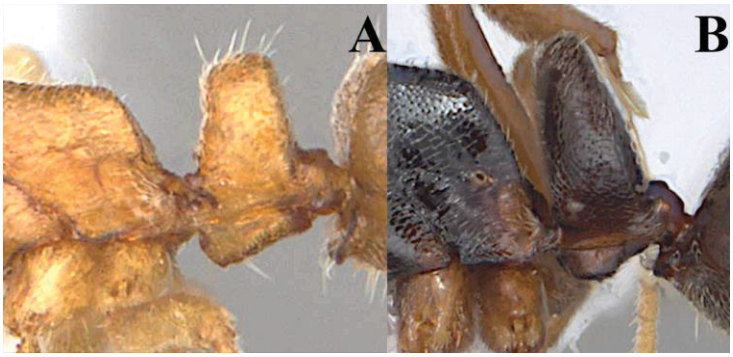

Figure 34. Detail of petiolar node shapes in lateral view. A: *Hypoponera* AMD_K New Species. B: *Hypoponera opacior* (Forel, 1893).

29A. Medium-sized ants (usually WL>1.1 mm). Prora extending ventrally forming a concavity in lateral view (Fig. 35A) ……..… ***argentina*** (Santschi, 1922) (widely distributed)

29B. Small ants (WL<1.1 mm). Prora not clearly extending and not forming a distinct ventral concavity in lateral view (Fig. 35B) …… 30

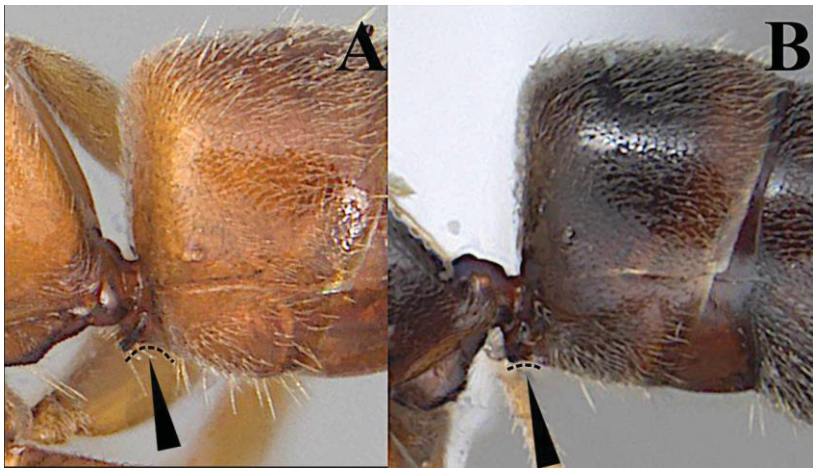

Figure 35. Detail of gaster in lateral view, with the arrow pointing to prora. A: Hypoponera *argentina* (Santschi, 1922). B: *Hypoponera opacior* (Forel, 1893).

30A. Mesopleuron sparsely punctate. Metapleuron with longitudinal strigulae only ventrally to propodeal spiracle …… **AMD_T New species** (Paraíba to Espírito Santo)
30B. Mesopleuron with longitudinal rugulae posteriorly. Metapleuron longitudinal strigulate extending dorsally ……..…….. 31

31A. In lateral view, dorsal margin of mesosoma virtually straight. Body usually dark brown, with mandible, antenna, and legs light brown (Fig. 36A) …… ***opacior*** (widely distributed)
31B. In lateral view, dorsal margin of mesosoma broadly convex. Body entirely light brown; sometimes brown with mandible, antenna, and legs light brown (Fig. 36B) ……. **AMD_S New species** (Minas Gerais do Rio Grande do Sul)

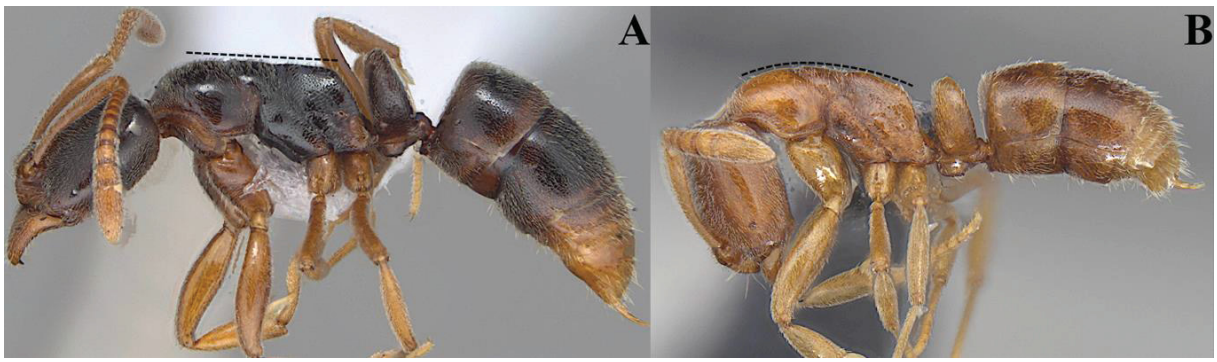

Figure 36. Mesosoma profile. A: *Hypoponera opacior* (Forel, 1893). B: *Hypoponera* AMD_S New Species.

Species accounts

Hypoponera argentina (Santschi, 1922)

Figure 37

Ponera distinguenda var. *argentina* Santschi, 1922: 242. Lectotype worker (by present designation): ARGENTINA: Córdoba, Alta Gracia (Bruch) [NHMB] (examined). Paralectotype worker: same data as the lectotype [NHMB] (examined). [Cited as species: Santschi, 1925: 8. Combination in *Hypoponera*: Kempf, 1972: 121].

Diagnosis. *Hypoponera argentina* is characterized by its medium size (WL 0.93-1.34 mm), reduced eye (with less than six distinct ommatidia) located distant from posterior margin of clypeus, antennal scape clearly surpassing posterior margin of the head in full-face view, propodeum at the same level as mesonotum in lateral view, declivitous margin of propodeum continuous, dorsal margin of mesosoma broadly convex in lateral view, petiolar node subrectangular, and petiolar sternite rounded.

Holotype measurements. HL 0.84; HW 0.72; SL 0.63; ML 0.45; PrW 0.57; MeL 0.31; WL 1.21; HFL NA; HBL NA; PeL 0.28; PeH 0.54; PeW 0.45; PS 0.42 (mm). CI 116.66; MI 53.57; SI 87.5; PeI 78.94; LPeI 52.77; DPeI 157.89.

Additional material measurements (n=18). HL 0.7-0.93; HW 0.56-0.74; SL 0.5-0.77; ML 0.36-0.5; PrW 0.45-0.62; MeL 0.22-0.32; WL 0.93-1.34; HFL 0.55-0.82; HBL 0.38-0.63; PeL 0.18-0.28; PeH 0.38-0.57; PeW 0.33-0.48; PS 0.3-0.45 (mm). CI 118.51-129.09; MI 51.32-57.6; SI 87.91-106.19; PeI 73.61-84.09; LPeI 46.77-55; DPeI 154.54-183.33.

Description. Medium-sized (WL 0.93-1.34 mm); body entirely light brown, but sometimes mesosoma darker.

Head. In full-face view subquadrate, with lateral margin broadly convex and posterior margin flat to slightly concave. Mandible with at least three apical teeth and indistinct denticles on the remainder of masticatory margin; external margin very slightly concave to straight. Anterior margin of clypeus convex. Eye with less than six distinct ommatidia, reaching but not clearly interrupting lateral cephalic margin; distant from the posterior margin of the clypeus in lateral view (eye-mandible distance index greater than 0.15). Antennal scape surpassing posterior margin of the head by less than the pedicel length. Mandible surface sparsely punctate. Frons densely punctate and silky. Gena densely and evenly punctate and shiny. Head ventrum smooth medially and shallowly punctate laterally; shiny.

Mesosoma. In lateral view, anteroventral corner of pronotum rounded; promesonotal sulcus shallow, slightly interrupting dorsal margin of mesosoma. Notopleural suture between mesonotum and mesopleuron well-marked; junction of upper and lower portion of the anterior margin of the mesopleuron forming an acute angle; dorsal margin of mesonotum flat, slightly higher than pronotum. Metanotum forming a shallow sulcus, which may slightly interrupt the dorsal margin of the mesosoma. Propodeum with dorsal margin at the same level as mesonotum, flat to broadly convex. Propodeal declivitous margin broadly convex to straight, not crenulate, and continuous. Propodeal spiracle elliptical. In posterior view, lateral margins of propodeum slightly converging dorsally. Mesosoma mostly shallowly punctate and shiny; mesopleuron mostly smooth and posteriorly with longitudinal rugulae; metapleuron longitudinally striate, with striae becoming sparser dorsally to propodeal spiracle; declivitous surface of propodeum mostly smooth. Pubescence appressed; long pilosity absent.

Metasoma. Petiolar node in lateral view subrectangular; anterior and posterior margins broadly convex; dorsal margin convex. Petiolar sternite usually rounded. Petiole densely punctate and shiny. Prora extending anteroventrally and forming a ventral concavity in lateral view. Girdling constriction of abdominal segment IV with a thin band cross-ribbed posteriorly on sternite. Gaster densely punctate and shiny; pubescence appressed to decumbent; long pilosity absent.

Remarks. *Hypoponera argentina* lacks any conspicuously unique features, but it can be distinguished from other species through the combination of all diagnostic characteristics. Probably the most similar species is *H*. AMD_R, but *H. argentina* differs by never having the petiolar sternite forming a sharp anteroventral angle. Due to similarities in body size, eye location, scape length, and dorsal profile of the mesosoma, *H. argentina* and *H*. AMD_Q can be mistakenly identified as each other. Nonetheless, in lateral view, the petiolar node of *H*. AMD_Q exhibits a straight anterior margin and a convex posterior margin, while in *H. argentina*, both margins are convex. Additionally, in *H*. AMD_Q, the petiolar sternite has a concave or straight ventral margin, whereas in *H. argentina*, it assumes a rounded form. Originally described as a variety of *H. distinguenda* (Emery, 1890), *H. argentina* was later recognized as a distinct species by Santschi (1925). Despite not having the opportunity to examine the holotype of *H. distinguenda*, a species originally described in Venezuela, we decided to treat both species as separate species.

Natural history. The small eyes, its light coloration, and its frequent occurrence in leaf litter indicate an affinity for low-luminosity microhabitats. Some individuals were collected on the Campus of the Universidade Federal do Paraná, situated within the urban setting of Curitiba. This observation suggests that *H. argentina* may tolerate environmental disturbances.

Distribution. Brazil: Bahia: Ilhéus; Paraíba: João Pessoa; Paraná: Curitiba, Palmas, Palotina; Paranavaí, Ponta Grossa, Tibagi, and Tuneiras do Oeste; Pernambuco: Recife; Rio de Janeiro: Santa Maria Madalena; Santa Catarina: Painel, São Bento do Sul, and São Miguel do Oeste; São Paulo: Cananeia, Iguape, Ribeirão Grande, and Salesópolis; Sergipe: Areia Branca, and Santa Luzia do Intanhi.

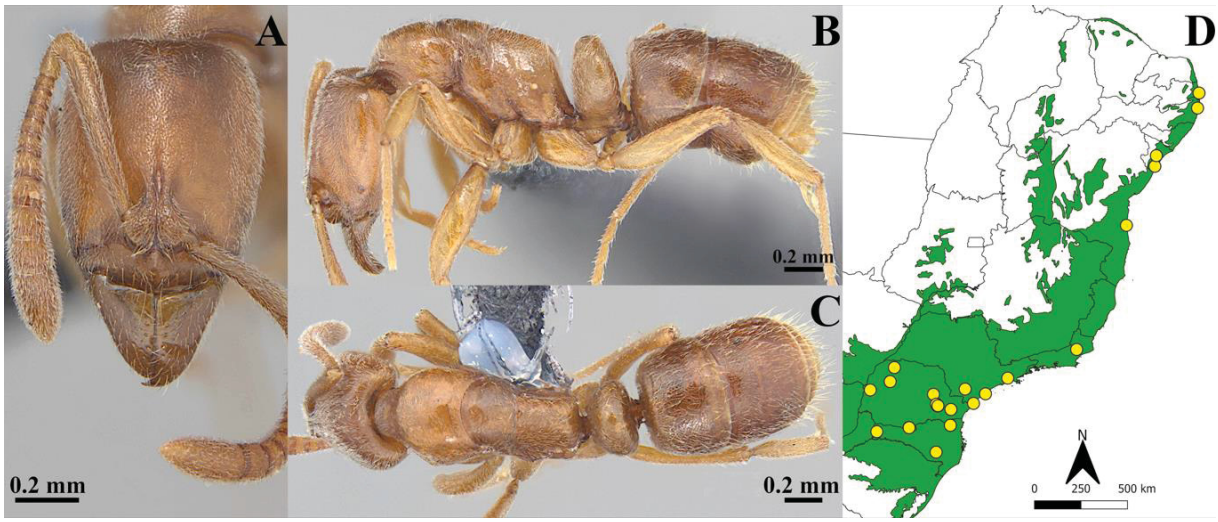

Figure 37. *Hypoponera argentina* (specimen DZUP550608). A. Full-face view. B. Full body in lateral view. C. Full body in dorsal view. D. Distribution map.

Hypoponera cauta (Forel, 1912) new status

Figure 38

Ponera trigona cauta Forel, 1912: 40. Lectotype worker (by present designation): BRAZIL: Rio de Janeiro, Colonie Alpina (Göldi) MHNG-ENTO-0094348 TOP [MHNG] (examined); paralectotypes: 1 worker on the same pin as the lectotype, but MHNG-ENTO-0094349 BOTTOM [MHNG] (examined); 2 workers with same data, but without collection number [MHNG] (examined). **New status.** [Combination in *Hypoponera*: Kempf, 1972: 124].

Ponera collegiana Santschi, 1925: 9. Holotype: BRAZIL: Passo Quatro (Zikon) [NHMB] (examined). **New synonym.** [Combination in *Ponera* (*Hypoponera*): Santschi, 1938: 79. Combination in *Hypoponera*: Kempf, 1972: 121].

Ponera collegiana var. paranensis Santschi, 1925: 9. Lectotype worker (by presente designation): BRAZIL: Paraná, Rio Negro (Reichensperger) [NHMB] (examined). Paralectotype worker: same data as the lectotype [NHMB] (examined). **New synonym**. [Combination in *Hypoponera*: Kempf, 1972: 121].

Diagnosis. Small to medium size ants (WL 0.87-1.15 mm), with anterior margin of clypeus strongly concave, subtriangular petiolar node, and mesosoma mostly silky; propodeum coarsely punctate, sometimes rugulose-punctate.

Lectotype measurements. HL 0.76; HW 0.66; SL 0.66; ML 0.4; PrW 0.51; MeL NA; WL 1.08; HFL 0.68; HBL 0.49; PeL 0.21; PeH 0.48; PeW 0.4; PS 0.36 (mm). CI 115.15; MI 52.63; SI 100; PeI 78.43; LPeI 43.75; DPeI 190.47.

Additional material measurements (n=24). HL 0.68-0.83; HW 0.57-0.7; SL 0.55-0.72; ML 0.34-0.45; PrW 0.37-0.52; MeL 0.17-0.27; WL 0.87-1.15; HFL 0.55-0.69; HBL 0.41-0.54; PeL 0.15-0.22; PeH 0.38-0.51; PeW 0.31-0.42; PS 0.28-0.38; CI 108.69-122.34; MI 47.5-57.69; SI 92.59-109.09; PeI 73.07-100; LPeI 36.61-47.36; DPeI 181.81-246.15

Description. Small to medium-sized (WL 0.87-1.15 mm); body mostly dark brown (sometimes brown), with mandible, antenna, and legs light brown.

Head. In full-face view subquadrate, with lateral margin distinctly convex and posterior margin flat to slightly convex. Mandible with at least three apical teeth and indistinct denticles on the remainder of masticatory margin; external margin very slightly concave to straight. Anterior margin of clypeus strongly concave. Eye with one to five distinct ommatidia, reaching but not clearly interrupting lateral cephalic margin; distant from the posterior margin of the clypeus in lateral view (eye-mandible distance index greater than 0.15). Antennal scape surpassing posterior margin of the head by a length similar to that of the pedicel. Mandible surface sparsely punctate. Frons densely punctate. Gena densely and evenly punctate. Head ventrum smooth medially and shallowly punctate laterally. Integument shiny.

Mesosoma. In lateral view, anteroventral corner of pronotum rounded; promesonotal sulcus weak or absent, not clearly interrupting dorsal margin of mesosoma. Notopleural suture between mesonotum and mesopleuron well-marked; junction of upper and lower portion of the anterior margin of the mesopleuron forming an acute angle; dorsal margin of mesonotum flat, at the same level as the pronotum. Metanotum as a well-marked line that does not interrupt the dorsal margin of the mesosoma; rarely forming a shallow sulcus that may slightly interrupt dorsal margin. Propodeum with dorsal margin at the same level as mesonotum, flat or slightly concave; Propodeal declivitous margin straight, not crenulate, and

continuous. Propodeal spiracle elliptical. In posterior view, lateral margins of propodeum slightly converging dorsally. Mesosoma mostly punctated and silky; the mesopleuron is shiny and may have a smooth anterior region and a rugulose posterior region, or be completely rugulose; metapleuron completely covered by longitudinal strigulae; lateral surface of propodeum coarsely punctate, sometimes rugulose-punctate; declivitous surface of propodeum mostly smooth. Pubescence appressed; suberect pilosity very sparse to absent.

Metasoma. Petiolar node in lateral view subtriangular; anterior margin straight to broadly convex; posterior and dorsal margins convex. Petiolar sternite with antero- and posteroventral angles rounded and ventral margin slightly concave, sometimes slightly bulging posteriorly. Petiole densely punctate and shiny. Prora not extending anteroventrally; rarely slightly extending anteroventrally and forming a small ventral concavity in lateral view. Girdling constriction of abdominal segment IV with a thin band cross-ribbed posteriorly on tergite and sternite. Gaster densely punctate and shiny; pubescence appressed to decumbent; pilosity decumbent to suberect.

Remarks. We are proposing to raise *Hypoponera cauta* to species because it differs from *Hypoponera trigona* in the anterior margin of clypeus, which is strongly concave in *Hypoponera cauta* and convex in *Hypoponera trigona*. Besides, *Hypoponera cauta* has the mesopleuron at least partially rugulose, while *Hypoponera trigona* has the mesopleuron with very sparse and superficial punctae. The type of *Hypoponera trigona* was examined by images (AntWeb: CASENT0915871).

Hypoponera cauta may resemble *H. opacior*, but the last has the anterior clypeal margin convex, while in *H. cauta* it is always strongly concave. Moreover, the lateral surface of propodeum is coarsely punctate in *Hypoponera cauta* and in *H. opacior* it is finely punctate with conspicuous space between them. *Hypoponera* AMD_C and *H*. AMD_A have a subtriangular petiolar node and the same body size of *Hypoponera cauta*, but both have the anterior margin of clypeus convex. *Hypoponera* AMD_A also differs by having petiolar sternite subtriangular and *H*. AMD_C differ by having the declivitous margin of propodeum interrupted by metapleural gland opening.

We are synonymizing *H. collegiana* and *H. collegiana paranensis* under *H. cauta*, as there is no discernible morphological difference between the types. Although in *H. collegiana paranensis* the anterior margin of the clypeus is just slightly concave, this variation is also observed in other specimens of *H. cauta*. Therefore, based on the available evidence, it is appropriate to gather these taxa under the single species name *H. cauta*.

Natural history. This species primarily inhabits the soil and is commonly found in litter samples. It can also be collected in soil monoliths extracted from underground. It is a common species collected in both primary and secondary forests.

Distribution. Brazil, Alagoas: Quebrângulo; Bahia: Camacã; Espírito Santo: Santa Teresa; Minas Gerais: Lima Duarte, and Passa Quatro; Paraná: Antonina, Bocaiúva do Sul, Colombo, Curitiba, Guaraqueçaba, Irati, Laranjeiras do Sul, Mangueirinha, Morretes, Palmas, Palmeira, Pinhão, Piraquara, Ponta Grossa, Quatro Barras, Rio Negro, São José dos Pinhais, Tibagi, and Tunas do Paraná; Rio de Janeiro: Itatiaia, Rio de Janeiro, and Santa Maria Madalena; Rio Grande do Sul: Barão de Cotegipe, Bom Jesus, Erechim, Nova Petrópolis, Panambi, and Vacaria; Santa Catarina: Blumenau, Campo Belo do Sul, Chapecó, Concórdia, Florianópolis, Indaial, Joinville, Lages, Lauro Muller, Orleans, Otacílio Costa, Painel, Palhoça, São Bento do Sul, São Bonifácio, São Joaquim, São Miguel do Oeste, Seara, Siderópolis, Três Barras, Urubici, Xanxerê, and Xaxim; São Paulo: Cananeia, Cunha, Iguape, Itapecirica, Miracatu, Mogi das Cruzes, Praia Grande, Ribeirão Grande, Salesópolis, São Paulo, São Vicente, Tapiraí, and Vargem Grande Paulista.

Figure 38. *Hypoponera cauta*. A. Full-face view. B. Full body in lateral view. C. Full body in dorsal view. D. Distribution map.

Hypoponera foreli (Mayr, 1887)

Figure 39

Ponera foreli Mayr, 1887: 534. Syntype workers and queen: BRAZIL: Santa Catarina [NHMW] (not examined). [Redescription: Kempf, 1962. Combination in *Hypoponera*: Kempf, 1972: 122].

Diagnosis. *Hypoponera foreli* is easily recognized by its medium to large size (WL 1.23-1.74 mm), antennal scape long and surpassing posterior margin of head by more than pedicel length, subtriangular petiolar node in lateral view, and propodeum noticeably lower than mesonotum in lateral view.

Non-type measurements (n=34). HL 0.83-1.16; HW 0.67-0.96; SL 0.91-1.12; ML 0.38-0.62; PrW 0.55-0.72; MeL 0.31-0.4; WL 1.23-1.74; HFL 0.93-1.18; HBL 0.75-0.96; PeL 0.19-0.33; PeH 0.48-0.66; PeW 0.37-0.53; PS 0.36-0.5 (mm). CI 98.85-139.82; MI 46.51-64.44; SI 106.66-134.28; PeI 65.95-80; LPeI 32.25-50; DPeI 158.49-250.

Description. Medium to large-sized (WL 1.23-1.74); body mostly dark brown (sometimes brown), with mandible, antenna, and legs light brown.

Head. In full-face view rounded, with posterior margin flat to slightly convex. Mandible with five or less distinct teeth, usually concentrated on apex, and indistinct denticles on the remainder of the masticatory margin; external margin straight to broadly convex, rarely slightly concave. Anterior margin of clypeus convex, rarely slightly concave. Eye well-developed, with more than ten distinct ommatidia (rarely less), reaching but not clearly interrupting lateral cephalic margin; distant from the posterior margin of the clypeus in lateral view (eye-mandible distance index greater than 0.15). Antennal scape surpassing posterior margin of the head by more than the pedicel length. Mandible surface sparsely punctate. Frons densely punctate and shiny, sometimes silky. Gena densely and evenly punctate and shiny. Head ventrum areolate and shiny.

Mesosoma. In lateral view, anteroventral corner of pronotum rounded; promesonotal sulcus clearly interrupting dorsal margin of mesosoma. Notopleural suture between mesonotum and mesopleuron well-marked; junction of upper and lower portion of the anterior margin of the mesopleuron forming an acute angle; dorsal margin of mesonotum varying from flat to convex, at the same level to slightly higher than pronotum. Metanotum forming a deep sulcus. Propodeum with dorsal margin much lower than mesonotum; concave, and sometimes with posterior edge higher than the rest of propodeum. Propodeal declivitous margin broadly convex, not crenulate, and continuous. Propodeal spiracle elliptical. In posterior view, lateral margins slightly converging dorsally. Mesosoma mostly punctate and silky; metapleuron longitudinally strigulate; declivitous surface of propodeum smooth. Pubescence decumbent; densely covered by suberect pilosity.

Metasoma. Petiolar node in lateral view subtriangular; anterior margin straight to broadly convex; posterior and dorsal margins convex. Petiolar sternite rounded. Petiole densely punctate and silky. Prora extending anteroventrally and forming a ventral concavity in lateral view. Girdling constriction of abdominal segment IV not clearly cross-ribbed posteriorly, rarely with a thin band cross-ribbed posteriorly. Gaster densely punctate and shiny; pubescence appressed to decumbent; pilosity decumbent to suberect.

Remarks. *H. foreli* is very distinct from all other *Hypoponera* species because of its mesosoma profile and petiolar node shape. *Hypoponera vernacula* has a similar mesosoma profile, with promesonotal sulcus well marked and propodeum at a level very lower than mesonotum in lateral view, but in *H. foreli* the petiole is subtriangular and in *H. vernacula* it is subrectangular. *Hypoponera* AMD_G has the mesosoma profile and petiolar node shapes very similar, but is much smaller, with WL never greater than 1 mm. In addition, *H*. AMD_G has a subtriangular projection on declivitous margin of propodeum, which is absent in *H. foreli*.

Although we have not examined types, the original description is detailed enough, and we believe that because of the very different body shape it is quite improbable that the specimens examined do not belong to *H. foreli* since they entirely fit Mayr's description.

Natural history. *Hypoponera foreli* may have small-sized colonies consisting of 15-20 workers (Kempf 1962). From the available label data, it is possible to infer that they can feed on seeds. Their habitat range covers a variety of environments, from well-preserved forests to more disturbed regions.

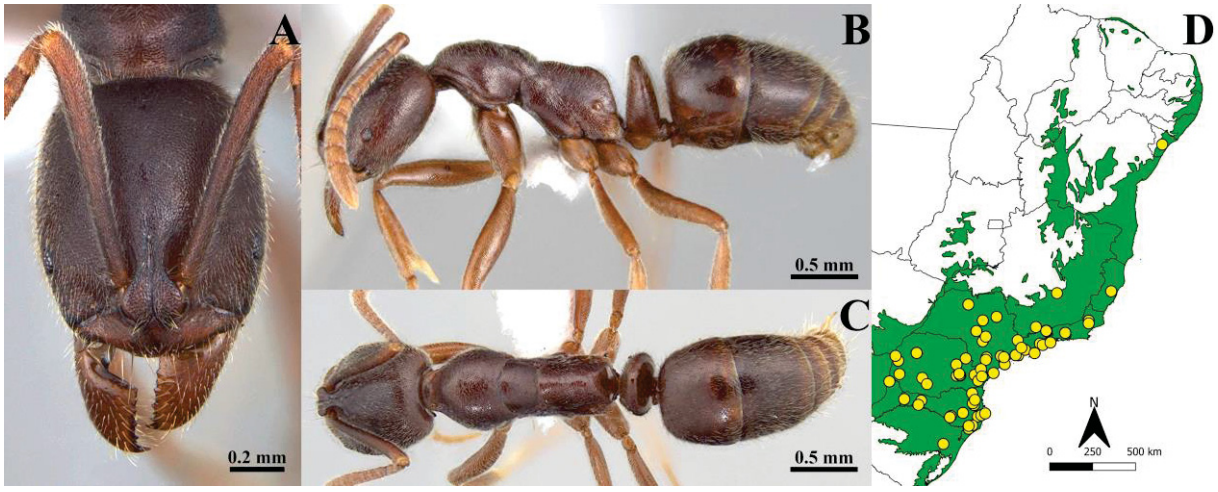

Figure 39. *Hypoponera foreli* (specimen MZSP0098127). A. Full-face view. B. Full body in lateral view. C. Full body in dorsal view. D. Distribution map.

Distribution. Brazil, Ceará: Crato; Espírito Santo: Santa Teresa; Minas Gerais: Cristina, and Nova Lima; Paraná: Antonina, Bocaiúva do Sul, Céu Azul, Foz do Iguaçu, Guaíra, Jaguariaiva, Laranjeiras do Sul, Morretes, Palotina, Pinhão, Ponta Grossa, Tibagi, Tunas do Paraná, and Tuneiras do Oeste; Rio de Janeiro: Ilha Grande, Itatiaia, Nova Iguaçu, and Santa Maria Madalena; Rio Grande do Sul: Morro Reuter; Santa Catarina: Blumenau, Campo Belo do Sul, Chapecó, Florianópolis, Indaial, Lages, Lauro Muller, Orleans, Otacílio Costa, Palhoça, São Bento do Sul, São Bonifácio, São Miguel do Oeste, Siderópolis, and Xanxerê; São Paulo: Agudos, Botucatu, Cananeia, Cunha, Iguape, Ilhabela, Itatinga, Luiz Antônio, Miracatu, Mirassol, Mogi das Cruzes, Picinguaba, Piracaia, Praia Grande, Ribeirão Grande, Salesópolis, São Vicente, Tabatinga, Tapiraí, and Ubatuba; Sergipe: Areia Branca.

Hypoponera idelettae (Santschi, 1923)

Figure 40

Ponera idelettae Santschi, 1923: 1258. Lectotype worker (by present designation): BRAZIL: Santa Catarina, Blumenau (Reichensperger) [NHMB] (examined). Paralectotype worker: same data as the lectotype [NHMB] (examined). [Combination in *Hypoponera*: Kempf, 1972: 122].

Diagnosis. The following characters combined separate this species from the others: medium to large size (WL 1.13-1.42 mm), eye small (less than six distinct ommatidia) and distant from the posterior margin of the clypeus, metanotum forming a deep and simple sulcus, propodeum lower than the mesonotum in lateral view, declivitous margin of propodeum continuous, and petiole subrectangular.

Lectotype measurements. HL 1.02; HW 0.795; SL 0.81; ML 0.525; PrW 0.6; MeL 0.33; WL 1.425; HFL 0.93; HBL 0.705; PeL 0.27; PeH 0.57; PeW 0.405; PS 0.415; CI 128.301886792453; MI 51.4705882352941; SI 101.88679245283; PeI 67.5; LPeI 47.3684210526316; DPeI 150.

Additional material measurements (n=7). 0.81-1.01; HW 0.64-0.79; SL 0.63-0.85; ML 0.42-0.52; PrW 0.51-0.6; MeL 0.23-0.3 WL 1.13-1.36; HFL 0.69-0.87; HBL 0.52-0.69;

PeL 0.21-0.27; PeH 0.45-0.57; PeW 0.35-0.45; PS 0.34-0.43 (mm). CI 122.13-129.31; MI 50.66-55.22; SI 95.08-107.54; PeI 68.29-78.4; LPeI 47.22-53.75; DPeI 160-175.

Redescription. Medium-sized (WL 1.13-1.42 mm); body entirely light brown.

Head. In full-face view subquadrate, with lateral margin broadly convex and posterior margin flat to slightly concave. Mandible with tree apical teeth, and at least three reduced teeth on the remainder of masticatory margin; external margin slightly concave to straight. Anterior margin of clypeus slightly concave. Eye with less than six distinct ommatidia, reaching but not clearly interrupting lateral cephalic margin; distant from the posterior margin of the clypeus in lateral view (eye-mandible distance index greater than 0.15). Antennal scape surpassing posterior margin of the head by a length similar to that of the pedicel. Mandible surface sparsely punctate. Frons densely punctate. Gena densely and evenly punctate. Head ventrum very sparsely finely punctate (mostly smooth). Integument shiny.

Mesosoma. In lateral view, anteroventral corner of pronotum rounded; promesonotal sulcus clearly interrupting dorsal margin of mesosoma. Notopleural suture between mesonotum and mesopleuron well-marked; junction of upper and lower portion of the anterior margin of the mesopleuron forming an acute angle; dorsal margin of mesonotum convex and slightly higher than pronotum. Metanotum forming a sulcus. Propodeum with dorsal margin slightly lower than mesonotum, slightly concave. Propodeal declivitous margin broadly convex to straight, not crenulate, and continuous. Propodeal spiracle elliptical. In posterior view, lateral margins of propodeum slightly converging dorsally. Mesosoma mostly densely punctate and shiny; mesopleuron anteriorly smooth and posteriorly with longitudinal rugulae; metapleuron longitudinally strigulate; declivitous surface of propodeum smooth. Pubescence appressed; pilosity sparse and erect.

Metasoma. Petiolar node in lateral view subrectangular; anterior margin straight to broadly convex; posterior and dorsal margins convex. Petiolar sternite with antero- and posteroventral angles rounded and ventral margin slightly concave but bulging posteriorly. Petiole densely punctate and shiny. Prora slightly extending anteroventrally and forming a small ventral concavity in lateral view. Girdling constriction of abdominal segment IV usually not clearly cross-ribbed posteriorly, but sometimes with a very thin cross-ribbed band posteriorly on tergite and sternite. Gaster densely punctate and shiny; pubescence appressed to decumbent; long pilosity absent.

Remarks. *Hypoponera idelettae* can be easily recognized using the combination of diagnostic characters. It can be most commonly confused with *H*. AMD_I, *H*. AMD_Q, *H*. AMD_P, *H*. AMD_O, *H. argentina*, and *H*. AMD_R. The most similar species is *H*. AMD_I, from which it differs by not having the wide and concave metanotal groove. In *H*. AMD_Q the petiolar node has a straight anterior margin in lateral view and a shallow metanotal sulcus, often not clearly interrupting the dorsal margin of the mesosoma in lateral view. *Hypoponera* AMD_P and *H*. AMD_O differs by having the declivitous margin of propodeum interrupted by a notch where the metapleural gland opens. Furthermore, *H*. AMD_P has a more rectangular petiolar node, with anterior and posterior margins subparallel in lateral view, while in *H. idelettae* the margins are always clearly convergent. In lateral view, the petiolar node of *H*. AMD_O displays a concave anterior margin, distinguishing it from *H. idelettae*. Both *H. argentina* and *H*. AMD_R share almost all diagnostic characteristics of *H. idelettae*, except for the fact that they do not present the propodeum at a lower level than the mesonotum in lateral view. Additionally, *H*. AMD_R features the anterior margin of the petiolar sternite forming an acute angle with the ventral margin.

Natural history. The small size of their eyes suggests that these ants are well-adapted to forage in dark microhabitats, such as underground and leaf litter environments. This hypothesis is further supported by the collection methods employed, which include pitfall traps, Winkler extractors, and the extraction of monoliths from soil.

Distribution. Brazil: Paraná: Curitiba, and Ponta Grossa; São Paulo: Luiz Antônio, and Tapiraí; Santa Catarina: Blumenau, Lauro Muller, Nova Teutônia, Orleans, and Palhoça.

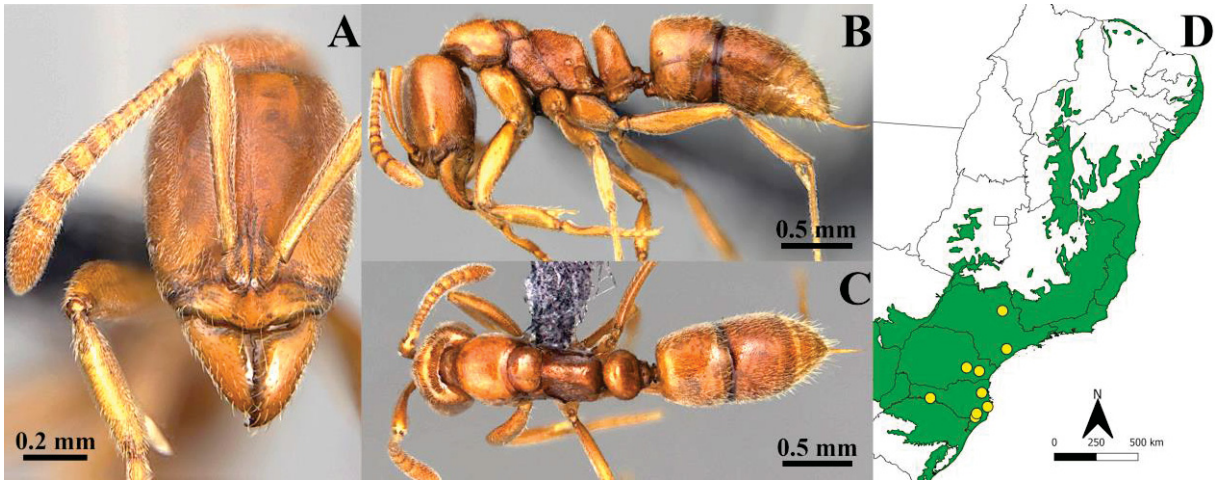

Figure 40. *Hypoponera idelettae* (specimen DZUP551345- bottom). A. Full-face view. B. Full body in lateral view. C. Full body in dorsal view. D. Distribution map.

Hypoponera inexpedita (Forel, 1911) New Status

Figure 41

Ponera inexorata inexpedita Forel, 1911: 285. Lectotype worker (by present designation): BRAZIL: São Paulo (von Ihering) MHNGENTO00094410 [MHNG] (examined); paralectotype: 1 worker on the same pin as the lectotype, but MHNGENTO00094410 [MHNG] (examined); 1 queen with same data, but MHNGENTO00094412 [MHNG] (not examined). **New status**. [Combination in *Hypoponera*: Kempf, 1972: 122. Subspecies of *Hypoponera inexorata*: Luederwaldt, 1918: 36; Borgmeier, 1923: 73. Subspecies of *Hypoponera distinguenda*: Santschi, 1923: 247].

Ponera foeda saroltae Forel, 1912: 41. Lectotype worker (by present designation): BRAZIL Santa Catarina, Blumenau (Moeller) MHNGENTO00094401 [MHNG] (examined). **New synonym**. [Combination in *Hypoponera*: Kempf, 1972: 122. Subspecies of *Hypoponera foeda*: Borgmeier, 1923: 73].

Diagnosis. Small ants (WL 0.6-1.1 mm), easily recognized by metanotum inconspicuous in lateral view. In addition, it has the girdling constriction of abdominal segment IV clearly cross-ribbed posteriorly on tergite and sternite, petiolar node subrectangular, and clypeus with anterior margin convex in full-face view.

Holotype measurements. HL 0.7; HW 0.67; SL 0.52; ML 0.36; PrW 0.48; MeL NA; WL 0.91; HFL 0.57; HBL 0.4; PeL 0.21; PeH 0.41; PeW 0.34; PS 0.32 (mm). CI 104.47; MI 51.42; SI 77.61; PeI 70.83; LPeI 51.21; DPeI 161.9.

Additional material measurements (n=29). HL 0.46-0.78; HW 0.36-0.71; SL 0.3-0.54; ML 0.23-0.41; PrW 0.27-0.5; MeL 0.16-0.25; WL 0.6-1.1; HFL 0.29-0.58; HBL 0.2-0.43; PeL 0.1-0.21; PeH 0.21-0.45; PeW 0.19-0.37; PS 0.16-0.34 (mm). CI 110.52-135.59; MI 46.93-56.6; SI 71.42-86.36; PeI 62.9-76.81; LPeI 42.85-58.18; DPeI 144.44-208.33.

Description. Small-sized (WL 0.6-1.1 mm); body entirely light brown.

Head. In full-face view subquadrate, with lateral margin broadly convex and posterior margin concave. Mandible with at least four apical teeth and indistinct denticles on the remainder of masticatory margin; external margin slightly concave to straight. Anterior margin of clypeus convex. Eye with less than six distinct ommatidia, reaching but not clearly interrupting lateral cephalic margin; close to the posterior margin of the clypeus in lateral view (eye-mandible distance index less than 0.15). Antennal scape reaching and slightly

surpassing posterior margin of the head by less than half length of pedicel. Mandible surface sparsely punctate. Frons densely punctate and silky. Gena densely and evenly punctate and shiny. Head ventrum smooth and shiny.

Mesosoma. In lateral view, anteroventral corner of pronotum rounded; promesonotal sulcus weak or absent, not clearly interrupting dorsal margin of mesosoma. Notopleural suture between mesonotum and mesopleuron well-marked; junction of upper and lower portion of the anterior margin of the mesopleuron forming an acute angle; dorsal margin of mesonotum flat, at the same level as pronotum. Metanotum inconspicuous, or rarely as a weak line. Propodeum with dorsal margin at the same level as mesonotum, broadly convex. Propodeal declivitous margin broadly convex, not crenulate, and continuous. Propodeal spiracle rounded. In posterior view, lateral margins of propodeum slightly converging dorsally. Mesosoma mostly shallowly punctate and shiny; mesopleuron mostly smooth and posteriorly with longitudinal rugulae; metapleuron longitudinally striate, with striae becoming sparser dorsally to propodeal spiracle; declivitous surface of propodeum mostly smooth. Pubescence appressed; long pilosity absent.

Metasoma. Petiolar node in lateral view subrectangular; anterior and posterior margins broadly convex; dorsal margin convex. Petiolar sternite rounded. Petiole densely punctate and shiny. Prora not extending anteriorly and slightly extending ventrally forming a small ventral concavity in lateral view. Girdling constriction of abdominal segment IV clearly cross-ribbed posteriorly on tergite and sternite. Gaster densely punctate and shiny; pubescence appressed to decumbent; long pilosity absent.

Remarks. This species is highly variable and may represent a species complex. The most striking aspect of this variation is the body size, represented by the difference in Weber's length between the smallest and largest specimens (WL=0.6 mm and 1.1 mm, respectively). Such size variability is not typical of *Hypoponera* species, yet it is continuous, making any attempt to establish a separation purely arbitrary.

In addition to body size, the variation in scape length and head width among the examined specimens is remarkable. Like body size, these characteristics also show a continuous range and, most important, are all conflicting with each other. Consequently, using body size as the sole criterion to separate *H. inexpedita* from other species would result in a high degree of variability in the scape and head indices for each new species, and so on.

These variations are not regional patterns either, since we observed very small specimens occurring in the same collect event and in the same transect as larger ones. For

example, specimens MZSP0098152 and MZSP0098086, both from São Bento do Sul and collected on the same date, show considerable variation in body size. Other examples are the specimens DZUP551843 and DZUP553001, from Parque Nacional do Itatiaia, Rio de Janeiro, which exhibit similar body sizes, but the first has a scape that clearly fails to reach posterior margin of head, while the second has a longer scape that slightly surpasses the posterior margin of the head in full-face view.

Considering the above observations, we propose that delineating *H. inexpedita* as a highly variable species represents the most conservative and well-founded solution.

Natural history. Based on the reduced eyes, light coloration, and collection data, it can be inferred that these ants inhabit mainly in leaf litter. Their habitat range extends from drier areas, near sandstones, to very humid environments like riparian forests.

Distribution. Brazil: Bahia: Camacã; Espírito Santo: Sooretama; Minas Gerais: Nova Lima, and Poço Fundo; Paraná: Adrianópolis, Antonina, Curitiba, Laranjeiras do Sul, Morretes, Palmeiras, Piraquara, Ponta Grossa, Quatro Barras, São José dos Pinhais, Tibagi, and Tunas do Paraná; Rio de Janeiro: Ilha Grande, Itatiaia, and Santa Maria Madalena; Rio Grande do Sul: Panambi; Santa Catarina: Blumenau, Campo Belo do Sul, Indaial, Lages, Lauro Muller, Palhoça, São Bento do Sul, São Bonifácio, São Miguel do Oeste, and Três Barras; São Paulo: Botucatu, Cunha, Iguape, Mogi das Cruzes, Praia Grande, Ribeirão Grande, Salesópolis, São Paulo, and Tapiraí.

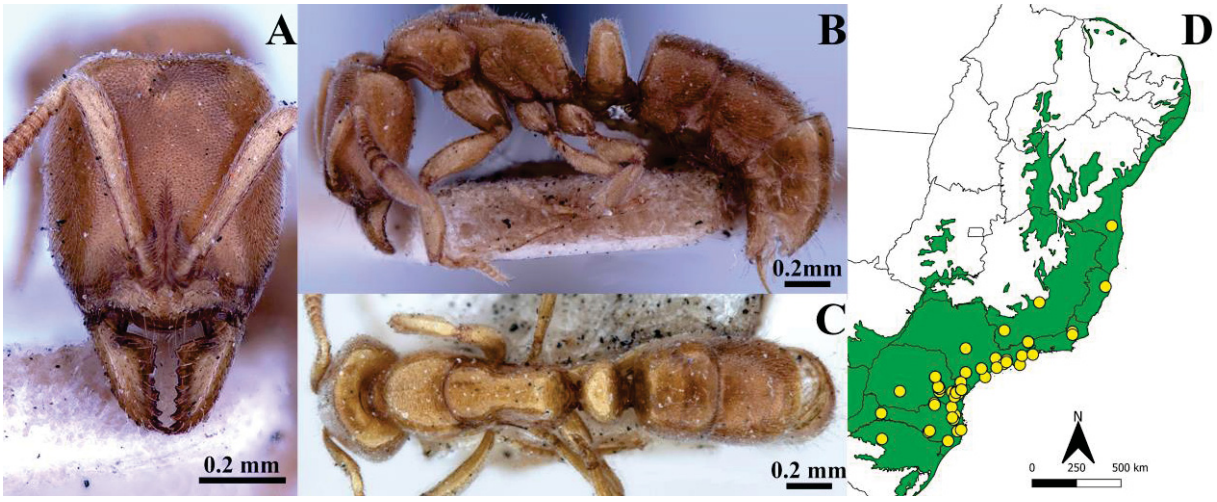

Figure 41. *Hypoponera inexpedita* (specimen MHNGENTO00094401 – lectotype of *Ponera foeda saroltae* New synonym). A. Full-face view. B. Full body in lateral view. C. Full body in dorsal view. D. Distribution map.

Hypoponera leninei (Santschi, 1925)

Figure 42

Ponera leninei Santschi, 1925: 7. Holotype worker: BRAZIL: Paraná, Rio Negro (Reichensperger) [NHMB] (examined). [Combination in *Hypoponera*: Kempf, 1972: 123].

Diagnosis. *H. leninei* can be distinguished by having medium to large size (WL 1.04-1.41 mm), eye well-developed (with more than six distinct ommatidia), antennal scape clearly surpassing posterior margin of head in full-face view, subrectangular petiolar node, petiolar sternite rounded, and head distinctly long (CI>120).

Holotype measurements. HL 0.9; HW 0.72; SL 0.72; ML 14.5; PrW 0.55; MeL 0.25; WL 1.26; HFL NA; HBL NA; PeL 0.29; PeH 0.78; PeW 0.45; PS 0.50; CI 125; MI NA; SI 100 PeI 81.08; LPeI 37.5; DPeI 153.84;

Additional material measurements (n=8). HL 0.76-0.98; HW 0.63-0.76; SL 0.59-0.8; ML 0.39-0.48; PrW 0.48-0.59; MeL 0.21-0.28; WL 1.04-1.41; HFL 0.63-0.89; HBL 0.49-0.75; PeL 0.2-0.3; PeH 0.4-0.53; PeW 0.35-0.47; PS 0.32-0.43 (mm). CI 120.79-130.3; MI 48.8-54.54; SI 92.42-105.73; PeI 71.15-80; LPeI 46.8-55.81; DPeI 154.16-181.81.

Description. Medium to large-sized (WL 1.04-1.41); body mostly dark brown (sometimes brown), with mandible, antenna, and legs light brown.

Head. In full-face view subquadrate, with lateral margin broadly convex and posterior margin flat to slightly concave. Mandible with at least three apical teeth and indistinct denticles on the remainder of masticatory margin; external margin concave. Anterior margin of clypeus convex or slightly concave. Eye with 6-25 distinct ommatidia, reaching and interrupting lateral cephalic margin; distant from the posterior margin of the clypeus in lateral view (eye-mandible distance index greater than 0.15). Antennal scape surpassing posterior margin of the head by less than the pedicel length. Mandible surface sparsely punctate. Frons densely punctate and subopaque. Gena densely and evenly punctate and shiny. Head ventrum smooth medially and shallowly punctate laterally; shiny.

Mesosoma. In lateral view, anteroventral corner of pronotum rounded; promesonotal sulcus shallow, slightly interrupting dorsal margin of mesosoma. Notopleural suture between

mesonotum and mesopleuron well-marked; junction of upper and lower portion of the anterior margin of the mesopleuron forming an acute angle; dorsal margin of mesonotum flat, at the same level as the pronotum; rarely slightly higher. Metanotum forming a sulcus. Propodeum with dorsal margin slightly lower than mesonotum, concave. Propodeal declivitous margin straight to broadly concave, not crenulate, and continuous. Propodeal spiracle elliptical to slit-shaped. In posterior view, lateral margins of propodeum slightly converging dorsally. Mesosoma mostly punctate and shiny; mesopleuron anteriorly smoother, posteriorly coarsely rugulose; punctae coarser on propodeum; metapleuron longitudinally strigulate; declivitous surface of propodeum smooth. Pubescence appressed; pilosity short and erect.

Metasoma. Petiolar node in lateral view subrectangular; anterior and posterior margins straight to broadly convex; dorsal margin convex. Petiolar sternite rounded. Petiole densely punctate and silky. Prora slightly extending anteroventrally and forming a small ventral concavity in lateral view. Girdling constriction of abdominal segment IV with a very thin band cross-ribbed posteriorly on tergite and sternite. Gaster densely punctate and shiny; pubescence appressed to decumbent; long pilosity absent.

Remarks. Due to the relatively large size, this species may be misidentified as *H. vernacula*, *H. leveillei,* or *H. schmalzi*. *Hypoponera vernacula* has a longer scape, which surpasses the posterior margin of the head in full-face view by more than pedicel length. *H. vernacula* also has the eye larger, with more than 25 distinct ommatidia, and the gaster surface is not shiny as in *H. leninei*. *H. leveillei* has a larger size than *H. leninei*, with WL greater than 1.6 mm. The most similar species is *H. schmalzi*, but *H. leninei* differs by having a longer head, with a cephalic index greater than 120, while in *H. schmalzi* this index usually is less than 120. Furthermore, the anterior margin of the clypeus is always concave in *H. schmalzi*, while in *H. leninei* it is usually convex.

Natural history. Soil inhabiting ants, usually collected using Winkler extractor.

Distribution. Brazil: Paraná: Palmas, Piraquara, Ponta Grossa, Rio Negro, and Tunas do Paraná; Rio de Janeiro: Petrópolis, and Rio de Janeiro; Santa Catarina: São Bonifácio; São Paulo: Cunha, and Tapiraí.

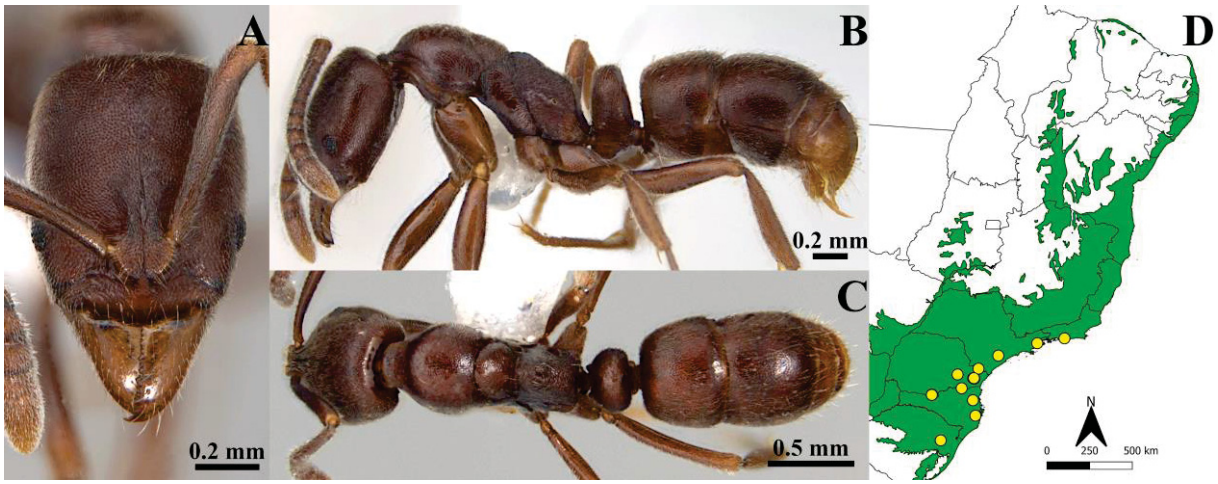

Figure 42. *Hypoponera leninei* (specimen MZSP0098112). A. Full-face view. B. Full body in lateral view. C. Full body in dorsal view. D. Distribution map.

Hypoponera leveillei **(Emery, 1890)**

Figure 43

Ponera leveillei Emery, 1890: 61. Holotype worker: VENEZUELA: Colonia Tovar, III.1888 (E. Simon) [MSNG] (examined by images: AntWeb.org-CASENT0903935). [Combination in *Euponera (Mesoponera)*: Emery, 1901: 4; in *Mesoponera*: Kempf, 1972: 141; in *Pachycondyla*: Brown, 1995: 306. *Incertae sedis* in *Hypoponera*: Schmidt & Shattuck, 2014: 64. Misspelled as *levillei* by Borgmeier, 1923: 71].

Ponera iheringi Forel, 1908: 344. Lectotype worker (by present designation): BRAZIL: São Paulo (H. von Ihering) MHNG-ENTO-0094322 [MHNG] (examined); paralectotypes: 2 workers with same data as the lectotype, but MHNG-ENTO-0094323 TOP and MHNG-ENTO-0094324 [MHNG] (examined). **New synonym.** [Queen and male description: Forel, 1913: 204. Larva description: Wheeler & Wheeler, 1971: 1211. Combination in *Hypoponera*: Kempf, 1972: 122. Frequently misspelled as *jheringi* by Emery, 1911: 92; Kempf, 1972: 122, and others].

Diagnosis. Easily recognized by the combination of large size (WL>1.55 mm), subrectangular petiole, and shiny integument. Anterior margin of clypeus distinctly concave medially. In lateral view, metanotum forms a groove that clearly interrupts the dorsal profile of the mesosoma.

Lectotype measurements. HL 1.26; HW 1.18; SL 1.04; ML 0.75; PrW 0.87; MeL 0.51; WL 1.98; HFL NA; HBL NA; PeL 0.36; PeH 0.74; PeW 0.56; PS 0.55 (mm). CI 106.77; MI 59.52; SI 88.13; PeI 64.36; LPeI 48.64; DPeI 155.55

Additional material measurements (n=20). HL 1.09-1.38; HW 0.97-1.3; SL 0.84-1.11; ML 0.52-0.78; PrW 0.72-0.91; MeL 0.34-0.5; WL 1.56-2.02; HFL 0.96-1.29; HBL 0.7-

1.02; PeL 0.25-0.4; PeH 0.49-0.76; PeW 0.5-0.63; PS 0.48-0.59 (mm). CI 104.65-116.66; MI 47.44-60.2; SI 80.4-96.21; PeI 62.85-72.85; LPeI 47.27-55.1; DPeI 149.58-176.36.

Redescription. Large-sized (WL 1.56-2.02 mm); body mostly brown (sometimes red-brown), with mandible, antenna, and legs light brown; rarely body entirely brown.

Head. In full-face view subquadrate, with lateral margin distinctly convex and posterior margin concave. Mandible with at least six distinct teeth and indistinct denticles between them; external margin concave. Anterior margin of clypeus strongly concave. Eye usually with 10-25 distinct ommatidia, reaching but not clearly interrupting lateral cephalic margin; distant from the posterior margin of the clypeus in lateral view (eye-mandible distance index greater than 0.15). Antennal scape surpassing posterior margin of the head by a length similar to that of the pedicel. Mandible surface sparsely punctate. Frons densely punctate. Gena densely and evenly punctate. Head ventrum very sparsely finely punctate. Integument shiny.

Mesosoma. In lateral view, anteroventral corner of pronotum rounded; promesonotal sulcus clearly interrupting dorsal margin of mesosoma. Notopleural suture between mesonotum and mesopleuron well-marked; junction of upper and lower portion of the anterior margin of the mesopleuron forming an acute angle; dorsal margin of mesonotum convex, higher than pronotum, or rarely at the same level as the pronotum. Metanotum forming a sulcus. Propodeum with dorsal margin slightly lower or at the same level as mesonotum, slightly concave, rarely flat. Propodeal declivitous margin straight to broadly concave, not crenulate, and continuous. Propodeal spiracle elliptical to slit-shaped. In posterior view, lateral margins of propodeum slightly converging dorsally. Mesosoma mostly shallowly punctate and shiny; mesopleuron mostly smooth and posteriorly with longitudinal rugulae, or sometimes virtually completely rugulose; metapleuron longitudinally striate, with striae becoming sparser dorsally to propodeal spiracle; declivitous surface of propodeum mostly smooth. Pubescence appressed; pilosity usually sparse and suberect.

Metasoma. Petiolar node in lateral view subrectangular; anterior margin straight; posterior margin convex and curving anteriorly; dorsal margin convex. Petiolar sternite with antero- and posteroventral angles rounded and ventral margin slightly concave, but raising posteriorly; or sometimes with antero- and posteroventral angles rounded and ventral margin convex. Petiole densely punctate and shiny. Prora extending anteroventrally and forming a ventral concavity in lateral view. Girdling constriction of abdominal segment IV clearly cross-

ribbed posteriorly on tergite and sternite. Gaster densely punctate and shiny; pubescence appressed to decumbent; pilosity decumbent to suberect.

Remarks. *Hypoponera leveillei* workers are among the largest *Hypoponera* ants. The only species that can reach the same size are *H. foreli* and *H. vernacula*. *Hypoponera foreli* differs by having a subtriangular petiolar node, a longer antennal scape, and a lower propodeum in relation to the mesonotum in lateral view. *Hypoponera vernacula* has an opaquer integument and a thicker petiole in lateral view. *H. schmalzi* and is very similar to *H. leveillei*, but differ in being smaller (WL<1.32 mm). Besides that, the overlapping distribution of *H. schmalzi* and *H. leveillei* suggests that the size is not a mere geographical variation.

We here synonymize *H. iheringi* under *H. leveillei* because we did not find discrete differences between them. The feature that separated these two species so far was the body size. However, by examining types from both species and two specimens from Aragua, Venezuela (type-locality of *H. leveillei*), we noted that body sizes are continuous between *H. iheringi* and *H. leveillei*.

To use body size to separate *H. schmalzi* and *H. leveillei*, but disregarding this character to keep *H. leveillei* and *H. iheringi* separate seems contradictory. However, in the first case, there is a clear discontinuity in size that makes it possible to separate the two species without arbitrariness, since the maximum size of the mesosoma of *H. schmalzi* was 1.31 mm and that of *H. leveillei* was always greater than 1.62 mm.

Although *H. iheringi* is now a junior synonym, we designate a lectotype to bear this name. We selected the specimen MHNG-ENTO-0094322 as lectotype because in the type series with three specimens examined, this specimen is on a separate pin, while the others are on the same. This same designation was previously made by Dash (2011) in his dissertation, but once this kind of work is not considered published according to article 9 of International Code of Zoological Nomenclature, the designation becomes valid with the publication of the present work.

Hypoponera leveillei was previously classified as *Pachycondyla* until Schmidt & Shattuck (2014) combine it in *Hypoponera* under the status *incertae sedis*. The single metatibial spur of *H. leveillei* leaves no doubt that it is not a *Pachycondyla* (or one of the other 18 genera once considered *Pachycondyla*). Finally, the current classification of *H. leveillei* within *Hypoponera* is supported by molecular evidence (Longino et al. *in prep*).

Specimens vary mainly in the shape of the petiolar sternite, which in specimens from Venezuela and Bahia (DZUP552433, DZUP552434, and DZUP552435) have antero- and

posteroventral angles rounded and the ventral margin convex. This character could not be seen on *H. leveillei* holotype image, because its petiole is glued on the cardboard. Anyway, petiolar sternite shape varies continuously in this species from the previously cited state to having antero- and posteroventral angles rounded and ventral margin convex.

Natural history. Based on the label data, this species is commonly found in forested areas, where it nests and forages within the litter and inside rotten logs. The peak of foraging activity seems to be in the morning. The most common collection methods are Winkler extractor and pitfall traps.

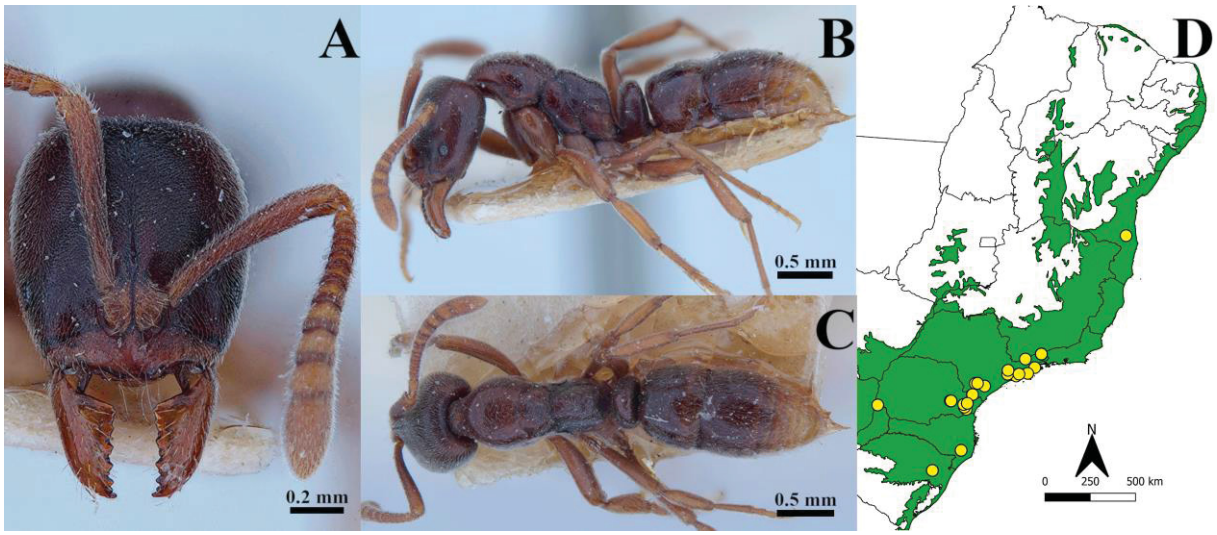

Figure 43. *Hypoponera leveillei* (specimen MHNGENTO00094323). A. Full-face view. B. Full body in lateral view. C. Full body in dorsal view. D. Distribution map.

Distribution. Brazil: Bahia, Camacã; Paraná: Curitiba, Ponta Grossa, Quatro Barras, Santa Terezinha de Itaipu, São José dos Pinhais, and Tunas do Paraná; Rio de Janeiro: Itatiaia, and Petrópolis; Santa Catarina: Orleans; São Paulo: Campos do Jordão, Caraguatatuba, Cunha Guapiara, Mogi das Cruzes, Ribeirão Grande, Salesópolis, São Paulo, and Sete Barras.

***Hypoponera opaciceps* (Mayr, 1887)**

Figure 44

Ponera opaciceps Mayr, 1887: 536. Lectotype worker (designated by Kempf, 1962: 7): BRAZIL: Santa Catarina (*Hetschko*) [NHMW] (not examined); paralectotypes: 1 worker and 2 queens with same data [NHMW] (worker examined by images: AntWeb.org-CASENT0915870). [Combination in *Hypoponera*: Taylor, 1967: 11. Misspelled as *oaciceps* by Santschi, 1925: 8. Male description: Smith, 1929: 545. Larva description: Wheeler & Wheeler, 1964: 453].

Ponera andrei Emery, 1900: 318 (footnote), fig. 47. Holotype worker: NEW CALEDONIA: Noumea [MNHN] (examined by images: AntWeb.org-CASENT0915491). [Junior synonym of *Hypoponera perkinsi*: Wilson, 1958: 334. Junior synonym of *Hypoponera opaciceps*: Wilson & Taylor, 1967: 28].

Ponera opaciceps postangustata Forel, 1908: 343. Lectotype worker (by present designation): PARAGUAY: San Bernardino (*Fiebrig*) MHNGENTO0094334 [MHNG] (examined); paralectotypes: 3 workers with same data, but MHNGENTO0094335, MHNGENTO0094336, and no collection number [MHNG] (examined). [Combination in *Hypoponera*: Kempf, 1972: 123. Junior synonym of *Hypoponera opaciceps*: Wild, 2007: 54].

Ponera perkinsi Forel, 1899: 117. Syntype workers, queens and males (number not stated): HAWAII ISLANDS [MHNG] (2 workers examined). [Junior synonym of *Hypoponera opaciceps*: Wilson & Taylor, 1967: 28].

Ponera opaciceps gaigei Forel, 1914: 615. Lectotype worker (by present designation): COLOMBIA: Prov. Santa Marta (*Gaige*) MHNGENTO00094333 [MHNG] (examined); paralectotypes: 1 worker and 1 queen-worker intercaste with same data, but MHNGENTO00094332, and MHNGENTO00094331 [MHNG] (examined). **New synonym**. [Combination in *Hypoponera*: Kempf, 1972: 123].

Diagnosis. Small to medium ants (WL>0.95 mm), anterior margin of clypeus strongly concave medially, petiolar node is rectangular in lateral view, with the anterior and posterior margins are virtually parallel. Moreover, it has the mesopleuron completely strigulate, and the integument is mostly subopaque to silky.

Non-type measurements (n=41). HL 0.66-0.85; HW 0.56-0.77; SL 0.56-0.69; ML 0.38-0.46; PrW 0.45-0.56; MeL 0.19-0.3; WL 0.98-1.11; HFL 0.61-0.7; HBL 0.46-0.57; PeL 0.18-0.23; PeH 0.33-0.45; PeW 0.33-0.41; PS 0.3-0.35 (mm). CI 106.66-122.58; MI 50-60.37; SI 84.16-103.29; PeI 69.62-76.82; LPeI 43.47-62.85; DPeI 150-216.66.

Description. Medium-sized (WL 0.98-1.11 mm); body mostly brown, with mandible, antenna, and legs light brown; rarely entirely light brown.

Head. In full-face view subquadrate, with lateral margin distinctly convex and posterior margin flat to slightly concave. Mandible with five or less distinct teeth, usually concentrated on apex, and indistinct denticles on the remainder of the masticatory margin; external margin very slightly concave to straight. Anterior margin of clypeus strongly concave. Eye usually with less than six distinct ommatidia, reaching but not clearly interrupting lateral cephalic margin; close to the posterior margin of the clypeus in lateral view (eye-mandible distance index less than 0.15). Antennal scape surpassing posterior margin of the head by less than the pedicel length. Mandible surface sparsely punctate. Frons densely punctate and subopaque. Gena densely and evenly punctate and shiny. Head ventrum smooth and shiny.

Mesosoma. In lateral view, anteroventral corner of pronotum rounded; promesonotal sulcus weak or absent, not clearly interrupting dorsal margin of mesosoma. Notopleural suture between mesonotum and mesopleuron well-marked; junction of upper and lower portion of the anterior margin of the mesopleuron forming an acute angle; dorsal margin of mesonotum flat, at the same level as the pronotum. Metanotum usually forming a very shallow sulcus, which may slightly interrupt dorsal margin of mesosoma. Propodeum with dorsal margin at the same level as mesonotum, flat to broadly convex. Propodeal declivitous margin straight to broadly convex, not crenulate, and continuous. Propodeal spiracle slit-shaped, rarely elliptical. In posterior view, lateral margins of propodeum slightly converging dorsally. Mesosoma mostly coarsely punctate and silky; mesopleuron and metapleuron longitudinally strigulate; declivitous surface of propodeum slightly rugulose. Pubescence appressed; suberect pilosity very sparse to absent.

Metasoma. Petiolar node in lateral view rectangular; anterior margin straight; posterior margin straight, sometimes sinuous; dorsal margin flat. Petiolar sternite with antero- and posteroventral angles rounded and ventral margin slightly concave. Petiole densely punctate and silky. Prora slightly extending anteroventrally and forming a small ventral concavity in lateral view. Girdling constriction of abdominal segment IV not clearly cross-ribbed posteriorly. Gaster densely punctate and silky; pubescence appressed to decumbent; pilosity decumbent to suberect.

Remarks. This species can be confused with *H. pampana* because both have a similar body size and subopaque mesosoma. However, *H. pampana* has the petiolar node subrectangular, that is, the lateral margins are slightly convergent apically in lateral view, while in *H. opaciceps* the petiolar node is rectangular with lateral margins virtually subparallel. In addition, the anterior margin of clypeus is concave in *H. opaciceps* and convex in *H. pampana*, and the gaster of *H. pampana* is shiny, while in *H. opaciceps* it is silky to subopaque. *Hypoponera* AMD_P also has a rectangular petiole, but differs mainly by declivitous margin of propodeum interrupted by metapleural gland opening, while in *H. opaciceps* the opening is continuous with declivitous margin.

Hypoponera opaciceps has three junior synonyms: *H. andrei*, *H. opaciceps postangustata*, and *H. perkinsi*. By examining *H. andrei* type, we agree with the synonymy. We also examined *H. opaciceps postangustata*, and *H. perkinsi* types and concluded that characteristics used in original descriptions, like head convexity and scape length, are inside the intraspecific variation of *H. opaciceps*.

We are proposing the synonymy of the subspecies *H. opaciceps gaigei*. The funiculus thickness used by Forel in the description does not support alone the maintenance of this subspecies. *Hypoponera opaciceps gaigei* also has an atypical ferruginous color, but this is also an intraspecific variation observed in some *H. opaciceps* specimens. The type series of *H. o. gaigei* includes a specimen which probably is a worker-queen intercaste. This specimen differs from other workers mainly by the larger eye, longer mesonotum, deep metanotal sulcus and subrectangular petiolar node. Although we are not providing a full description of this form, we illustrated the type available on AntWeb.org (MHNGENTO00094331).

H. opaciceps remains with two valid subspecies: *H. o. cubana* and *H. o. jamaicensis*. As the two species occur outside Brazil and we did not have access to the types, both are not treated in this study.

Natural history. Occurs in soil, and is frequently collected using epigaeic pitfalls, Berlese Funnel, Winkler extractor, and by extracting soil monoliths. This species probably has much to be explored about reproductive behavior, since, in addition to normal alate queens and males, there are also apterous males and possibly a queen-worker intercaste (Smith & Haug 1931).

Distribution. According to Wilson & Taylor (1967) *H. opaciceps* occurs in both the New and Old Worlds. However, in the Old World it is more concentrated in some areas, which could suggest it was introduced from the New World. The following distribution list comprises only the material examined herein: Brazil, Bahia: Camacã; Minas Gerais: Nova Lima; Paraná: Antonina, and Palmas; Rio Grande do Sul: Pareci Novo; Santa Catarina: Blumenau, Campo Belo do Sul, Chapecó, Florianópolis, Gaspar, Indaial, Itajaí, Itapoá, Joinvile, Lages, Lauro Muller, Orleans, Otacílio Costa, São Miguel do Oeste, Siderópolis, Timbó, Treviso, and Xanxerê; São Paulo: Cotia, Jardinópolis, José Bonifácio, Luiz Antônio, Mirassol, Neves Paulista, Osasco, Piracicaba, São Paulo, São Sebastião, and São José do Rio Preto.

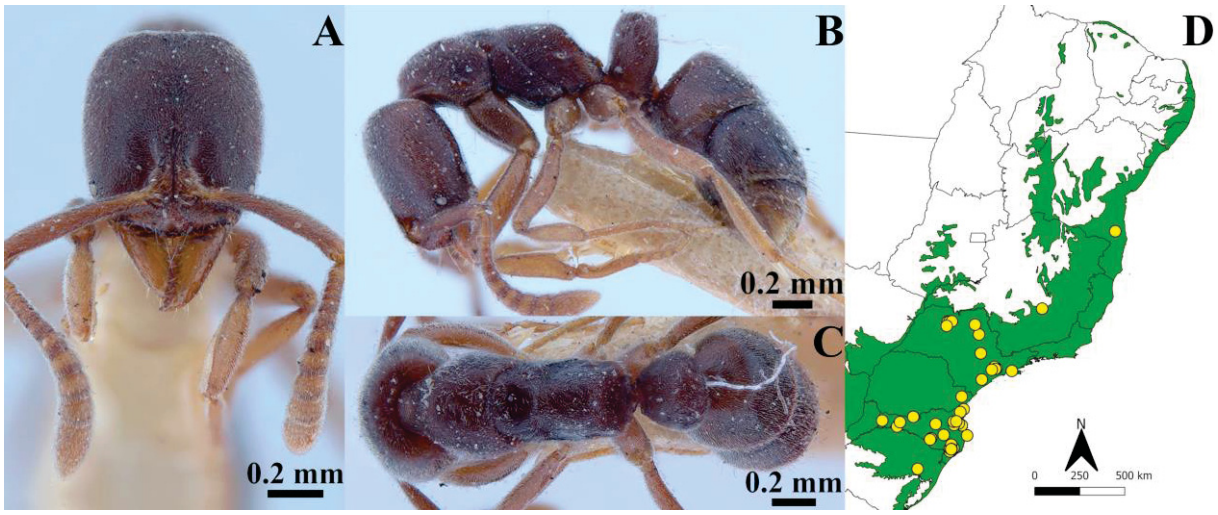

Figure 44. *Hypoponera opaciceps* (specimen MHNGENTO00094330). A. Full-face view. B. Full body in lateral view. C. Full body in dorsal view. D. Distribution map.

***Hypoponera opacior* (Forel, 1893)**

Figure 45

Ponera trigona opacior Forel, 1893: 363. Lectotype worker (designated by R.W. Taylor): ST VINCENT & THE GRENADINES, CASENT0907333 BOTTOM [MHNG] (examined); paralectotypes: 2 workers on the same pin as the lectotype, but UP and MID specimens [MHNG] (examined); 2 queens with the same data, but MHNG-ENTO-0094350 and MHNG-ENTO-0094394 [MHNG] (not examined). [Male description: Emery, 1895: 268. Larva description: Wheeler & Wheeler, 1964: 454. Combination in *Hypoponera* and rising to species: Taylor, 1968: 65].

Diagnosis. Small to medium size ants (WL 0.9-1.08 mm), with anterior margin of clypeus convex, metanotum forming a line which does not interrupt the dorsal margin of mesosoma in lateral view, propodeal declivitous margin continuous, petiolar node usually subtriangular, and petiolar sternite with antero- and posteroventral angles rounded and ventral margin flat to broadly convex. Furthermore, in lateral view the dorsal margin of mesosoma is virtually straight, that is, the pronotum, mesonotum and propodeum are flat in lateral view and there is no sulcus interrupting this profile.

Holotype measurements. HL 0.62; HW 0.53; SL 0.48; ML 0.33; PrW 0.45; MeL 0.21; WL 0.9; HFL 0.52; HBL 0.32; PeL 0.19; PeH 0.39; PeW 0.31; PS 0.29 (mm). CI 116.98; MI 53.22; SI 90.56; PeI 68.88; LPeI 48.71; DPeI 163.15.

Non-type measurements (n=10). HL 0.66-0.74; HW 0.55-0.62; SL 0.48-0.6; ML 0.35-0.39; PrW 0.42-0.5; MeL 0.2-0.26; WL 0.9-1.08; HFL 0.52-0.65; HBL 0.37-0.47; PeL

0.16-0.19; PeH 0.37-0.44; PeW 0.3-0.37; PS 0.27-0.33 (mm). CI 116-123.15; MI 48.3-54.86; SI 88.63-98.94; PeI 70.58-78.37; LPeI 42.25-46.87; DPeI 174.19-200.

Description. Small-sized (WL 0.9-1.08 mm); body mostly dark brown (sometimes brown), with mandible, antenna, and legs light brown.

Head. In full-face view subquadrate, with lateral margin distinctly convex and posterior margin flat to slightly concave. Mandible with at least three apical teeth and indistinct denticles on the remainder of masticatory margin; external margin concave. Anterior margin of clypeus convex. Eye with one distinct ommatidia, reaching but not clearly interrupting lateral cephalic margin; distant from the posterior margin of the clypeus in lateral view (eye-mandible distance index greater than 0.15). Antennal scape surpassing posterior margin of the head by less than the pedicel length. Mandible surface sparsely punctate. Frons densely punctate. Gena densely and evenly punctate. Head ventrum smooth medially and shallowly punctate laterally. Integument shiny.

Mesosoma. In lateral view, anteroventral corner of pronotum rounded; promesonotal sulcus very weak to absent, not clearly interrupting dorsal margin of mesosoma. Notopleural suture between mesonotum and mesopleuron suture well-marked; junction of upper and lower portion of the anterior margin of the mesopleuron forming an acute angle; dorsal margin of mesonotum flat, at the same level as the pronotum. Metanotum as a well-marked line that does not interrupt the dorsal margin of the mesosoma. Propodeum with dorsal margin at the same level as mesonotum, flat. Propodeal declivitous margin straight, not crenulate, and continuous. Propodeal spiracle rounded, rarely elliptical. In posterior view, lateral margins of propodeum slightly converging dorsally. Mesosoma mostly shallowly punctate and shiny; mesopleuron mostly smooth and posteriorly with longitudinal rugulae; metapleuron longitudinally strigulate; declivitous surface of propodeum mostly smooth. Pubescence appressed; long pilosity absent.

Metasoma. Petiolar node in lateral view subtriangular, sometimes subrectangular; anterior and posterior margins straight to broadly convex; dorsal margin convex. Petiolar sternite with antero- and posteroventral angles rounded and ventral margin flat to broadly convex. Petiole densely punctate and shiny. Prora not extending anteroventrally. Girdling constriction of abdominal segment IV with a very thin band cross-ribbed posteriorly on tergite and sternite, which may be completely inconspicuous in some specimens or at less than 50x magnification. Gaster sparsely punctate and shiny; pubescence appressed to decumbent; long pilosity absent.

Remarks. Despite the name, *H. opacior* has a very shiny integument. It is very similar to *H*. AMD_S, differing by having a flat mesosoma profile, while in *H*. AMD_S it is broadly convex. *Hypoponera opacior* usually has a larger size (WL >0.89 mm, *vs* <0.9 mm in *H*. AMD_S). Furthermore, petiolar node of *H. opacior* is usually subtriangular, while in *H*. AMD_S it is subrectangular. See more in the remarks sections of *H*. AMD_S.

H. opacior is also very similar to *H. cauta*. However, *H. cauta* always has the anterior margin of clypeus concave, while in *H. opacior* it is convex. In addition, *H. cauta* has the propodeum very coarsely punctate, and in *H. opacior* the propodeum is finely punctate, with conspicuous space between punctae. Other species that may be confused with *H. opacior* are *H*. AMD_Q, *H*. AMD_C, *H. pampana*, and *H*. AMD_R. *Hypoponera pampana* is easily distinguished by eye position, which is close to the posterior margin of clypeus in *H. pampana* and distant in *H. opacior*. *Hypoponera* AMD_C can be separated by its metapleural gland opening interrupting declivitous margin of propodeum, while in *H. opacior* the opening is continuous with declivitous margin. *Hypoponera* AMD_Q shares with *H. opacior* the convex clypeal margin, and subtriangular petiolar node, but differs by having metanotum slightly interrupting dorsal margin of mesosoma in lateral view and larger size (usually WL>1.2 mm). The main difference between *H*. AMD_R and *H. opacior* is that the former has the petiolar sternite with anterior margin forming a sharp angle with ventral margin, while in *H. opacior* this angle is rounded.

Although *H. opacior* was originally described in North America, it is known that the species has a high invasive capacity, leading to its common occurrence in Brazil.

Natural history. Common ants that live in soil and leaf litter. Although some works mentioning aspects of its natural history, we did not include them here because this species is frequently misidentified. The sexual behavior of this species is remarkable among ants due to the coexistence of both winged and wingless males within the same colony (Fiotzik et al., 2002). Details on the reproduction of this species can be found in the natural history section of the genus.

The majority of records of this species are concentrated in coastal cities, which might be attributed to the fact that these places are more likely to be invaded.

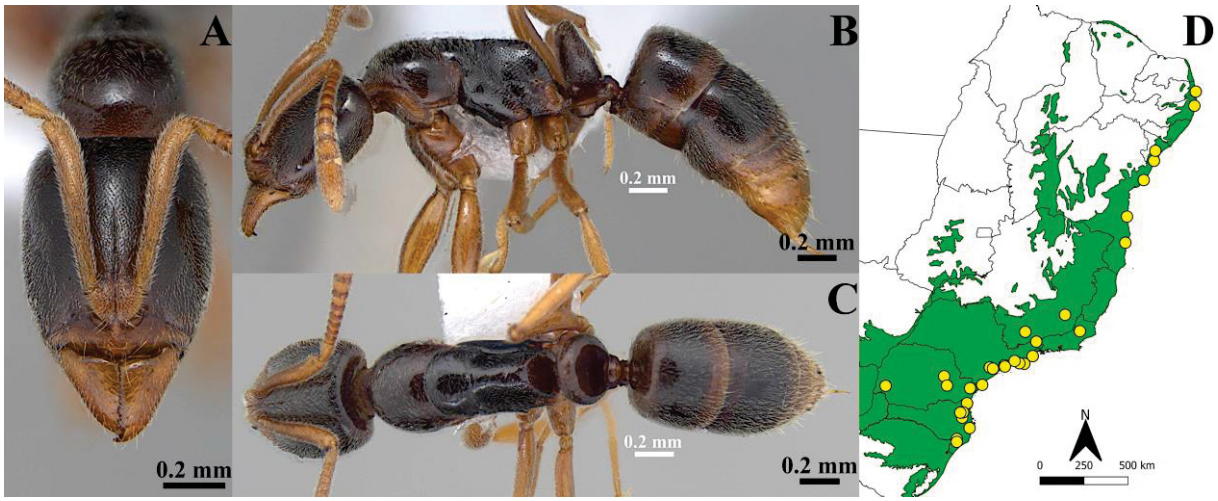

Figure 45. *Hypoponera opacior* (specimen DZUP550799). A. Full-face view. B. Full body in lateral view. C. Full body in dorsal view. D. Distribution map.

Distribution. *Hypoponera opacior* is an exotic species in Brazil, prevalent close to the coast. It can be found on the following localities: Brazil, Bahia: Ilhéus, Mata São João, and Porto Seguro; Minas Gerais: Cambuquira, and Viçosa; Paraíba: João Pessoa; Paraná: Antonina, Céu Azul, Ponta Grossa, and Tibagi; Pernambuco: Recife; Rio de Janeiro: Itatiaia, and Santa Maria Madalena; Santa Catarina: Blumenau, Joinville, Lauro Muller, Palhoça, Siderópolis, and Timbó; São Paulo: Cananéia, Ilhabela, Miracatu, Picinguaba, Praia Grande, Salesópolis, São Sebastião, Tapiraí, and Ubatuba; Sergipe: Areia Branca, and Santa Luzia do Itanhi.

Hypoponera pampana **(Santschi, 1925) New Status**

Figure 46

Ponera opaciceps var. *pampana* Santschi, 1925: 153. Lectotype worker (by present designation): ARGENTINA: Catamarca, Cerro Colorado (Weiser) [NHMB] (examined by images: AntWeb.org-CASENT0915296). **New status**. [Combination in *Hypoponera*: Kempf, 1972: 123].

Diagnosis. *Hypoponera pampana* is recognized by having small size (WL<1 mm), eye reduced (less than six distinct ommatidia) and close to posterior margin of clypeus, antennal scape surpassing posterior margin of head in full-face view, metanotum forming a sulcus, subrectangular petiolar node, and integument mostly brown and opaque.

Lectotype measurements. HL 0.62; HW 0.52; SL 0.46; ML 0.31; PrW 0.41; MeL 0.2; WL 0.86; HFL NA; HBL NA; PeL0.16; PeH 0.33; PeW 0.28; PS 0.25; CI 119.23; MI 50; SI 88.46; PeI 68.29; LPeI 48.48; DPeI 175.

Non-type measurements (n=18). HL 0.63-0.69; HW 0.53-0.62; SL 0.47-0.53; ML 0.32-0.38; PrW 0.38-0.47; MeL 0.19-0.25; WL 0.78-0.96; HFL 0.47-0.56; HBL 0.35-0.43; PeL 0.16-0.18; PeH 0.31-0.38; PeW 0.26-0.36; PS 0.25-0.29 (mm). CI 110.2-117.44; MI 50.98-59.04; SI 82.6-88.37; PeI 67.64-85.5; LPeI 44.82-54.9; DPeI 150-226.92

Description. Small-sized (WL 0.78-0.96 mm); body mostly brown (sometimes red-brown), with mandible, antenna, and legs light brown.

Head. In full-face view subquadrate, with lateral margin distinctly convex and posterior margin concave. Mandible with at least three apical teeth and indistinct denticles on the remainder of masticatory margin; external margin concave. Anterior margin of clypeus convex. Eye with up to seven ommatidia, but fused and difficult to distinguish; it reaches but not clearly interrupts lateral cephalic margin; close to the posterior margin of the clypeus in lateral view (eye-mandible distance index less than 0.15). Antennal scape surpassing posterior margin of the head by less than the pedicel length. Mandible surface sparsely punctate. Frons densely punctate and subopaque to silky. Gena densely and evenly punctate and shiny. Head ventrum very sparsely punctate, mostly smooth and shiny.

Mesosoma. In lateral view, anteroventral corner of pronotum rounded; promesonotal sulcus weak, sometimes slightly interrupting dorsal margin of mesosoma. Notopleural suture between mesonotum and mesopleuron weakly impressed; junction of upper and lower portion of the anterior margin of the mesopleuron forming an acute angle; dorsal margin of mesonotum flat, at the same level to slightly higher than pronotum. Metanotum forming a sulcus. Propodeum with dorsal margin at the same level as mesonotum, flat. Propodeal declivitous margin straight to broadly concave, not crenulate, and continuous. Propodeal spiracle rounded, rarely elliptical. In posterior view, lateral margins of propodeum slightly converging dorsally. Mesosoma mostly densely punctate and opaque; mesopleuron and metapleuron finely strigulate; declivitous surface of propodeum smooth. Pubescence appressed; long pilosity absent.

Metasoma. Petiolar node in lateral view subtriangular to subrectangular; anterior and posterior margins straight to broadly convex; dorsal margin convex. Petiolar sternite with antero- and posteroventral angles rounded and ventral margin slightly concave. Petiole

densely punctate and shiny. Prora slightly extending anteroventrally and forming a small ventral concavity in lateral view. Girdling constriction of abdominal segment IV with a thin band cross-ribbed posteriorly on tergite and sternite. Gaster densely punctate and shiny; pubescence appressed to decumbent; short decumbent to suberect pilosity.

Remarks. *H. pampana* was firstly described as a subspecies of *H. opaciceps*. However, we have examined enough specimens to state that *H. pampana* deserves to become a valid species other than *H. opaciceps*. Despite the similarities between the two species, such as the opaque integument, head shape, scape length, petiolar sternite, and body size, they can be separated by petiolar node shape in lateral view, which in *H. opaciceps* has the anterior and posterior margins subparallel in lateral view, while in *H. pampana* the margins are convergent. Moreover, girdling constriction of *H. pampana* always has a thin band cross-ribbed posteriorly, which is absent in *H. opaciceps*.

Other species that share some similarities with *H. pampana* are *H. inexpedita*, *H.* AMD_B, and *H.* AMD_D. *Hypoponera inexpedita* has a reduced eye positioned close to clypeus, subrectangular petiolar node, and scape surpassing posterior margin of head, similar to *H. pampana*. However, it differs by having shiny integument. In addition, *H. inexpedita* also can be easily separated by the absence of metanotal sulcus, which is present in *H. pampana*. *Hypoponera* AMD_B, and *H.* AMD_D are distinguished by their shiny integument and by petiolar sternite, which never is concave or flat as in *H. pampana*.

Natural history. Based on labels information, it is possible to infer that *H. pampana* is a species nests and forages in soil environments. Additionally, several specimens were collected on disturbed areas of sugarcane plantation.

Distribution. Brazil, Minas Gerais: Betim; Paraná: Curitiba, Palmas, and Ponta Grossa; Rio de Janeiro: Petrópolis; Rio Grande do Sul: Morro Redondo; Santa Catarina: Blumenau, Campo Belo do Sul, Chapecó, Joinville, Lages, Lauro Muller, Orleans, Otacílio Costa, São Miguel do Oeste, Siderópolis, Timbó, and Xanxerê; São Paulo: Agudos, Guaratinguetá, and Monte Aprazivel.

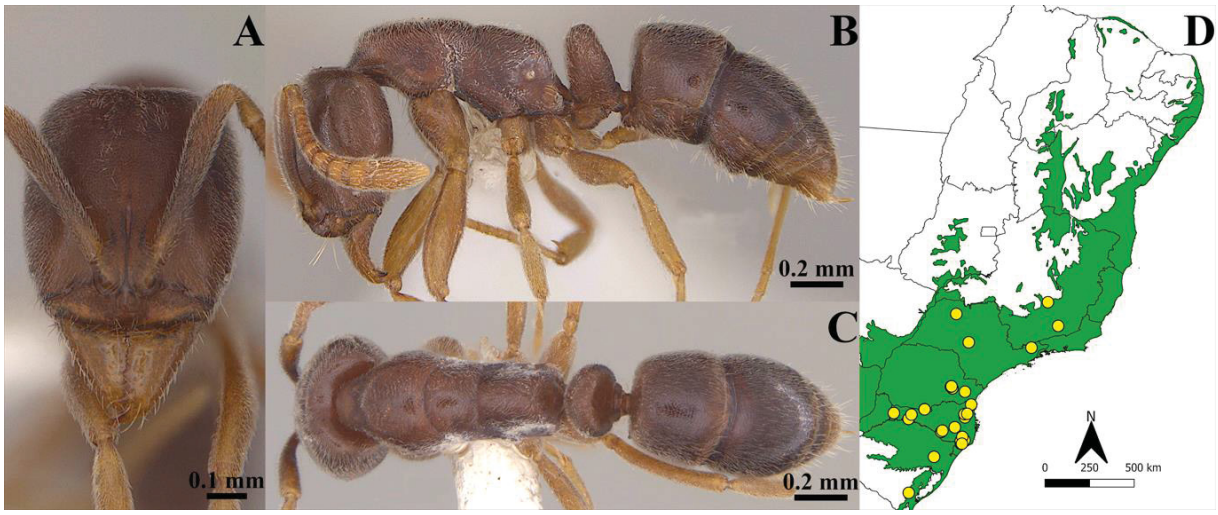

Figure 46. *Hypoponera pampana* (specimen DZUP556172). A. Full-face view. B. Full body in lateral view. C. Full body in dorsal view. D. Distribution map.

***Hypoponera schmalzi* (Emery, 1896)**

Figure 47

Ponera schmalzi Emery, 1896: 57. Syntype workers (number not stated): BRAZIL: Santa Catarina, Joinville [MSNG] (1 specimen examined by images: Dash, 2011). [Combination in *Hypoponera*: Kempf, 1972:123].

Ponera schmalzi fugitans Forel, 1912: 40. Holotype worker (by monotypy): BRAZIL: Rio de Janeiro (Göldi) MHNG-ENTO-0094339 [MHNG] (examined). **New synonym**. [Combination in *Hypoponera*: Kempf, 1972: 123].

Ponera distinguenda histrio Forel, 1912: 40. Lectotype worker (by presente designation): BRAZIL: Rio de Janeiro, Colonie Alpina (Göldi), MHNGENTO00094399 BOTTOM [MHNG] (examined). Paralectotype worker in the same pin as the lectotype, but MHNGENTO00094398 UP [MHNG] (examined). **New synonym**. [Combination in *Hypoponera*: Kempf, 1972: 122].

Diagnosis. Medium to large size ants (WL>1.13 mm) with well-developed eye (more than six ommatidia), subrectangular petiolar node, petiolar sternite with anterior and ventral margins continuous and convex and posterior margin concave, and metapleuron completely strigulate.

Non-type measurements (n=25). HL 0.77-0.9; HW 0.66-0-.83; SL 0.57-0.68; ML 0.37-0.48; PrW 0.51-0.61; MeL 0.21-0.36; WL 1.08-1.31; HFL 0.65-0.75; HBL 0.46-0.6; PeL 0.19-0.25; PeH 0.40-0.55; PeW 0.36-0.46; PS 0.32-0.42 (mm). CI 103.78-121.23; MI 46.87-56.25; SI 81.2-90.26; PeI 68.08-76.28; LPeI 44.44-53.62; DPeI 165.78-200.

Description. Medium-sized (WL 1.08 mm - 1.31 mm); body mostly dark brown (sometimes brown), with mandible, antenna, and legs light brown.

Head. In full-face view subquadrate, with lateral margin distinctly convex and posterior margin flat to slightly concave. Mandible with five or less distinct teeth, usually concentrated on apex, and several denticles on the remainder of the masticatory margin; external margin straight to broadly convex. Anterior margin of clypeus strongly concave. Eye usually with 7-25 distinct ommatidia, reaching but not clearly interrupting lateral cephalic margin; distant from the posterior margin of the clypeus in lateral view (eye-mandible distance index greater than 0.15). Antennal scape surpassing posterior margin of the head by less than the pedicel length. Mandible surface sparsely punctate. Frons densely punctate. Gena densely and evenly punctate. Head ventrum smooth medially and shallowly punctate laterally. Integument shiny.

Mesosoma. In lateral view, anteroventral corner of pronotum rounded; promesonotal sulcus weak or absent, usually not clearly interrupting dorsal margin of mesosoma. Notopleural suture between mesonotum and mesopleuron well-marked; junction of upper and lower portion of the anterior margin of the mesopleuron meets forming an acute angle; dorsal margin of mesonotum flat, at the same level as the pronotum. Metanotum forming a sulcus that interrupts dorsal margin of mesosoma. Propodeum with dorsal margin at the same level as mesonotum, slightly concave. Propodeal declivitous margin straight to broadly concave, not crenulate, and continuous. Propodeal spiracle elliptical to slit-shaped. In posterior view, lateral margins of propodeum slightly converging dorsally. Mesosoma mostly punctate and shiny; mesopleuron anteriorly smoother, posteriorly coarsely rugulose; punctae coarser on propodeum; metapleuron longitudinally strigulate; declivitous surface of propodeum smooth. Pubescence appressed; pilosity usually sparse and suberect.

Metasoma. Petiolar node in lateral view subrectangular; anterior and posterior margins straight to broadly convex; dorsal margin convex. Petiolar sternite with anterior and ventral margins continuous and bulging posteriorly; posteroventral angle rounded; posterior margin concave. Petiole densely punctate and shiny. Prora slightly extending anteroventrally and forming a small ventral concavity in lateral view. Girdling constriction of abdominal segment IV cross-ribbed posteriorly on tergite and sternite. Gaster densely punctate and shiny; pubescence appressed to decumbent; short suberect pilosity.

Remarks. *Hypoponera schmalzi* closely resembles *H. leninei*, but differs by the petiolar sternite shape, which is more continuously rounded in *H. leninei*, while in *H. schmalzi* the posterior margin is distinct and concave. Moreover, *H. schmalzi* has anterior clypeal margin strongly concave medially, and in *H. leninei* the clypeus is usually convex or

very slightly concave. *H. leveillei* is very similar to *H. schmalzi*, but they differ because *H. leveillei* is noticeably larger, with WL>1.5 mm (see more in *H. leveillei* remarks).

We are synonymizing *H. s. fugitans* under *H. schmalzi*, as our observations reveal that the characteristics used to differentiate the subspecies, such as color, scape length, and petiolar node height, are actually intraspecific variations.

We are also proposing the synonymy of *H. distinguenda histrio* under *H. schmalzi*, because although *H. d. histrio* is slightly smaller and lighter, all other characters align with those of *H. schmalzi*. We believe that the small difference in body size and the pale color may actually indicate a younger individual.

Probably, the subspecies *H. schmalzi paulina* (Forel, 1913) is a different species from *H. schmalzi* because of the anterior margin of clypeus, which is concave in *H. schmalzi*, and convex in *H. schmalzi paulina*. However, we opted not to change its status due to the fact that the subspecies was described based on queens and males, making comparisons with other species impossible now.

Natural history. *Hypoponera schmalzi* is frequently collected on soil using Winkler extractor, which suggests it lives and forages on leaf litter. However, it has also been collected on trees. Its well-developed eyes indicate that *H. schmalzi* may live in open habitats. Therefore, the available information indicates that *H. schmalzi* can forages in several types of habitats.

Distribution. Brazil, Bahia: Camacã; Minas Gerais: Mariana, and Viçosa; Paraná: Antonina, Curitiba, Morretes, Palmas, Quatro Barras, São José dos Pinhais, and Tunas do Paraná; Rio de Janeiro; Santa Catarina: Campo Belo do Sul, Florianópolis, Joinville, Lages, São Bento do Sul, and São Bonifácio; São Paulo: Cananeia, Cunha, Iporanga, Mogi das Cruzes, Nazaré Paulista, and Tapiraí.

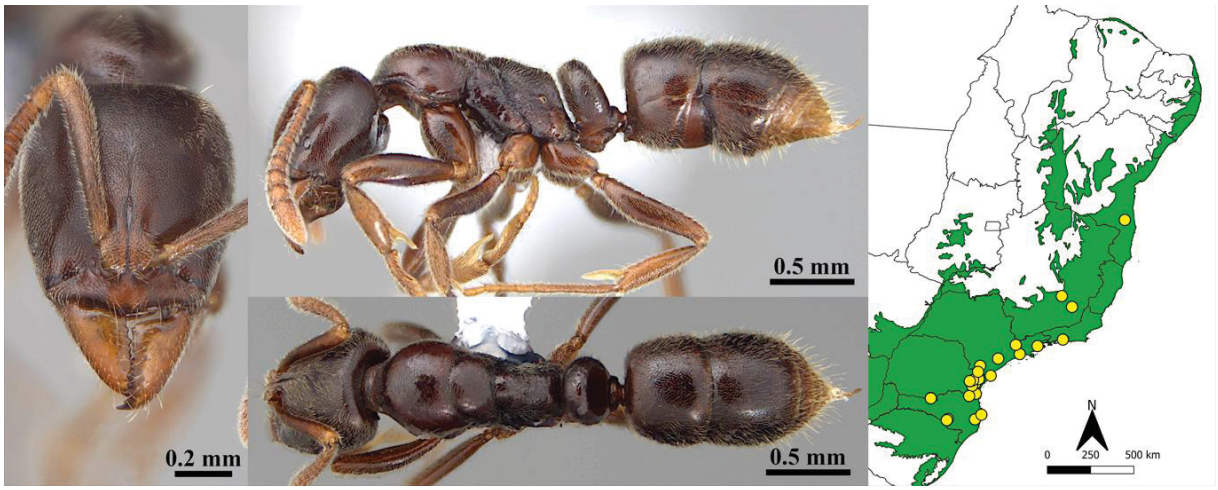

Figure 47. *Hypoponera schmalzi* (specimen DZUP551019). A. Full-face view. B. Full body in lateral view. C. Full body in dorsal view. D. Distribution map.

Hypoponera vernacula (Kempf, 1962)

Figure 48

Ponera vernacula Kempf, 1962: 13, figs. 13, 16. Holotype worker: BRAZIL: São Paulo, Serra de Cantareira Mts, nr São Paulo City, 31.I.1960, no. 3394 (W.W. Kempf & V. dos Santos) MZSPHYM89518 [MZSP] (examined); paralectotypes: 7 workers with same data, but 3 MZSPHYM89519, and 3 MZSPHYM89520 [MZSP] (examined). [Combination in *Hypoponera*: Kempf, 1972: 124].

Diagnosis. *H. vernacula* can be recognized by the combination of large size (WL>1.30 mm), petiolar node subrectangular and thick, and integument subopaque to silky, never shiny. Moreover, it has very well-developed eyes (more than 25 distinct ommatidia), and propodeum clearly lower than mesonotum in lateral view.

Holotype measurements. HL 1.02; HW 0.86; SL 0.88; ML 0.54; PrW 0.7; MeL 0.38; WL 1.54; HFL NA; HBL NA; PeL 0.33; PeH 0.59; PeW 0.44; PS 0.45 (mm). CI 118.6; MI 52.94; SI 102.32; PeI 62.85; LPeI 55.93; DPeI 133.33.

Additional material measurements (n=4). HL 0.92-1.1; HW 0.75-0.95; SL 0.86-1.01; ML 0.5-0.58; PrW 0.55-0.68; MeL 0.28-0.43; WL 1.31-1.65; HFL 0.91-1.1; HBL 0.75-0.93; PeL 0.27-0.36; PeH 0.46-0.58; PeW 0.38-0.48; PS 0.37-0.47 (mm). CI 115.03-124.7; MI 50.94-55.55; SI 105.61-115.83; PeI 70.45-71.01; LPeI 56.66-64.83; DPeI 132.2-144.11.

Redescription. Large-sized (WL 1.31-1.65 mm); body entirely brown or entirely light brown.

Head. In full-face view subquadrate, with lateral margin distinctly convex and posterior margin flat to slightly convex. Mandible usually with seven to nine distinct teeth and indistinct denticles between them; external margin concave. Anterior margin of clypeus slightly concave. Eye with more than 25 distinct ommatidia, reaching and interrupting lateral cephalic margin; distant from the posterior margin of the clypeus in lateral view (eye-mandible distance index greater than 0.15). Antennal scape surpassing posterior margin of the head by more than the pedicel length. Mandible surface sparsely punctate. Frons densely punctate. Gena densely and evenly punctate. Head ventrum smooth medially and punctate laterally. Integument subopaque.

Mesosoma. In lateral view, anteroventral corner of pronotum rounded; promesonotal sulcus clearly interrupting dorsal margin of mesosoma. Notopleural suture between mesonotum and mesopleuron well-marked; junction of upper and lower portion of the anterior margin of the mesopleuron forming an acute angle; dorsal margin of mesonotum convex, higher than pronotum. Metanotum forming a sulcus. Propodeum with dorsal margin lower than mesonotum, slightly concave. Propodeal declivitous margin broadly convex to straight, not crenulate, and continuous. Propodeal spiracle elliptical. In posterior view, lateral margins of propodeum slightly converging dorsally. Mesosoma mostly coarsely punctate; mesopleuron rugulose to strigulate posteriorly; metapleuron strigulate; declivitous surface mostly smooth. Pubescence appressed; pilosity usually sparse and suberect.

Metasoma. Petiolar node in lateral view subrectangular; anterior and posterior margins strongly convex; dorsal margin broadly convex.

Petiolar sternite with anterior and ventral margins continuous and bulging posteriorly; posteroventral angle rounded; posterior margin concave. Petiole densely punctate and silky. Prora slightly extending anteroventrally and forming a small ventral concavity in lateral view. Girdling constriction of abdominal segment IV not clearly cross-ribbed posteriorly, or rarely with a thin band cross-ribbed posteriorly on tergite and sternite. Gaster densely punctate and silky, pubescence appressed to decumbent; pilosity suberect to erect.

Remarks. *H. vernacula* is similar to *H. foreli* due its low propodeum in relation to mesonotum in lateral view. However, *H. foreli* has a subtriangular petiolar node, while it is very thick and subrectangular in *H. vernacula*; also, *H. foreli* is shinier than *H. vernacula*, specially on gaster. Other species, such as *H.* AMD_Q, *H. idelettae*, *H.* AMD_C, and *H.*

AMD_I have a large body size, but can be separated by their small eyes, usually with less than six distinct ommatidia. *Hypoponera schmalzi* and *H. leninei* are large-sized and have a large eye, but the propodeum is never so low, and the antennal scape is shorter than the pedicel. *Hypoponera leveillei* may have a similar size, but the propodeum is never so low, and the integument is shiny.

Natural history. Type series of *H. vernacula* was collected on a decaying log at Serra da Cantareira state park, São Paulo, Brazil (Kempf 1962).

Distribution. Brazil: São Paulo: Salesópolis, and São Paulo; Paraná: Piraquara.

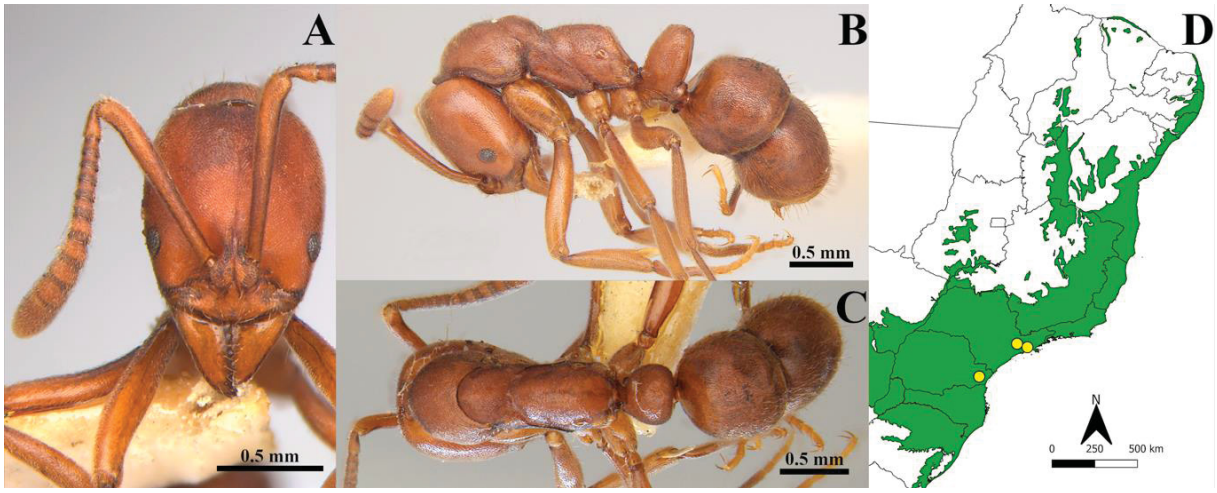

Figure 48. *Hypoponera vernacula* (specimen MZSP89518). A. Full-face view. B. Full body in lateral view. C. Full body in dorsal view. D. Distribution map.

Hypoponera AMD_A New Species

Figure 49

Holotype worker: BRAZIL: Paraná, São José dos Pinhais, 880m, 25°36'18"S 49°11'37"W, 13.x.2018 (A.C. Domahovski), sweep, DZUP554730 [DZUP].

Paratype workers: with the same data as the holotype, but DZUP554731 (1 ☿) [DZUP]; same data, but DZUP554732 (1 ☿) [MZSP].

Diagnosis. *H.* AMD_A can be distinguished by the small size (WL<1 mm), antennal scape surpassing posterior margin of head by a length similar to pedicel length, metanotum

impressed as a line that does not interrupt the dorsal margin of the mesosoma, subtriangular petiolar node, and subtriangular petiolar sternite.

Holotype measurements. HL 0.68; HW 0.55; SL 0.56; ML 0.36; PrW 0.44; MeL 0.22; WL 0.97; HFL 0.58; HBL 0.41; PeL 0.18; PeH 0.35; PeW 0.25; PS 0.26 (mm). CI 123.86; MI 53.21; SI 102.27; PeI 56.33; LPeI 53.57; DPeI 133.33.

Additional material measurements (n=2). HL 0.66-0.68; HW 0.55; SL 0.55; ML 0.36; PrW 0.42-0.43; MeL 0.21-0.22; WL 0.94-0.96; HFL 0.55-0.56; HBL 0.41; PeL 0.18; PeH 0.33-0.35; PeW 0.25; PS 0.25-0.26 (mm). CI 121.59-123.86; MI 53.21-55.1; SI 100; PeI 57.97-58.82; LPeI 53.57-53.7; DPeI 133.33-137.93.

Description. Small-sized (WL 0.94-0.97 mm); body mostly brown, with mandible, antenna, and legs light brown.

Head. In full-face view subquadrate, with lateral margin broadly convex and posterior margin flat to slightly concave. Mandible with at least four apical teeth and indistinct denticles on the remainder of masticatory margin; external margin concave. Anterior margin of clypeus convex. Eye with one distinct ommatidia, reaching but not clearly interrupting lateral cephalic margin; distant from the posterior margin of the clypeus in lateral view (eye-mandible distance index greater than 0.15). Antennal scape surpassing posterior margin of the head by a length similar to that of the pedicel. Mandible surface densely punctate. Frons densely punctate and subopaque. Gena densely and evenly punctate and shiny. Head ventrum smooth medially and finely punctate laterally; shiny.

Mesosoma. In lateral view, anteroventral corner of pronotum rounded; promesonotal sulcus very shallow, slightly interrupting dorsal margin of mesosoma. Notopleural suture between mesonotum and mesopleuron well-marked; junction of upper and lower portion of the anterior margin of the mesopleuron forming an acute angle; dorsal margin of mesonotum flat, at the same level as the pronotum. Metanotum as a well-marked line that does not interrupt the dorsal margin of the mesosoma. Propodeum with dorsal margin at the same level as mesonotum, flat. Propodeal declivitous margin straight to broadly concave, not crenulate, and continuous. Propodeal spiracle slit-shaped. In posterior view, lateral margins of propodeum slightly converging dorsally. Mesosoma mostly punctate and shiny; mesopleuron anteriorly punctate and posteriorly with longitudinal rugulae; metapleuron longitudinally

striate; declivitous surface of propodeum mostly smooth. Pubescence decumbent to suberect; long pilosity absent.

Metasoma. Petiolar node in lateral view subtriangular; anterior margin convex; posterior margin straight; dorsal margin convex. Petiolar sternite diminishes in height posteriorly, with irregular ventral margin. Petiole densely punctate and silky. Prora extending anteroventrally and forming a ventral concavity in lateral view. Girdling constriction of abdominal segment IV not clearly cross-ribbed posteriorly. Gaster densely punctate and shiny; pubescence appressed to decumbent; pilosity short and suberect.

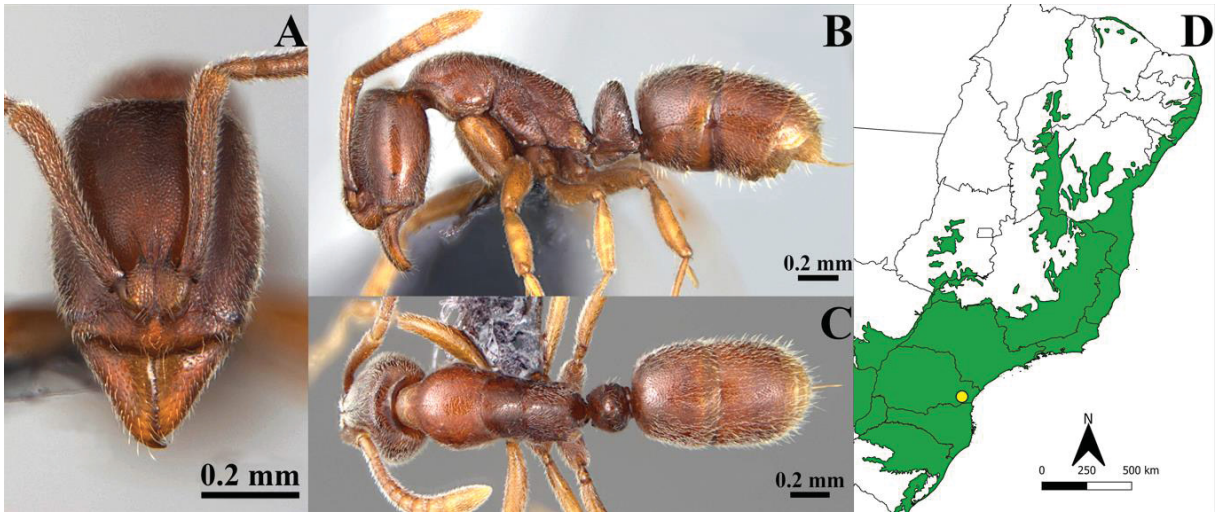

Figure 49. *Hypoponera* AMD_A (specimen DZUP554730). A. Full-face view. B. Full body in lateral view. C. Full body in dorsal view. D. Distribution map.

Remarks. This species is very different from all the other *Hypoponera* species because of the subtriangular petiolar node and of the sternite shape. Petiolar sternite reduces posteriorly, with ventral margin irregular. *Hypoponera* AMD_E and *H*. AMD_F have a similar petiolar node shape, but the scape of these species usually does not surpass or slightly surpass the posterior margin oh head in full-face view, while in *H.* AMD_A the scape surpasses it by a length similar to pedicel length. Moreover, in *H*. AMD_F and *H*. AMD_E the upper and lower portion of the anterior margin of the mesopleuron meet forming an obtuse angle, while in *H*. AMD_A it is acute.

Probably the most similar species is *H.* AMD_C, which differs by having the girdling constriction of abdominal segment IV with well-developed cross-rib striation on tergite and sternite, while in *H*. AMD_A the girdling constriction is not conspicuously cross-ribbed. Besides, *H.* AMD_C also differs by having the propodeum slightly lower in relation to

mesonotum in lateral view, contrasting with the even mesosoma profile of *H.* AMD_A. *H. opacior* is also similar to *H.* AMD_A, but in the former the petiolar node is shorter in lateral view and the petiolar sternite is not subtriangular. *Hypoponera cauta* has a subtriangular petiolar node and a similar body size, but in *H. cauta* the anterior margin of clypeus is always medially concave, while in *H.* AMD_A is convex.

Natural History. All known specimens have been collected using nets to sweep through plants.

Distribution. Known only for type locality in Brazil, Paraná: São José dos Pinhais.

Hypoponera AMD_B New Species

Figure 50

Holotype worker: BRAZIL: Bahia, Camacã, RPPN Serra Bonita, Centro de pesquisa, 790m, 15°23'33.30"S 39°33'51.57"W, 14-19.vii.2018 (R. Feitosa, N. Ladino, A. Ferreira & M. Martins) col. manual, DZUP554728 [DZUP].

Paratype worker: with the same data as the holotype, but DZUP554729 (1 ☿) [MZSP].

Diagnosis. *H.* AMD_B is a small species (WL<0.9 mm) recognized by the poor developed eyes (with less than six ommatidia) located close to posterior margin of clypeus, antennal scape reaching and slightly surpassing posterior margin of head, junction of upper and lower portion of the anterior margin of the mesopleuron forming an obtuse angle, metanotum forming a sulcus that interrupts dorsal margin of mesosoma in lateral view, and the petiolar sternite subtriangular.

Holotype measurements. HL 0.6; HW 0.5; SL 0.43; ML 0.32; PrW 0.38; MeL 0.17; WL 0.8; HFL 0.43; HBL 0.32; PeL 0.17; PeH 0.27; PeW 0.24; PS 0.23 (mm). CI 1.2; MI 54.16; SI 86.25; PeI 62.9; LPeI 63,63; DPeI 139.28.

Additional material measurements (n=1). HL 0.58; HW 0.5; SL 0.42; ML 0.3; PrW 0.37; MeL 0.18; WL 0.78; HFL 0.42; HBL 0.31; PeL 0.17; PeH 0.27; PeW 0.25; PS 0.23 (mm). CI 1.16; MI 51.06; SI 83.95; PeI 66.66; LPeI 63.63; DPeI 142,85.

Description. Small-sized (WL 0.78-0.8 mm); body entirely light brown.

Head. In full-face view subquadrate, with lateral margin broadly convex and posterior margin concave. Mandible with tree apical teeth, and 3-7 denticles on the remainder of masticatory margin; external margin very slightly concave to straight. Anterior margin of clypeus convex. Eye with one distinct ommatidia, reaching but not interrupting lateral cephalic margin; close to the posterior margin of the clypeus in lateral view (eye-mandible distance index less than 0.15). Antennal scape reaching and slightly surpassing posterior margin of the head by less than half length of pedicel. Mandible surface mostly smooth, with sparse shallow punctae. Frons densely punctate. Gena with sparser punctae evenly distributed. Head ventrum smooth. Integument shiny.

Mesosoma. In lateral view, anteroventral corner of pronotum rounded; promesonotal sulcus shallow, slightly interrupting dorsal margin of mesosoma. Notopleural suture between mesonotum and mesopleuron weakly impressed; junction of upper and lower portion of the anterior margin of the mesopleuron meets forming an obtuse angle; dorsal margin of mesonotum flat, slightly higher than pronotum. Metanotum forming a sulcus. Propodeum with dorsal margin in the same level to slightly lower than mesonotum, flat to broadly convex. Propodeal declivitous margin convex, not crenulate, and continuous. Propodeal spiracle rounded. In posterior view, lateral margins of propodeum slightly converging dorsally. Mesosoma mostly punctate and shiny; mesopleuron with sparse irregular rugulae; metapleuron longitudinally striate, with striae becoming sparser dorsally to propodeal spiracle; declivitous surface of propodeum smooth. Pubescence appressed; long pilosity absent.

Metasoma. Petiolar node in lateral view subrectangular; anterior margin broadly concave to straight; posterior margin convex; dorsal margin flat. Petiolar sternite diminishes in height posteriorly, with regular ventral margin. Petiole densely punctate and shiny. Prora slightly extending anteroventrally and forming a small ventral concavity in lateral view. Girdling constriction of abdominal segment IV clearly cross-ribbed posteriorly on sternite. Gaster densely punctate and shiny; pubescence appressed to decumbent; short suberect pilosity on ventral surface.

Remarks. *Hypoponera* AMD_B can be confused with *H*. AMD_D, but in the last the petiolar node in lateral view is shorter and the petiolar sternite is not subtriangular. *Hypoponera* AMD_N and *H*. AMD_M also have poorly developed eyes located anteriorly on head, but differ by having a smaller size (WL<0.6 mm), yellow color, and a metanotal line that does not form a sulcus that clearly interrupt the dorsal margin of mesosoma in lateral view. Besides, in *H*. AMD_M the scape never reaches the posterior margin of head in full-face view. *Hypoponera* AMD_L resembles *H*. AMD_B, but has a shorter scape that fails to reach the posterior margin of head. Additionally, the anterior margin of mesopleuron is concave in *H*. AMD_L and broadly convex to straight in *H*. AMD_B, and the girdling constriction of abdominal segment IV is posteriorly cross-ribbed on tergite of *H*. AMD_L and not in *H*. AMD_B. *Hypoponera pampana* has a similar size, eye, metanotal sulcus and scape length, but differs by not having a subtriangular petiolar sternite and by present meso- and metapleuron completely strigulate, while in *H*. AMD_B these regions are partially smooth. This species is similar to the tramp species *H. punctatissima*, but the petiolar sternite of *H. punctatissima* is rounded and the scape shorter (Bolton & Fisher 2011).

Natural history. This species was collected at the base of a tree close to the Nature Reserve Research center's living quarters, which suggests that it tolerates at least some disturbance. It was collected manually, and therefore *H*. AMD_B can forages exposed on the ground.

Distribution. Known only for type locality in Brazil, Bahia: Camacã.

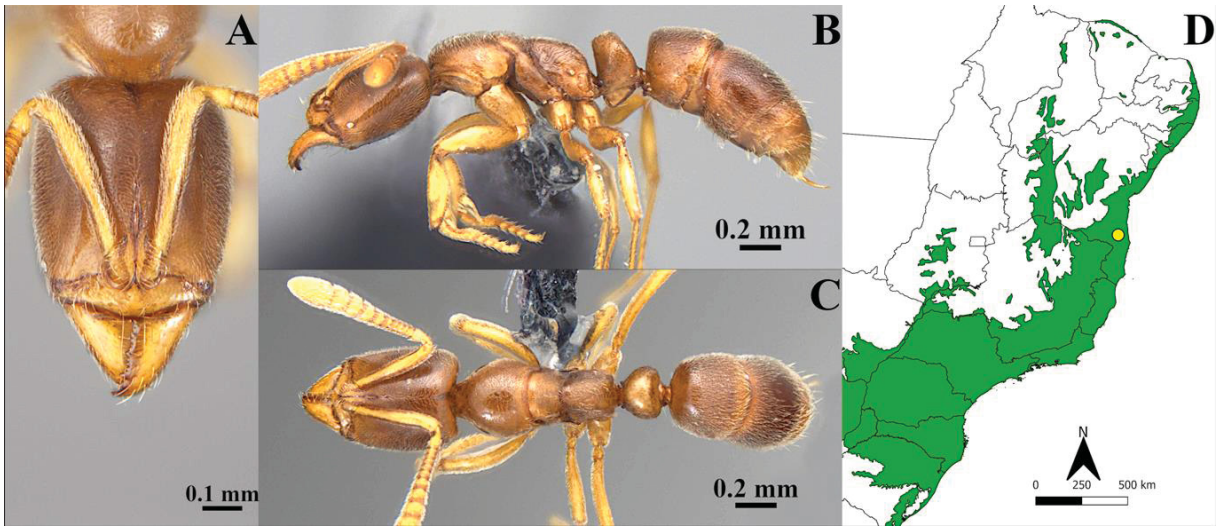

Figure 50. *Hypoponera* AMD_B (specimen DZUP554728). A. Full-face view. B. Full body in lateral view. C. Full body in dorsal view. D. Distribution map.

Hypoponera AMD_C New Species

Figure 51

Holotype worker: BRAZIL: Santa Catarina, Xanxerê, Oeste, 710m, XII.2011-I.2012 (M.L.C. Bartz et al.) TSBF VT136, DZUP553434 [DZUP].

Paratype workers: with the same data as the holotype, but DZUP553431 (1 ☿) [DZUP]; same data, but Oeste, 711m, TSBF VT137, DZUP553442 (2 ☿) [MZSP]; same locality and collector as preceding, but VII-VIII.2011, TSBF IT137, DZUP553443 (2 ☿) [DZUP]; same locality and collector as preceding, but Oeste, 721m, XII.2011-I.2012, TSBF VT144, DZUP553444 (1 ☿) [DZUP].

Diagnosis. *H.* AMD_C is a medium-sized species (WL>1.02 mm), with reduced eyes (less than six ommatidia), a subtriangular petiolar node in lateral view, very coarsely punctate on gaster, girdling constriction of abdominal segment IV clearly cross-ribbed on tergite and sternite, and declivitous margin of propodeum not crenulate and interrupted by the metapleural gland opening in lateral view.

Holotype measurements. HL 0.73; HW 0.61; SL 0.57; ML 0.41; PrW 0.5; MeL 0.26; WL 1.11; HFL 0.62; HBL 0.51; PeL 0.2; PeH 0.41; PeW 0.3; PS 0.3 (mm). CI 1.19; MI 55.93; SI 92.92; PeI 61.25; LPeI 50; DPeI 148.48.

Additional material measurements (n=9). HL 07.-0.75; HW 0.56-0.63; SL 0.53-0.56; ML 0.38-0.43; PrW 0.46-0.51; MeL 0.21-0.28; WL 1.02-1.11; HFL 0.58-0.62; HBL 0.45-0.51; PeL 0.17-0.21; PeH 0.36-0.43; PeW 0.28-0.31; PS 0.27-0.31 (mm). CI 117.82-123.77; MI 53.91-58.82; SI 89.1-94.5; PeI 60-64.1; LPeI 46.15-50.76; DPeI 145.55-164.28.

Description. Medium-sized (WL 1.02-1.11 mm); head light brown, mesosoma and petiole brown, and gaster dark brown; mandible, antenna, and legs light brown.

Head. In full-face view subquadrate, with lateral margin broadly convex and posterior margin flat to slightly concave. Mandible with at least four apical teeth and

indistinct denticles on the remainder of masticatory margin; external margin concave. Anterior margin of clypeus convex. Eye with about four ommatidia slightly fused, reaching but not clearly interrupting lateral cephalic margin; distant from the posterior margin of the clypeus in lateral view (eye-mandible distance index greater than 0.15). Antennal scape surpassing posterior margin of the head by less than pedicel length. Mandible surface mostly smooth, with sparse shallow punctae. Frons densely punctate. Gena sparsely and evenly punctate. Head ventrum smooth. Integument shiny.

Mesosoma. In lateral view, anteroventral corner of pronotum rounded; promesonotal sulcus shallow, slightly interrupting dorsal margin of mesosoma. Notopleural suture between mesonotum and mesopleuron weakly impressed; junction of upper and lower portion of the anterior margin of the mesopleuron forming an acute angle; dorsal margin of mesonotum flat, at the same level to slightly higher than pronotum. Metanotum forming a shallow sulcus, which may slightly interrupt dorsal margin of mesosoma. Propodeum with dorsal margin in the same level as mesonotum, slightly concave. Propodeal declivitous margin straight to broadly concave, not crenulate, and with a notch where the metapleural gland opens. Propodeal spiracle slit-shaped. In posterior view, lateral margins of propodeum slightly converging dorsally. Mesosoma mostly shiny and with dense shallow punctate; mesopleuron rugulose to strigulate; metapleuron entirely longitudinally striate; propodeum sparsely punctate on dorsum and smooth on declivitous surface. Pubescence decumbent; pilosity usually sparse and suberect.

Metasoma. Petiolar node in lateral view subtriangular; anterior and posterior margins straight; dorsal margin convex. Petiolar sternite anteriorly with a rounded lobe, which is ventrally slightly concave on holotype. Petiole sparsely punctate and shiny. Prora not extending anteriorly and slightly extending ventraly forming a small ventral concavity in lateral view. Girdling constriction of abdominal segment IV clearly cross-ribbed posteriorly on tergite and sternite. Gaster densely covered by coarse punctae; shiny. Pubescence appressed to decumbent; pilosity decumbent to suberect.

Remarks. *Hypoponera* AMD_C is a very distinct species, unlikely to be confused with other *Hypoponera* species. The most similar species is *H*. AMD_H, which is distinguished by present a crenulate declivitous margin of propodeum and an acute anteroventral angle of pronotum. In addition, *H*. AMD_H has the apex of petiolar node anteriorly curved. *H. opacior*, *H*. AMD_Q, *H. cauta*, and *H*. AMD_R have a similar size, subtriangular petiolar node, and eyes reduced and distant from clypeal posterior margin, but

all differ from *H.* AMD_C by do not have metapleural gland opening interrupting declivitous margin of propodeum. Besides that, the coarse punctuation on gaster of *H.* AMD_C is very atypical and is not found in any other species.

The main observed variation among studied specimens was the petiolar sternite, which is more rounded (lacks the slight ventral concavity observed on holotype) on specimens DZUP553432, DZUP553433, DZUP553435, DZUP553441, DZUP553442, and DZUP553444.

Natural history. All specimens were collected by extracting soil monoliths, which may help to explain the rarity of the species, which probably does not typically forage above ground.

Distribution. This species is known only from two cities in Southern Brazil, Santa Catarina: Chapecó and Xanxerê.

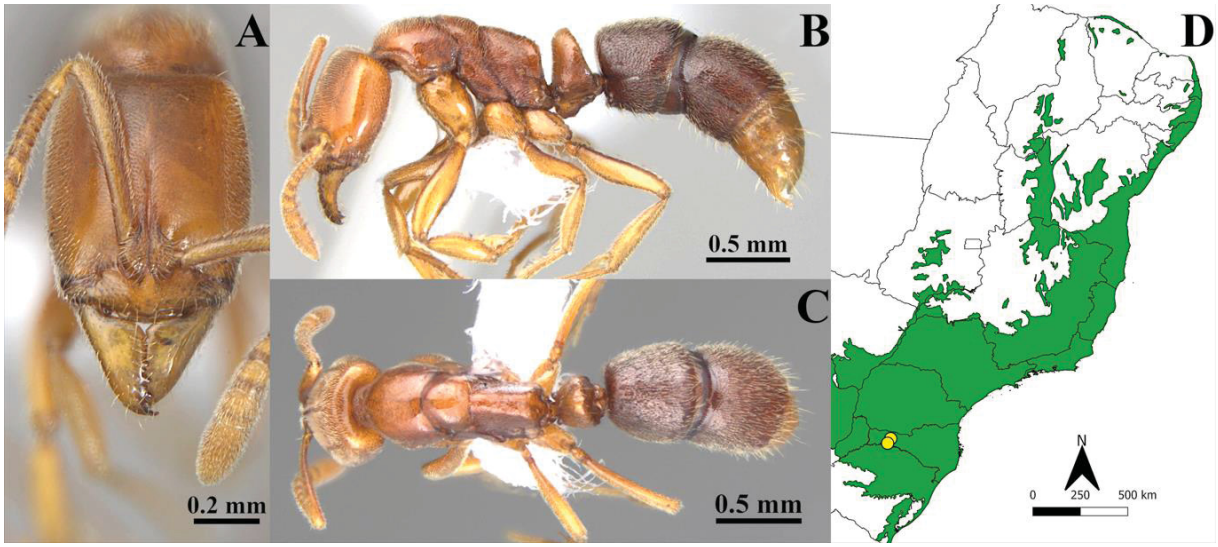

Figure 51. *Hypoponera* AMD_C (specimen DZUP553434). A. Full-face view. B. Full body in lateral view. C. Full body in dorsal view. D. Distribution map.

Hypoponera AMD_D New Species

Figure 52

Holotype worker: BRAZIL: Sergipe, Areia Branca, E.E. da Serra da Itabaiana, 10°45'54"S 37°19'57.4"W, 19-25.V.2003 (Dietz, BH & Ferreira, LS) Winkler 38, *Hypoponera* sp. 28, Biota-FAPESP, MZSP0098268 (2º specimen) [MZSP].

Paratype workers: on the same pin as holotype, but 1º and 3º specimens (2 ☿) [MZSP]; same data, but Winkler 32, *Hypoponera* sp. 28, Biota-FAPESP, MZSP0098267 (2 ☿) [DZUP].

Diagnosis. The combination of small size (WL<0.8 mm), poorly developed eyes (less than six ommatidia), and petiolar sternite with anteroventral subquadrate projection usually is enough to identify this species. Additionally, the eye is located close to the posterior margin of clypeus (see in lateral view), the scape fails to reach posterior margin of head in full-face view, the petiolar node is subrectangular, and the metanotum forms a sulcus that interrupts dorsal margin of mesosoma in lateral view.

Holotype measurements. HL 0.55; HW 0.49; SL 0.41; ML 0.3; PrW 0.36; MeL 0.17; WL 0.79; HFL 0.43; HBL 0.32; PeL 0.16; PeH 0.28; PeW 0.24; PS 0.22 (mm). CI 112.24; MI 54.54; SI 83.67; PeI 66.66; LPeI 57.14; DPeI 150.

Additional material measurements (n=5). HL 0.54-0.6; HW 0.48-0.55; SL 0.41-0.46; ML 0.3-0.33; PrW 0.35-0.4; MeL 0.18-0.19; WL 0.73-0.8; HFL 0.41-0.47; HBL 0.31-0.36; PeL 0.13-0.15; PeH 0.28-0.31; PeW 0.24-0.27; PS 0.22-0.24 (mm). CI 109.65-115.38; MI 53.33-56.52; SI 84.09-87.17; PeI 66.66-68.96; LPeI 47.82-52.17; DPeI 166.66-183.33.

Description. Small-sized (WL 0.73-0.8 mm); body entirely light brown or brown with mandible, antenna, and legs light brown.

Head. In full-face view subquadrate, with lateral margin broadly convex and posterior margin concave. Mandible with five or less distinct teeth, usually concentrated on apex, and indistinct denticles on the remainder of the masticatory margin; external margin very slightly concave to straight. Anterior margin of clypeus slightly concave. Eye with one distinct ommatidia, reaching but not clearly interrupting lateral cephalic margin; close to the posterior margin of the clypeus in lateral view (eye-mandible distance index less than 0.15). Antennal scape surpassing posterior margin of the head by less than the pedicel length. Mandible surface sparsely punctate. Frons densely punctate. Gena densely and evenly punctate. Head ventrum smooth. Integument shiny.

Mesosoma. In lateral view, anteroventral corner of pronotum rounded; promesonotal sulcus shallow, slightly interrupting dorsal margin of mesosoma. Notopleural suture between mesonotum and mesopleuron weakly impressed; junction of upper and lower portion of the anterior margin of the mesopleuron forming an obtuse angle; dorsal margin of mesonotum flat, at the same level to slightly higher than pronotum. Metanotum forming a shallow sulcus, which may slightly interrupt dorsal margin. Propodeum with dorsal margin at the same level to slightly lower than mesonotum, broadly convex. Propodeal declivitous margin convex, not crenulate, and continuous. Propodeal spiracle rounded. In posterior view, lateral margins of propodeum slightly converging dorsally. Mesosoma mostly shallowly punctate and shiny; mesopleuron mostly smooth; metapleuron longitudinally striate, with striae becoming sparser dorsally to propodeal spiracle; declivitous surface of propodeum smooth. Pubescence appressed; long pilosity absent.

Metasoma. Petiolar node in lateral view subrectangular; anterior, posterior and dorsal margins convex. Petiolar sternite with a subrectangular anterior lobe. Petiole sparsely punctate and shiny. Prora slightly extending anteroventrally and forming a small ventral concavity in lateral view. Girdling constriction of abdominal segment IV not clearly cross-ribbed posteriorly. Gaster sparsely punctate and shiny; pubescence appressed to decumbent; long pilosity absent.

Remarks. The petiolar sternite shape of *H.* AMD_D is very different from most *Hypoponera* species and makes this species relatively easy to identify. The most similar petiolar sternite shapes are found on *H. schmalzi*, and in some *H*. AMD_R specimens. However, *H. schmalzi* is larger and have well-developed eyes. *H*. AMD_R differs from *H.* AMD_D by having the eye distant from posterior clypeal margin, and the metanotum does not interrupt the dorsal margin of mesosoma in lateral view. *Hypoponera pampana* shares several characteristics with *H.* AMD_D, but is distinguished by having an opaque mesosoma and completely strigulate meso- and metapleuron, contrasting with the shiny integument and mostly smooth mesopleuron of *H.* AMD_D. *H*. AMD_B is the one that most closely resembles *H.* AMD_D in general body shape, but it has the petiolar sternite subtriangular (see *H*. AMD_B discussion).

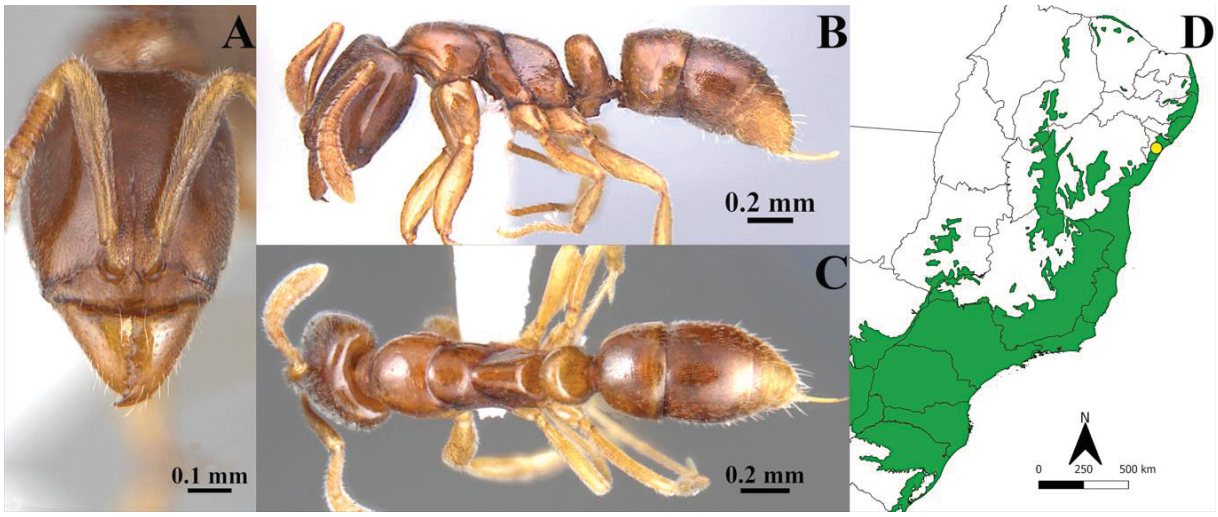

Figure 52. *Hypoponera* AMD_D (specimen DZUP0098268). A. Full-face view. B. Full body in lateral view. C. Full body in dorsal view. D. Distribution map.

Natural history. Due to its morphological characteristics, such as reduced eye and light color, it is likely that *H*. AMD_D inhabits environments with low light and little space, such as underground and litter. The two known specimens were collected using the Winkler extraction method.

Distribution. Brazil, Sergipe: Areia Branca.

Hypoponera AMD_E New Species

Figure 53

Holotype worker: BRAZIL: São Paulo, Praia Grande, PE Serra do Mar, Núcleo Pilões-Cubatão, 23d58′31″S 46d32′24″W, 26-27.V.2001 (A.A. Tavares, R.R. Silva) Winkler 28, *Hypoponera* sp26, BIOTA-FAPESP, MZSP0098416 UP [MZSP].

Paratype workers: on the same pin as holotype, but BOTTOM (1 ☿) [MZSP]; same data, but winkler 3, MZSPHYM0114233 (2 ☿) [MZSP]; same data, but winkler 4, MZSPHYM0114234 (1 ☿) [MZSP]; same data, but winkler 22, MZSPHYM0114235 (1 ☿) [MZSP]; same data, but winkler 27-B, MZSPHYM0114237 (2 ☿) [MZSP]; same data, but winkler 29, MZSPHYM0114238 (2 ☿) [MZSP]; same data, but winkler 30, MZSPHYM0114239 (1 ☿) [MZSP]; same data, but winkler 30-B, MZSPHYM0114240 (1 ☿) [MZSP]; same data, but winkler 34, MZSPHYM0114242 (2 ☿) [MZSP]; same data, but

winkler 34-B, MZSPHYM0114243 (1 ☿) [MZSP]; same data, but winkler 35, MZSPHYM0114244 (1 ☿) [MZSP]; same data, but winkler 35-B, MZSPHYM0114245 (2 ☿) [DZUP]; same data, but winkler 47-B, MZSPHYM0114246 (1 ☿) [DZUP].

Diagnosis. *H*. AMD_E is distinguished by the small size (WL<0.8 mm), reduced eye (less than six ommatidia) distant from posterior clypeal margin, subtriangular petiolar node, rounded petiolar sternite, antennal scape apex resting on posterior margin of head in full-face view (sometimes very slightly shorter or longer), and notopleural suture between mesonotum and mesopleuron weakly impressed.

Holotype measurements. HL 0.55; HW 0.41; SL 0.37; ML 0.27; PrW 0.31; MeL 0.18; WL 0.71; HFL 0.45; HBL 0.32; PeL 0.12; PeH 0.25; PeW 0.18; PS 0.18 (mm). CI 134.84; MI 49.43; SI 90.9; PeI 58.82; LPeI 48.78; DPeI 150.

Additional material measurements (n=13). HL 0.53-0.63; HW 0.41-0.47; SL 0.36-0.4; ML 0.26-0.3; PrW 0.3-0.35; MeL 0.15-0.21; WL 0.71-0.8; HFL 0.44-0.51; HBL 0.31-0.39; PeL 0.11-0.13; PeH 0.25-0.3; PeW 0.16-0.21; PS 0.17-0.21 (mm). CI 126.38-134.28; MI 43.56-52.12; SI 84.21-91.42; PeI 45.61-61.4; LPeI 43.9-48.83; DPeI 144.44-166.66.

Description. Small-sized (WL 0.71-0.8 mm); body entirely light brown or entirely pallid.

Head. In full-face view subquadrate, with lateral margin broadly convex and posterior margin flat to slightly convex. Mandible with denticles very reduced, almost edentate; external margin slightly concave to straight. Anterior margin of clypeus convex. Eye with one distinct ommatidia, reaching but not clearly interrupting lateral cephalic margin; distant from the posterior margin of the clypeus in lateral view (eye-mandible distance index greater than 0.15). Antennal scape apex resting on posterior margin of head, sometimes very slightly longer (as on holotype), and rarely very slightly shorter. Mandible surface densely punctate. Frons densely punctate and silky. Gena and head ventrum densely punctate and shiny.

Mesosoma. In lateral view, anteroventral corner of pronotum rounded; promesonotal sulcus weak or absent, not clearly interrupting dorsal margin of mesosoma. Notopleural suture between mesonotum and mesopleuron weakly impressed; junction of upper and lower portion

of the anterior margin of the mesopleuron forming an obtuse angle; dorsal margin of mesonotum flat, at the same level to slightly higher than pronotum. Metanotum as a well-marked line or forming a shallow sulcus, which may slightly interrupt dorsal margin of mesosoma. Propodeum with dorsal margin at the same level as mesonotum, broadly convex. Propodeal declivitous margin convex, not crenulate, and continuous. Propodeal spiracle rounded; in posterior view, lateral margins of propodeum strongly converging dorsally. Mesosoma mostly shallowly punctate and shiny; mesopleuron punctate sparser; metapleuron slightly longitudinally strigulate, with strigulae becoming sparser dorsally to propodeal spiracle; declivitous surface of propodeum sparsely punctate. Pubescence appressed; long pilosity absent.

Metasoma. Petiolar node in lateral view subtriangular; anterior margin convex; posterior margin straight; dorsal margin convex. Petiolar sternite rounded and anteriorly directed, rarely ventrally slightly notched. Petiole densely punctate and shiny. Prora not extending anteriorly and slightly extending ventrally forming a small ventral concavity in lateral view. Girdling constriction of abdominal segment IV not clearly cross-ribbed posteriorly. Gaster densely punctate and shiny; pubescence appressed to decumbent; long pilosity absent.

Remarks. The appearance of *H.* AMD_E is somewhat different from the typical *Hypoponera* species because of its more rounded gaster and mesosoma. *Hypoponera* AMD_E is very similar to *H.* AMD_F, but in the last the scape never reaches the posterior margin of head in full-face view and the petiolar node apex is slightly posteriorly directed. Moreover, in *H.* AMD_F the metanotum does not interrupt the dorsal margin of mesosoma in lateral view, while in *H.* AMD_E it forms a shallow sulcus or at least a strongly impressed line. *Hypoponera* AMD_A may resemble *H.* AMD_E in eye size and position, body size, and subtriangular petiole, but has a longer antennal scape that surpasses the posterior margin of head by a length similar to pedicel length. *Hypoponera* AMD_A is also darker than *H.* AMD_E and has a longer petiolar node.

This species may vary on petiolar sternite shape and metapleuron sculpture. Petiolar sternite may have a slight ventral concavity on some species (for example on specimen MZSP0097948) with no geographical pattern. Some specimens from São Paulo and Santa Catarina states (MZSP0097949, and MZSP0098167) have the metapleuron more strongly strigulate.

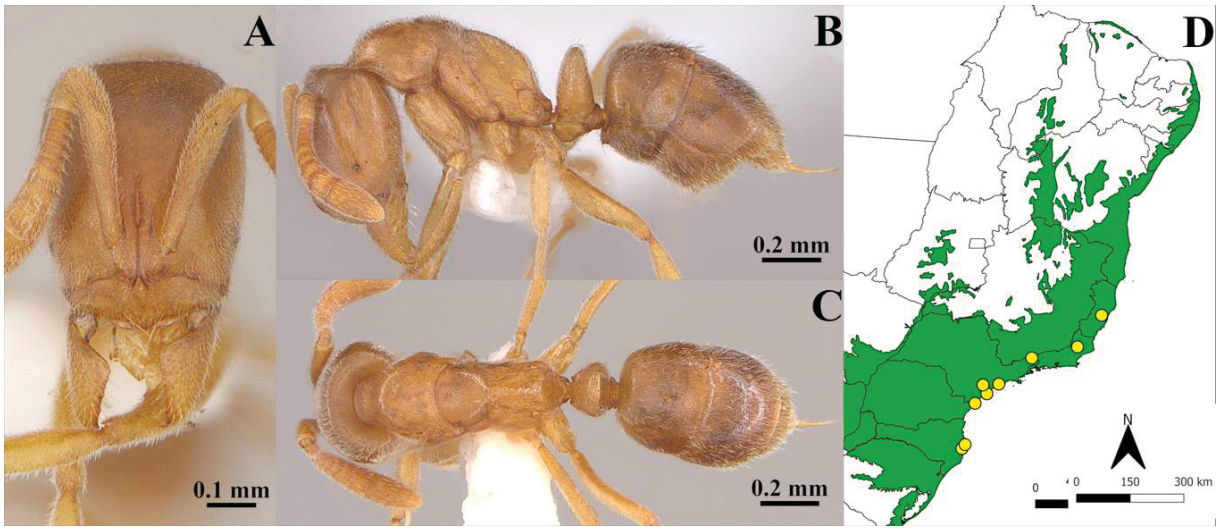

Figure 53. *Hypoponera* AMD_E (specimen_MZSP0098416). A. Full-face view. B. Full body in lateral view. C. Full body in dorsal view. D. Distribution map.

Natural history. Some individuals were collected from bromeliad roots.

Distribution. Brazil, Espírito Santo: Santa Teresa; Rio de Janeiro: Itatiaia, and Santa Maria Madalena; Santa Catarina: Florianópolis, and Palhoça; São Paulo: Cananeia, Iguape, Praia Grande, and Tapiraí.

Hypoponera AMD_F New Species

Figure 54

Holotype worker: BRAZIL: Sergipe, Sta Luzia do Itanhy, Crasto, 11°22'39.3"S 37°25'07.4"W, 29.vii-03.viii.2001 (Silva R.R., Brandão C.R.F.) Winkler 4, *Hypoponera* 26, Biota-FAPESP, MZSP0098417 UP [MZSP].

Paratype worker: on the same pin as holotype, but bottom specimen (1 ☿) [MZSP].

Diagnosis. Small-sized ants (WL<0.8 mm), with petiolar node subtriangular and slightly curved posteriorly; petiolar sternite rounded, and antennal scape not reaching posterior margin of head in full-face view.

Holotype measurements. HL 0.56; HW 0.46; SL 0.37; ML 0.25; PrW 0.33; MeL NA; WL 0.75; HFL 0.43; HBL 0.3; PeL 0.12; PeH 0.27; PeW 0.21; PS 0.2 (mm). CI 122.97; MI 43.95; SI 81.08; PeI 62.96; LPeI 45.45; DPeI 170.

Additional material measurements (n=6). HL 0.54-0.59; HW 0.43-0.47; SL 0.33-0.38; ML 0.25-0.27; PrW 0.31-0.35; MeL 0.16-0.18; WL 0.67-0.77; HFL 0.4-0.45; HBL 0.27-0.31; PeL 0.11-0.13; PeH 0.25-0.28; PeW 0.18-0.21; PS 0.18-0.21 (mm). CI 120.27-126.02; MI 45.45-48.27; SI 77.02-82.19; PeI 56.6-64.15; LPeI 42.85-48.78; DPeI 150-188.88.

Description. Small-sized (WL 0.67-0.77 mm); body entirely light brown or entirely pallid.

Head. In full-face view subquadrate, with lateral margin broadly convex and posterior margin flat to slightly concave. Mandible with denticles very reduced, almost edentate; external margin slightly concave to straight. Anterior margin of clypeus convex. Eye with one distinct ommatidia, reaching but not clearly interrupting lateral cephalic margin; distant from the posterior margin of the clypeus in lateral view (eye-mandible distance index greater than 0.15). Antennal scape not reaching the posterior margin of the head. Mandible surface densely punctate. Frons densely punctate and subopaque to silky. Gena and head ventrum densely punctate and shiny.

Mesosoma. In lateral view, anteroventral corner of pronotum rounded; promesonotal sulcus weak or absent, not clearly interrupting dorsal margin of mesosoma. Notopleural suture between mesonotum and mesopleuron weakly impressed to absent; junction of upper and lower portion of the anterior margin of the mesopleuron forming an obtuse angle; dorsal margin of mesonotum flat, at the same level as the pronotum. Metanotum as a weak line that does not interrupt the dorsal margin of the mesosoma. Propodeum with dorsal margin at the same level as mesonotum, broadly convex. Propodeal declivitous margin convex, not crenulate, and continuous. Propodeal spiracle rounded. In postrior view, lateral margins of propodeum strongly converging dorsally. Mesosoma mostly shallowly punctate and shiny; mesopleuron punctae sparser; metapleuron slightly longitudinally strigulate, with strigulae becoming sparser dorsally to propodeal spiracle; declivitous surface of propodeum sparsely punctate. Pubescence appressed; long pilosity absent.

Metasoma. Petiolar node in lateral view subtriangular; anterior margin convex; posterior margin slightly concave near the apex, so that the petiole is slightly posteriorly directed; dorsal margin convex. Petiolar sternite rounded and anteriorly directed, rarely

ventrally slightly concave. Petiole densely punctate and shiny. Prora not extending anteriorly and slighty extending ventrally forming a small ventral concavity in lateral view. Girdling constriction of abdominal segment IV not clearly cross-ribbed posteriorly. Gaster densely punctate and shiny; pubescence appressed to decumbent; long pilosity absent.

Remarks. *Hypoponera* AMD_F is similar to *H.* AMD_E, but the scape of *H.* AMD_F never reaches the posterior margin of head, as in *H.* AMD_E. Besides, the curved apex of petiole, and the metanotum not interrupting dorsal margin of mesosoma support their separation (see *H.* AMD_E remarks). Moreover, *H.* AMD_F and *H.* AMD_E have no geographical overlap, which may facilitate the identification based on locality. Is possible that the segregation between these two species is due the barrier of the Doce River, as demonstrated for dung beetles (Vieira et al. 2022).

Hypoponera AMD_J, *H.* AMD_L, *H.* AMD_M, and *H.* AMD_N also have small body size and short antennal scape, but all differ by having subrectangular petiolar node. Besides, *H.* AMD_L, *H.* AMD_M, and *H.* AMD_N have the eye close to the posterior margin of the clypeus. *Hypoponera* AMD_J has the girdling constriction of abdominal segment IV clearly cross-ribbed posteriorly, while in *H.* AMD_F the cross-ribs are inconspicuous.

Natural history. These ants are collected using pitfall traps and Winkler extractor which suggests that they nest and/or forage in the soil and litter.

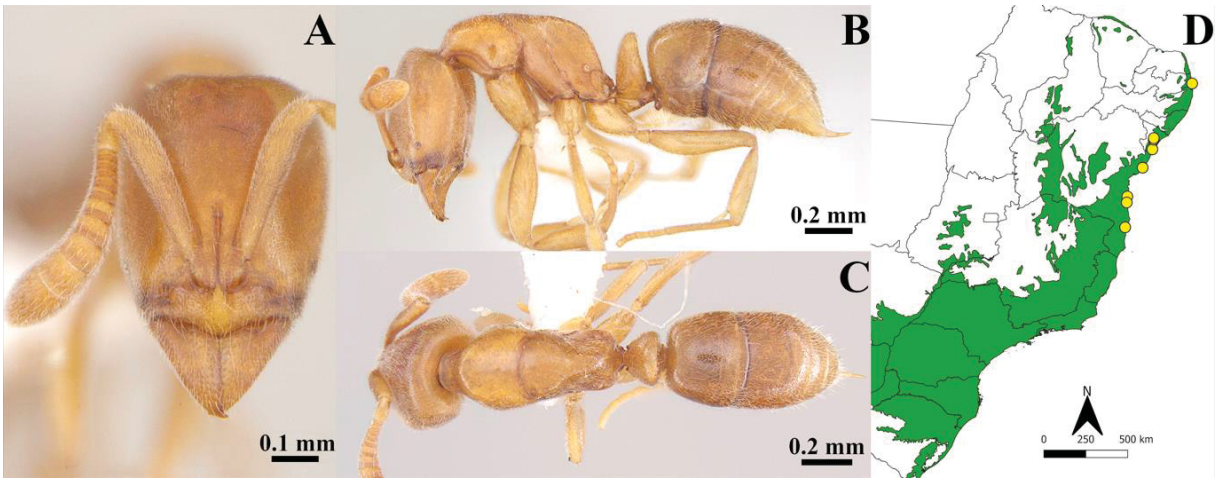

Figure 54. *Hypoponera* AMD_F (specimen MZSP0098417). A. Full-face view. B. Full body in lateral view. C. Full body in dorsal view. D. Distribution map.

Distribution. Brazil, Bahia: Ilhéus, Mata de São João, Porto Seguro, and Uruçuca; Pará: Belém, and Benevides; Paraíba: João Pessoa; Sergipe: Areia Branca, Malhador, and Santa Luzia do Itanhi.

Hypoponera AMD_G New Species

Figure 55

Holotype worker: BRAZIL, Bahia, Porto Seguro, E.E. Pau Brasil, 16°23'33"S39°10'99"W, 16.VI.2000 (Santos J.R.M., Soares J.C.) Winkler 6, *Hypoponera* 19, Biota-FAPESP, MZSP0098418 [MZSP].

Paratype workers: with the same data as the holotype, but Winkler 2, MZSPHYM0113947 (1 ☿) [MZSP]; same data, but Winkler 4, MZSPHYM0113949 (2 ☿) [MZSP]; same data, but Winkler 7, MZSPHYM0113950 (1 ☿) [MZSP]; same data, but Winkler 15, MZSPHYM0113951 (1 ☿) [MZSP]; same data, but Winkler 19, MZSPHYM0113952 (1 ☿) [MZSP]; same data, but Winkler 20, MZSPHYM0113953 (1 ☿) [MZSP]; same data, but Winkler 21, MZSPHYM0113954 (1 ☿) [MZSP]; same data, but Winkler 22, MZSPHYM0113955 (2 ☿) [MZSP]; same data, but Winkler 23, MZSPHYM0113956 (1 ☿) [MZSP]; same data, but Winkler 24, MZSPHYM0113957 (3 ☿) [MZSP]; same data, but Winkler 24, MZSPHYM0113958 (2 ☿) [MZSP]; same data, but Winkler 25, MZSPHYM0113959 (1 ☿) [MZSP]; same data, but Winkler 25, MZSPHYM0113960 (1 ☿) [MZSP]; same data, but Winkler 27, MZSPHYM0113962 (1 ☿) [MZSP]; same data, but Winkler 21, MZSPHYM0113963 (1 ☿) [MZSP]; same data, but Winkler 30, MZSPHYM0113964 (1 ☿) [MZSP]; same data, but Winkler 32, MZSPHYM0113965 (1 ☿) [MZSP]; same data, but Winkler 33, MZSPHYM0113966 (2 ☿) [MZSP]; same data, but Winkler 33, MZSPHYM0113967 (2 ☿) [MZSP]; same data, but Winkler 34, MZSPHYM0113968 (1 ☿) [MZSP]; same data, but Winkler 37, MZSPHYM0113971 (1 ☿) [MZSP]; same data, but Winkler 38, MZSPHYM0113972 (1 ☿) [MZSP]; same data, but Winkler 38, MZSPHYM0113973 (2 ☿) [MZSP]; same data, but Winkler 46, MZSPHYM0113978 (1 ☿) [MZSP]; same data, but Winkler 46,

MZSPHYM0113979 (1 ☿) [DZUP]; same data, but Winkler 49, MZSPHYM0113981 (1 ☿) [DZUP]; same data, but Winkler 44, MZSPHYM0113985 (2 ☿) [DZUP].

Diagnosis. The subtriangular projection on declivitous margin of propodeum is a characteristic unique to this species. In addition, among the small species with WL<1 mm, this is the only one with well-developed eye (more than six ommatidia) and mesosoma strongly divided by the metanotal sulcus.

Holotype measurements. HL 0.64; HW 0.54; SL 0.56; ML 0,34; PrW 0.4; MeL 0.24; WL 0.94; HFL 0.66; HBL 0.48; PeL 0.13; PeH 0.35; PeW 0.27; PS 0.25 (mm). CI 118.51; MI 53.12; SI 103.7; PeI 67.5; LPeI 37.14; DPeI 207.69.

Additional material measurements (n=2). HL 0,64-0,67; HW 0,53; SL 0,56-0,60; ML 0,33-0,35; PrW 0,38-0,43; MeL 0,21-0,23; WL 0,88-0,95; HFL 0,63-0,68; HBL 0.4-0.45; PeL 0.11-0.12; PeH 0.26-0.36; PeW 0.25-0.29; PS 0.21-0.26 (mm). CI 121.17-125.58; MI 51.85-52.42; SI 105.88-102.79; PeI 64.51-67.14; LPeI 34.48-41.86; DPeI 222.22-235.

Description. Small-sized (WL 0.88-0.95 mm); body entirely brown or mostly brown, with mandible, antenna, and legs light brown.

Head. In full-face view subquadrate, with lateral margin broadly convex and posterior margin flat to slightly convex. Mandible with denticles very reduced, almost edentate; external margin slightly concave to straight. Anterior margin of clypeus convex. Eye with four to ten ommatidia, reaching but not clearly interrupting lateral cephalic margin; distant from the posterior margin of the clypeus in lateral view (eye-mandible distance index greater than 0.15). Antennal scape surpassing posterior margin of the head by a length greater than or equal to the pedicel length. Mandible surface densely punctate. Frons densely punctate. Gena densely and evenly punctate. Head ventrum very sparsely punctate, or mostly smooth. Integument shiny.

Mesosoma. In lateral view, anteroventral corner of pronotum rounded; promesonotal sulcus clearly interrupting dorsal margin of mesosoma. Notopleural suture between mesonotum and mesopleuron well-marked; junction of upper and lower portion of the anterior margin of the mesopleuron forming an obtuse angle; dorsal margin of mesonotum convex, higher than pronotum. Metanotum forming a sulcus. Propodeum with dorsal margin lower

than mesonotum, slightly concave. Propodeal declivitous margin continuous, not crenulated; with a subtriangular projection just above the metapleural gland opening. Propodeal spiracle elliptical. In posterior view, lateral margins of propodeum slightly converging dorsally. Mesosoma mostly punctate and shiny; mesopleuron medially smoother; punctae coarser on propodeum; metapleuron strigulate; declivitous surface of propodeum smooth. Pubescence appressed; long pilosity absent.

Metasoma. Petiolar node in lateral view subtriangular; anterior, posterior and dorsal margins convex. Petiolar sternite with antero- and posteroventral angles rounded and even, and ventral margin slightly concave. Petiole densely punctate and shiny. Prora slightly extending anteroventrally and forming a small ventral concavity in lateral view. Girdling constriction of abdominal segment IV not clearly cross-ribbed posteriorly. Gaster densely punctate and shiny; pubescence appressed to decumbent; long pilosity absent.

Remarks. There is no species that clearly resembles *H.* AMD_G. The most similar species is probably *H. foreli*, but they can be easily separated because *H. foreli* is much larger (WL>1.23 mm) and does not have the propodeal subtriangular projection of *H.* AMD_G.

Natural history. Ground-dwelling ants that forage in leaf litter.

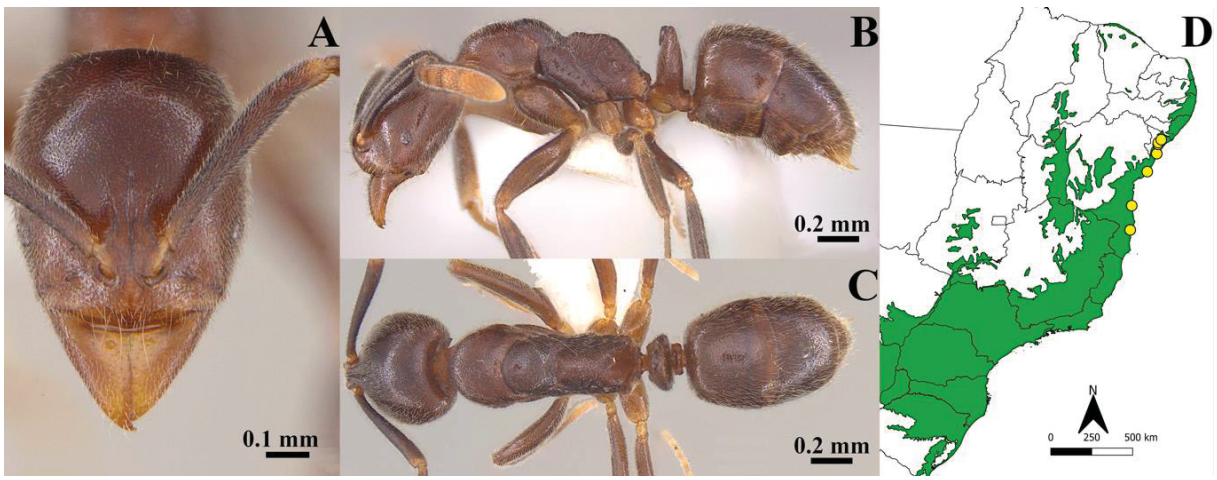

Figure 55. *Hypoponera* AMD_G (specimen_MZSP0098418). A. Full-face view. B. Full body in lateral view. C. Full body in dorsal view. D. Distribution map.

Distribution. *Hypoponera* AMD_G is known for Brazil, Bahia: Ilhéus, Porto Seguro, and Mata de São João; Sergipe: Areia Branca, Malhador, Nossa Senhora das Dores, and Santa Luzia do Itanhy.

Hypoponera AMD_H New Species

Figure 56

Holotype worker: BRAZIL, Paraná, Tunas, Parque das Lauráceas, 24°51'16"S 48°43'00.4"W, 21-29.II.2001 (Silva & Eberhardt) Winkler 20, *Hypoponera* 9, Biota-FAPESP, MZSP0098419 UP [MZSP].

Paratype workers: on the same pin as holotype, but BOTTOM (1 ☿) [MZSP]; same data, but winkler 20, MZSPHYM0113946 (2 ☿) [MZSP]; same data, but winkler 39, MZSP0098206 (1 ☿) [DZUP]; same data, but winkler 14, *Hypoponera* sp. 20, MZSP0097946 (1 ☿) [DZUP].

Diagnosis. *H.* AMD_H is strikingly different from all other known species by its petiolar node curved anteriorly, the head rugulose-punctate, and the crenulate and convex declivitous margin of propodeum. Additionally, metapleural gland opens in a concavity that clearly interrupts the declivitous margin of propodeum and the anteroventral corner of pronotum is angled.

Holotype measurements. HL 0.94; HW 0.76; SL 0.68; ML 0.48; PrW 0.58; MeL 0.3; WL 1.28; HFL 0.75; HBL 0.57; PeL 0.23; PeH 0.54; PeW 0.44; PS 0.4 (mm). CI 123.77; MI 51.65; SI 90.16; PeI 75.53; LPeI 43.67; DPeI 186.84.

Paratype measurements (n=2). HL 0.9; HW 0.75-0.76; SL 0.65-0.66; ML 0.46-0.47; PrW 0.56-0.58; MeL 0.3-0.31; WL 1.28; HFL 0.71-0.73; HBL 0.55; PeL 0.22-.025; PeH 0.52-0.55; PeW 0.43-0.44; PS 0.4 (mm). CI 1.18-1.2; MI 51.38-52.41; SI 86.66-86.88; PeI 75.26-78.02; LPeI 40.9-47.61; DPeI 175-197.22.

Non-type measurements (n=6). HL 0.83-0.92; HW 0.71-0.76; SL 0.6-0.66; ML 0.43-0.5; PrW 0.55-0.58; MeL 0.24-0.31; WL 1.16-1.28; HFL 0.7-0.73; HBL 0.52-0.56; PeL 0.21-0.25; PeH 0.48-0.55; PeW 0.41-0.44; PS 0.37-0.4 (mm). CI 116.52-121.31; MI 50.36-55.22; SI 83.47-86.88; PeI 73.33-78.02; LPeI 40.9-48.71; DPeI 175-197.22.

Description. Medium-sized (WL 1.16-1.28 mm); body mostly dark brown (sometimes brown), with mandible, antenna, and legs light brown.

Head. In full-face view subquadrate, with lateral margins subparallel and posterior margin flat to slightly convex. Mandible with three conspicuous apical teeth, and usually 2-7 less developed denticles on the remainder of masticatory margin; external margin concave. Anterior margin of clypeus convex. Eye with one distinct ommatidia, reaching but not clearly interrupting lateral cephalic margin; distant from the posterior margin of the clypeus in lateral view (eye-mandible distance index greater than 0.15). Antennal scape surpassing posterior margin of the head by less than the pedicel length. Mandible surface sparsely punctate. Frons densely rugulose-punctate and silky to subopaque. Gena densely and evenly punctate and shiny. Head ventrum smooth and shiny.

Mesosoma. In lateral view, anteroventral corner of pronotum toothed or angled; promesonotal sulcus shallow, slightly interrupting dorsal margin of mesosoma. Notopleural suture between mesonotum and mesopleuron well-marked; junction of upper and lower portion of the anterior margin of the mesopleuron forming an acute angle; dorsal margin of mesonotum flat, at the same level to slightly higher than pronotum. Metanotum forming a shallow sulcus, which may slightly interrupt dorsal margin. Propodeum with dorsal margin at the same level as mesonotum, flat. Propodeal declivitous margin convex, crenulate, and with a notch where the metapleural gland opens. Propodeal spiracle elliptical to slit-shaped. In posterior view, lateral margins of propodeum slightly converging dorsally. Mesosoma with sparse shallow punctae on pronotum and mesonotum; mesopleuron mostly irregularly rugulose; metapleuron longitudinally strigulate; propodeum laterally smooth and dorsally sparsely punctate; declivitous surface of propodeum smooth. Pubescence appressed; sparse erect pilosity.

Metasoma. Petiolar node in lateral view subtriangular; anterior margin concave; posterior margin convex and curving anteriorly, so that the apex of the petiole node is sloped forward; dorsal margin convex. Petiolar sternite rounded but diminishing in height posteriorly. Petiole mostly smooth and shiny. Prora slightly extending anteroventrally and forming a small ventral concavity in lateral view. Girdling constriction of abdominal segment IV with a thin band cross-ribbed posteriorly on tergite and sternite. Gaster densely rugulose-punctate and shiny. Pubescence appressed; pilosity decumbent to suberect.

Remarks. *Hypoponera* AMD_H is so different from others that, at first glance, it does not even seem to belong to *Hypoponera*. The only comparable species is *H*. AMD_C,

which has a similar size, subtriangular petiole, coarsely punctate gaster, and propodeum interrupted by the opening of the metapleural gland. However, *H.* AMD_C lacks the crenulate propodeum, the anteriorly curved petiole, and the anteroventral corner of the angulated pronotum.

All known specimens, except one, are from Parque das Lauráceas, in Paraná. The single specimen from Alagoas (MZSP0098105) is slightly different from the others. This specimen has the mesopleuron mostly smooth, contrasting with the other specimens, that have the mesopleuron mostly rugulose. Gaster is also different, as it lacks rugulae and is only punctate. Besides that, it has the ventral surface of head, the mesonotum, mesopleuron, and propodeum with light impressions of areolate pattern (as if they were lines drawn with a very fine white pencil). However, as this variation is found in a single specimen from a disjunct location, we are considering it as the same species.

Natural history. Ants collected on soil, mainly in leaf litter.

Distribution. With the present data, this species has a disjunct distribution and is known from only two localities: Brazil, Alagoas: Quebrângulo; and Paraná: Tunas do Paraná.

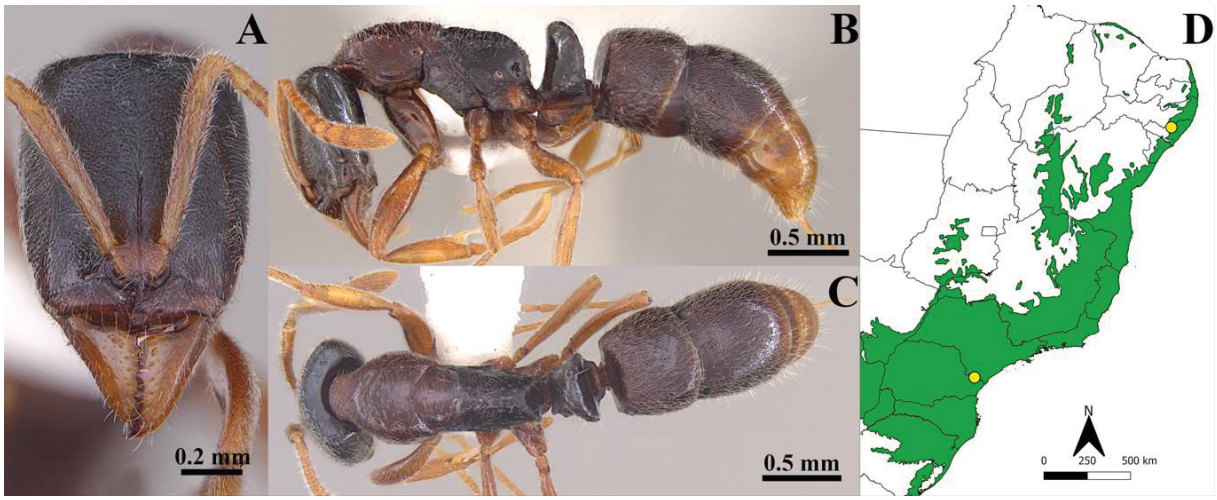

Figure 56. *Hypoponera* AMD_H (specimen MZSP0098419). A. Full-face view. B. Full body in lateral view. C. Full body in dorsal view. D. Distribution map.

Hypoponera AMD_I New Species

Figure 57

Holotype worker: BRAZIL, São Paulo, Piracaia, Sítio Cedro Velho (Brandão) 19, MZSP0098421 [MZSP].

Paratype workers: BRAZIL, São Paulo, Piracaia, Sítio Cedro Velho, sítio Fortaleza com sítio dos maia, 03.XII.1989 (Brandão) sob pedra, MZSPHYM0113944 (1 ☿) [MZSP]; same data, but MZSPHYM0113945 (1 ☿) [DZUP].

Diagnosis. *Hypoponera* AMD_I is distinguished by a deep and wide metanotal sulcus, which is wide and concave in lateral view. It is a medium to large species (WL 1.12-1.33 mm), with reduced eyes (less than six distinct ommatidia) distant from posterior clypeal margin, and subrectangular petiolar node.

Holotype measurements. HL 0.82; HW 0.62; SL 0.66; ML 0.43; PrW 0.5; MeL 0.29; WL 1.12; HFL 0.75; HBL 0.56; PeL 0.23; PeH 0.42; PeW 0.35; PS 0.33 (mm). CI 132; MI 53.03; SI 106; PeI 69.13; LPeI 54.41; DPeI 151.35.

Additional material measurements (n=2). HL 0.9-0.96; HW 0.71-0.75; SL 0.73-0.75; ML 0.47-0.5; PrW 0.55-0.58; MeL 0.26; WL 1.29-1.33; HFL 0.81-0.86; HBL 0.62-0.65; PeL 0.26; PeH 0.5-0.53; PeW 0.41-0.43; PS 0.39-0.41 (mm). CI 126.31-128.33; MI51.94-52.77; SI 100.83-102.63; PeI 74.15-74.46; LPeI 49.41-53.75; DPeI 153.48-166.66.

Description. Medium-sized (WL 1.12-1.33 mm); body entirely light brown.

Head. In full-face view subquadrate, with lateral margin broadly convex and posterior margin flat to slightly concave. Mandible with three apical teeth, and at least three reduced teeth on the remainder of masticatory margin; external margin concave. Anterior margin of clypeus slightly concave. Eye with one (or two almost fused) ommatidia, reaching but not interrupting lateral cephalic margin; distant from the posterior margin of the clypeus in lateral view (eye-mandible distance index greater than 0.15). Antennal scape surpassing posterior margin of the head by a length similar to that of the pedicel. Mandible surface sparsely punctate. Frons densely punctate. Gena densely and evenly punctate. Head ventrum very sparsely punctate, mostly smooth. Integument shiny.

Mesosoma. In lateral view, anteroventral corner of pronotum rounded; promesonotal sulcus clearly interrupting dorsal margin of mesosoma. Notopleural suture between

mesonotum and mesopleuron well-marked; junction of upper and lower portion of the anterior margin of the mesopleuron forming an acute angle; dorsal margin of mesonotum convex, higher than pronotum. Metanotum forming a deep and wide sulcus, which is concave. Propodeum with dorsal margin slightly lower than mesonotum, flat to slightly concave. Propodeal declivitous margin broadly convex to straight, not crenulate, and continuous. Propodeal spiracle elliptical. In posterior view, lateral margins of propodeum slightly converging dorsally. Mesosoma mostly densely punctate and shiny; mesopleuron irregularly rugulose; metapleuron longitudinally strigulate; declivitous surface of propodeum smooth. Pubescence appressed; sparse erect pilosity.

Metasoma. Petiolar node in lateral view subrectangular; anterior margin convex; posterior margin convex; dorsal margin convex. Petiolar with antero- and posteroventral angles rounded and approximately on the same level. Petiole densely punctate and shiny. Prora slightly extending anteroventrally and forming a small ventral concavity in lateral view. Girdling constriction of abdominal segment IV posteriorly cross-ribbed on tergite and sternite. Gaster densely punctate and shiny; pubescence appressed to decumbent; long pilosity absent.

Remarks. *Hypoponera* AMD_I is similar to *H. idelettae*, but the last does not have the concave metanotal sulcus. *Hypoponera idelettae* and *H.* AMD_I are probably sympatric at least in Santa Catarina, which indicates that the deepness of the metanotal sulcus is not a geographical variation. *Hypoponera* AMD_O and *H.* AMD_P have similar body size, color, and eye size, but both differ by petiolar node shape, which is anteriorly curved in *H.* AMD_O, rectangular with dorsal margin flat in *H.* AMD_P, and subrectangular with dorsal margin convex in *H.* AMD_I. In addition, there are well-developed cross-ribs posteriorly on girdling constriction of abdominal segment IV of *H.* AMD_O and *H.* AMD_P, while it is poorly developed in *H.* AMD_I.

There are five known specimens for this species. Two of them, from Santa Catarina, differ in some aspects in relation to the three from São Paulo. In Santa Catarina specimens (MZSP0097937 - both in the same pin), head punctae are shallower and sparser, the prora is larger and the girdling constriction of gaster does not have cross-ribs posteriorly. Additionally, anterior margin of clypeus is medially concave (clearer on bottom specimen of the pin). Even so, we here keep São Paulo and Santa Catarina specimens as the same species given the low quantity of material and considering that the before mentioned differences can be geographical variations. We consider the metanotal sulcus a stronger character, since

punctuation, anterior margin of clypeus and girdling constriction sculpture are more variable in other species.

Natural history. *Hypoponera* AMD_I specimens were collected under a stone in a small farm, suggesting this species can inhabit areas with a certain level of disturbance.

Distribution. Brazil, Santa Catarina: São Bonifácio; and São Paulo: Piracaia.

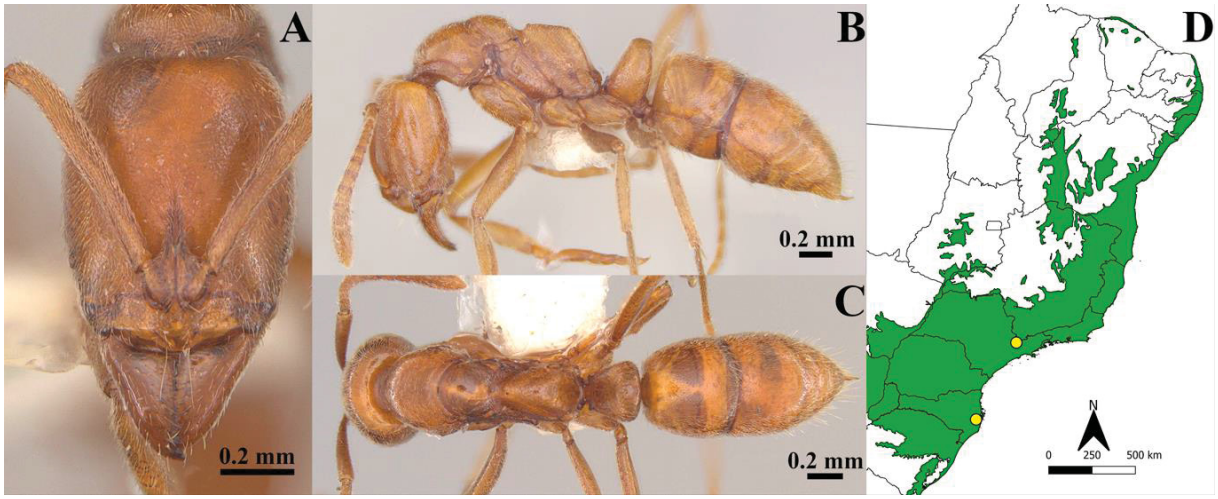

Figure 57. *Hypoponera* AMD_I (specimen MZSP0098421). A. Full-face view. B. Full body in lateral view. C. Full body in dorsal view. D. Distribution map.

Hypoponera AMD_J New Species

Figure 58

Holotype worker: BRAZIL, Paraná, Palmas, R.V.S.C.P. Capão 2, 26°29'17.85"S 51°40'0.20"W (R. Feitosa, W. Franco, P. Andrade) 17-20.ii.2017, winkler 2, DZUP553040 UP [DZUP].

Paratype workers: in the same pin as the holotype, but BOTTOM (1 ☿) [DZUP]; with the same data as the holotype, but winkler 5, DZUP553039 (1 ☿) [DZUP]; with the same data as the holotype, but winkler 6, DZUP553038 (1 ☿) [DZUP]; with the same data as the holotype, but winkler 7, DZUP553037 (3 ☿) [MZSP].

Diagnosis. Small ants (WL<0.8 mm), with antennal scape not reaching posterior margin of head in full-face view, petiolar node subrectangular, eye distant from posterior clypeal margin (see in lateral view), and petiolar sternite with anterior margin convex, ventral margin slightly concave, and posterior margin broadly concave.

Holotype measurements. HL 0,56; HW 0,45; SL 0,37; ML0,28; PrW 0,33; MeL 0,16; WL 0,73; HFL 0,37; HBL 0,27; PeL 0,15; PeH 0,25; PeW 0,23; PS 0,21; CI 126,38; MI 49,45; SI 83,33; PeI 70,37; LPeI 58,53; DPeI 158,33.

Additional material measurements (n=4). HL 0.55-0.58; HW 0.41-0.45; SL 0.36-0.38; ML 0.26-0.29; PrW 0.33-0.35; MeL 0.15-0.17; WL 0.71-0.75; HFL 0.36-0.38; HBL 0.26-0.28; PeL 0.13-0.15; PeH 0.25-0.27; PeW 0.22-0.24; PS 0.2-0.21 (mm). CI 125.71-134.32; MI 46.8-51.64; SI 84.5-88.05; PeI 66.66-73.58; LPeI 50-62.5; DPeI 156-172.72.

Description. Small-sized (WL 0.71-0.75 mm); body entirely light brown or entirely pallid.

Head. In full-face view subquadrate, with lateral margin broadly convex and posterior margin concave. Mandible with tree apical teeth, and 3-7 denticles on the remainder of masticatory margin; external margin straight to broadly convex. Anterior margin of clypeus convex. Eye with less than six distinct ommatidia, reaching but not clearly interrupting lateral cephalic margin; distant from the posterior margin of the clypeus in lateral view (eye-mandible distance index greater than 0.15). Antennal scape not reaching posterior margin of the head. Mandible surface very sparsely punctate. Frons densely punctate. Gena densely and evenly punctate. Head ventrum smooth. Integument shiny.

Mesosoma. In lateral view, anteroventral corner of pronotum rounded; promesonotal sulcus absent, not clearly interrupting dorsal margin of mesosoma, or sometimes very shallow, and slightly interrupting dorsal margin of mesosoma. Notopleural suture between mesonotum and mesopleuron weakly impressed; junction of upper and lower portion of the anterior margin of the mesopleuron forming an obtuse angle; dorsal margin of mesonotum flat, at the same level as the pronotum. Metanotum forming a shallow sulcus which may slightly interrupt the dorsal margin of the mesosoma. Propodeum with dorsal margin at the same level as mesonotum, flat to slightly concave. Propodeal declivitous margin straight to broadly concave, not crenulate, and slightly concave where the metapleural gland opens. Propodeal spiracle elliptical. In posterior view, lateral margins of propodeum slightly

converging dorsally. Mesosoma mostly punctate and shiny; mesopleuron anteriorly punctate and posteriorly with longitudinal rugulae; metapleuron longitudinally striate; declivitous surface of propodeum mostly smooth. Pubescence appressed; long pilosity absent.

Metasoma. Petiolar node in lateral view rectangular; anterior and posterior margins straight; dorsal margin convex. Petiolar sternite diminishes in height posteriorly, but with a distinct ventral margin slightly notched. Petiole densely punctate and shiny. Prora not extending anteriorly and slightly extending ventrally forming a small ventral concavity in lateral view. Girdling constriction of abdominal segment IV clearly cross-ribbed posteriorly on tergite and sternite. Gaster densely punctate and shiny; pubescence appressed to decumbent; long pilosity absent.

Remarks. This species is one of the little and light brown *Hypoponera* that at first look may seem very similar. *Hypoponera* AMD_J is most similar to *H*. AMD_K, but in the last the scape reaches the posterior margin of head in full-face view and the petiolar sternite have ventral and posterior margins continuous, while in *H.* AMD_J these margins are different. *H*. AMD_L resembles *H.* AMD_J in size and scape length, but they can be separated because *H*. AMD_L has the eye close to the posterior margin of clypeus and the petiolar sternite with ventral and posterior margins continuous. *Hypoponera* AMD_F, and *H*. AMD_E have a similar body size and light color, but both have subtriangular petiolar node, while in *H.* AMD_J it is subrectangular. Finally, *H. inexpedita* is different by having metanotum inconspicuous or slightly impressed, while in *H.* AMD_J it is well-marked and may slightly interrupt the dorsal margin of mesosoma.

Natural history. *H.* AMD_J inhabits the soil and is frequently collected using Winkler extractor.

Distribution. Brazil, Paraná: Palmas; Santa Catarina: Otacílio Costa

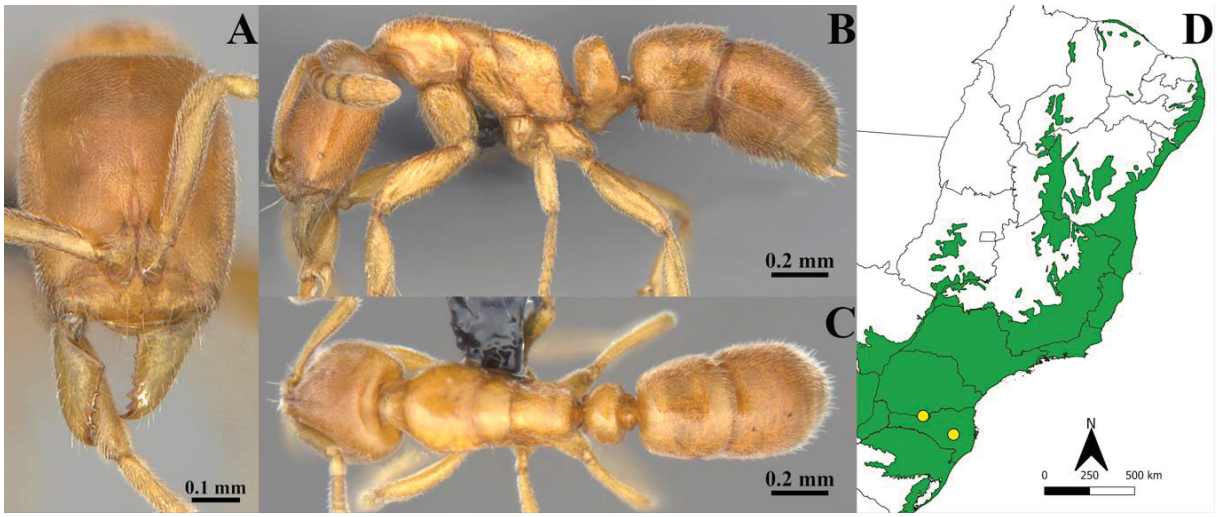

Figure 58. *Hypoponera* AMD_J (specimen DZUP553040). A. Full-face view. B. Full body in lateral view. C. Full body in dorsal view. D. Distribution map.

Hypoponera AMD_K New Species

Figure 59

Holotype worker: BRAZIL, Paraná, Ponta Grossa, P.E. Vila Velha, 25°14'00.6"S 49°59'9"W, 16.IX.2013 (A. Santos et al.) TSBF, F2.2 0-10 1, DZUP554733 [DZUP].

Paratype worker: with the same data as the holotype, but DZUP556171 (1 ☿) [MZSP].

Diagnosis. *H*. AMD_K is distinguished by the combination of small size (WL<0.8 mm), subrectangular petiole, eye distant from posterior clypeal margin (see in lateral view), antennal scape reaching - and sometimes slightly surpassing - posterior margin of head in lateral view, and petiolar sternite with anterior margin convex, and ventral and posterior margins continuous and broadly concave.

Holotype measurements. HL 0.53; HW 0.42; SL 0.39; ML 0.3; PrW 0.3; MeL 0.13; WL 0.73; HFL 0.4; HBL 0.3; PeL 0.12; PeH 0.2; PeW 0.19; PS 0.17 (mm). CI 126.47; MI 55.81; SI 92.64; PeI 63.26; LPeI 60.6; DPeI 155.

Description. Small-sized (WL 0.73 mm); body entirely light brown or entirely yellow.

Head. In full-face view subquadrate, with lateral margin broadly convex and posterior margin concave. Mandible with tree apical teeth, and 3-7 denticles on the remainder of masticatory margin; external margin straight to broadly convex. Anterior margin of clypeus convex. Eye with less than six distinct ommatidia, reaching but not clearly interrupting lateral cephalic margin; distant from the posterior margin of the clypeus in lateral view (eye-mandible distance index greater than 0.15). Antennal scape reaching and slightly surpassing posterior margin of the head by less than half length of pedicel. Mandible surface with very sparse shallow punctae. Frons densely punctate. Gena densely and evenly punctate. Head ventrum smooth. Integument shiny.

Mesosoma. In lateral view, anteroventral corner of pronotum rounded; promesonotal sulcus weak or absent, not clearly interrupting dorsal margin of mesosoma. Notopleural suture between mesonotum and mesopleuron varying from weakly to well-marked; junction of upper and lower portion of the anterior margin of the mesopleuron forming an obtuse angle; dorsal margin of mesonotum flat, at the same level as the pronotum. Metanotum forming a very shallow sulcus which may slightly interrupt the dorsal margin of the mesosoma. Propodeum with dorsal margin at the same level as mesonotum, flat to slightly concave. Propodeal declivitous margin convex and lobed, not crenulate, and with a notch where the metapleural gland opens. Propodeal spiracle elliptical to slit-shaped. In posterior view, lateral margins of propodeum slightly converging dorsally. Mesosoma mostly shallowly punctate and shiny; mesopleuron punctae sparser; metapleuron slightly longitudinally strigulate; declivitous surface of propodeum sparsely punctate. Pubescence appressed; long pilosity absent.

Metasoma. Petiolar node in lateral view subrectangular; anterior margin broadly concave to straight; posterior margin straight; dorsal margin convex. Petiolar sternite diminishes in height posteriorly, with regular ventral margin. Petiole densely punctate and shiny. Prora not extending anteriorly and slightly extending ventrally forming a small ventral concavity in lateral view. Girdling constriction of abdominal segment IV clearly cross-ribbed posteriorly on tergite and sternite. Gaster densely punctate and shiny; pubescence appressed to decumbent; long pilosity absent.

Remarks. *Hypoponera* AMD_K resembles *H.* AMD_O because of color, petiolar shape, scape length, and eye size and position. However, *H.* AMD_K has the mesopleuron smooth, while in *H.* AMD_O it is rugulose, and the petiolar sternite with only two very distinct margins - the anterior and the posteroventral. In *H.* AMD_O the petiolar sternite has three distinct margins: anterior, ventral and posterior. *Hypoponera* AMD_P differs from *H.*

AMD_K by the same characteristics as *H.* AMD_O, plus the petiolar node, which is distinctly rectangular. *Hypoponera* AMD_J is similar, but differs by having a shorter antennal scape (see *H.* AMD_J remarks). *Hypoponera* AMD_K can be distinguished from *H.* AMD_N by the eye, which in the last is close to posterior margin of clypeus, and by the scape that does not reach posterior margin of the head.

Natural history. Cryptobiotic ants collected by extracting soil monoliths.

Distribution. Brazil, Paraná: Ponta Grossa.

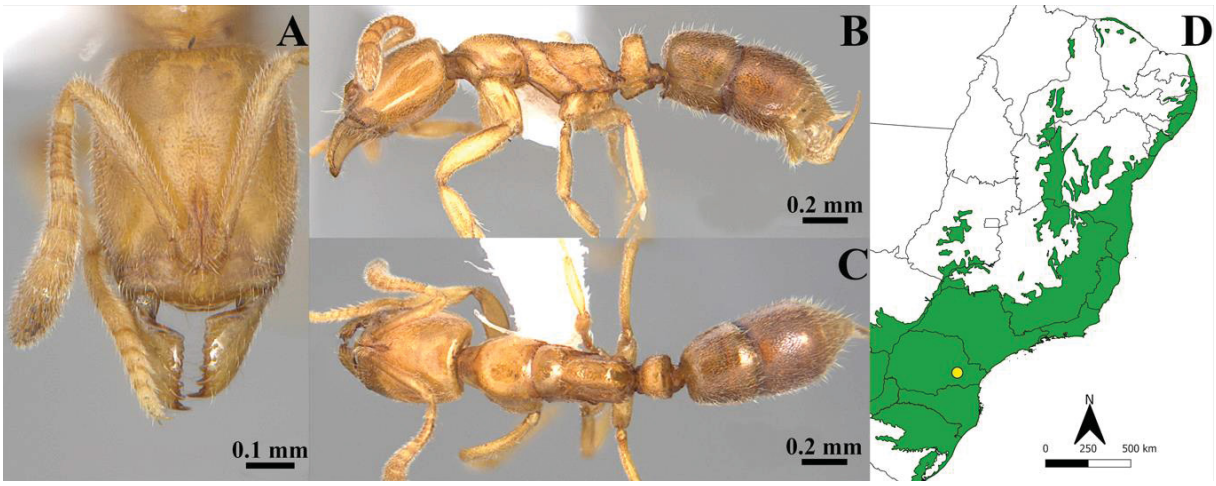

Figure 59. *Hypoponera* AMD_K (specimen DZUP554733). A. Full-face view. B. Full body in lateral view. C. Full body in dorsal view. D. Distribution map.

Hypoponera AMD_L New Species

Figure 60

Holotype worker: BRAZIL: Santa Catarina, Otacílio Costa, Planalto 919m, M.L.C. Bartz et al., xii.2011-i.2012, TSBF VT95, DZUP551273 [DZUP].

Paratype worker: with the same data as the holotype, but DZUP550809 (1 ☿) [DZUP].

Diagnosis. *H.* AMD_L is distinguished by the following characteristics combined: small body size (WL 0.62-0.97 mm), eye close to posterior margin of clypeus, antennal scape failing to reach posterior margin of head, petiolar sternite reducing posteriorly, but with a

distinct slightly concave ventral margin, and girdling constriction of abdominal segment IV clearly cross-ribbed posteriorly on tergite and sternite.

Holotype measurements. HL 0.62; HW 0.48; SL 0.41; ML 0.25; PrW 0.4; MeL 0.18; WL 0.88; HFL 0.45; HBL 0.35; PeL 0.16; PeH 0.28; PeW 0.27; PS 0.24; CI 128.20; MI 41; SI 85.89; PeI 68.75; LPeI 56.52; DPeI 169.23.

Additional material measurements (n=18). HL 0.47-0.68; HW 0.37-0.54; SL 0.3-0.47; ML 0.21-0.36; PrW 0.26-0.43; MeL 0.13-0.18; WL 0.62-0.97; HFL 0.3-0.5; HBL 0.19-0.36; PeL 0.12-0.2; PeH 0.2-0.36; PeW 0.18-0.33; PS 0.17-0.3 (mm). CI 122.13-128.57; MI 44-53.21; SI 76.33-87.35; PeI 66-75.71; LPeI 55.93-67.18; DPeI 120.83-170.

Description. Small-sized (WL 0.62-0.88 mm); body entirely light brown.

Head. In full-face view subquadrate, with lateral margin broadly convex and posterior margin concave. Mandible with at least four apical teeth and indistinct denticles on the remainder of masticatory margin; external margin concave. Anterior margin of clypeus convex. Eye with less than six distinct ommatidia, reaching but not clearly interrupting lateral cephalic margin; close to the posterior margin of the clypeus in lateral view (eye-mandible distance index less than 0.15). Antennal scape not reaching posterior margin of the head. Mandible surface sparsely punctate. Frons densely punctate and shiny. Gena densely and evenly punctate. Head ventrum smooth. Integument shiny.

Mesosoma. In lateral view, anteroventral corner of pronotum rounded; promesonotal sulcus weak or absent, not clearly interrupting dorsal margin of mesosoma. Notopleural suture between mesonotum and mesopleuron weakly impressed; junction of upper and lower portion of the anterior margin of the mesopleuron forming an acute angle; dorsal margin of mesonotum flat, at the same level as the pronotum. Metanotum as a well-marked line, rarely forming a shallow sulcus, which may slightly interrupt the dorsal margin of the mesosoma. Propodeum with dorsal margin at the same level as mesonotum, flat to slightly concave. Propodeal declivitous margin straight to broadly concave, not crenulate, and continuous. Propodeal spiracle elliptical. In posterior view, lateral margins of propodeum slightly converging dorsally. Mesosoma mostly shallowly punctate and shiny; mesopleuron mostly smooth and posteriorly with longitudinal rugulae; metapleuron longitudinally striate, with striae becoming sparser dorsally to propodeal spiracle; declivitous surface of propodeum mostly smooth. Pubescence appressed; long pilosity absent.

Metasoma. Petiolar node in lateral view subrectangular; anterior and posterior margins straight; dorsal margin convex. Petiolar sternite diminishes in height posteriorly, but with a distinct ventral margin slightly concave. Petiole densely punctate and shiny. Prora not extending anteroventrally, or rarely slightly extending ventrally forming a small ventral concavity in lateral view. Girdling constriction of abdominal segment IV clearly cross-ribbed posteriorly on tergite and sternite. Gaster densely punctate and shiny; pubescence appressed to decumbent; long pilosity absent.

Remarks. *Hypoponera* AMD_L may be confused with *H*. AMD_M, but the last is smaller (WL< 0.6 mm), and does not present the notopleural suture between mesonotum and mesopleuron seen in *H.* AMD_L (although weak). Moreover, *H*. AMD_M has a posteroventral notch on petiolar sternite, absent in *H.* AMD_L. *Hypoponera* AMD_L resembles *H*. AMD_K and *H*. AMD_J, but these have the eye distant from the posterior margin of clypeus (to see more, see *H*. AMD_K and *H*. AMD_J remarks).

Hypoponera AMD_L resembles *H*. *fiebrigi* (Forel, 1908), a species originally described for Paraguay. However, unlike *H*. AMD_L, the girdling constriction of abdominal segment IV is not clearly cross-ribbed posteriorly. Furthermore, *H*. *fiebrigi* has the junction of upper and lower portions of the anterior margin of the mesopleuron forming an obtuse angle, while in *H.* AMD_L the angle formed is acute.

From the original description, some traits indicate that *H*. AMD_L could be *H. clavatula* (Emery, 1906), originally discovered in Misiones, Argentina. Both are small, have short scape that does not reach the posterior margin of the head in full-face view, and have the anterior margin of the clypeus convex. However, the type specimen of *H*. *clavatula*, which was believed to be in the MSNG collection, was borrowed and has not been located yet. Consequently, since there is not enough evidence that they are the same species, we describe *H*. AMD_L as new. Although the original description of *H*. *clavatula* is quite incomplete, it is known that this species has an antennal club, a characteristic absent in *H*. AMD_L. Furthermore, in *H*. AMD_L the metanotum is always well marked, while Emery states that in *H*. *clavatula* the metanotum is weakly marked.

Natural history. These ants inhabit the soil, being more commonly collected in leaf litter. Some individuals were collected in a coffee plantation, suggesting that they can tolerate disturbance.

Distribution. Brazil, Minas Gerais Poço Fundo; Paraná: Jaguariaiva, Morretes, Ponta Grossa, and Tuneiras do Oeste; Rio de Janeiro: Nova Iguaçu, and Santa Maria Madalena; Santa Catarina: Blumenau, Chapecó, Indaial, Joinville, Otacílio Costa, Palhoça, São Bento do Sul, São Bonifácio, and Treviso.

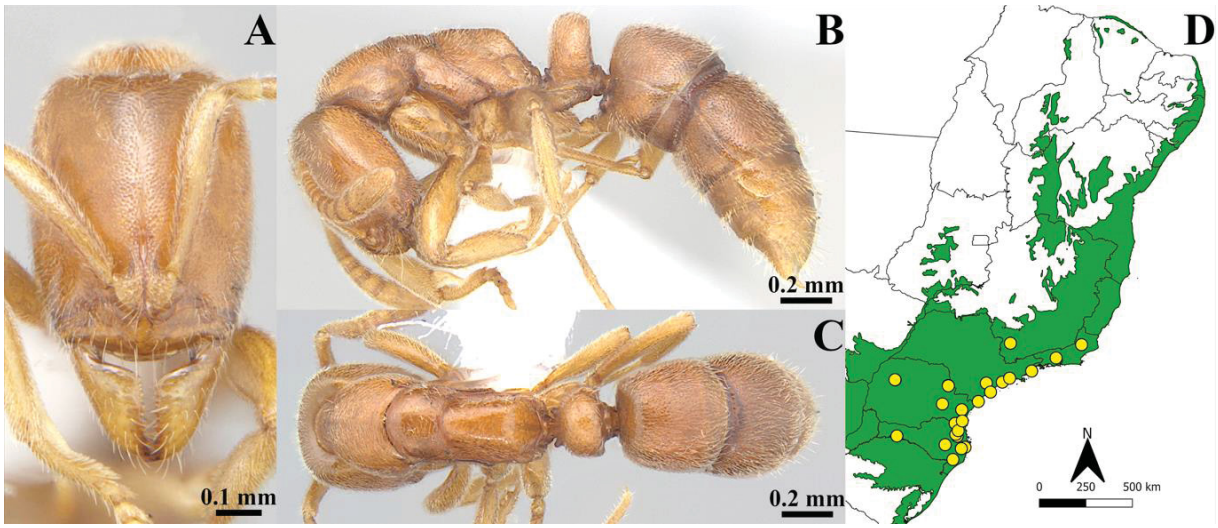

Figure 60. *Hypoponera* AMD_L (specimen DZUP550809). A. Full-face view. B. Full body in lateral view. C. Full body in dorsal view. D. Distribution map.

Hypoponera AMD_M New Species

Figure 61

Holotype Worker: BRAZIL: Pernambuco, Recife, Horto Dois Irmãos, 08°00'32"S 34°56'4"W (Silva, RR & Eberhardt, F) 15-24.vii.2002, Winkler 3, *Hypoponera* sp. 27 Biota-FAPESP, MZSP0098285 UP [MZSP].

Paratype: on the same pin as holotype, but BOTTOM (1 ☿) [MZSP]; same data as the holotype, but Winkler 27, MZSP0098286 (2 ☿) [DZUP].

Diagnosis. Very small yellow ants (WL<0.6 mm), with antennal scape failing to reach posterior margin of head in full-face view, petiolar sternite with a posteroventral small notch, and girdling constriction of abdominal segment IV clearly cross-ribbed posteriorly on tergite and sternite.

Holotype measurements. HL 0.46; HW 0.36; SL 0.3; ML 0.22; PrW 0.26; MeL 0.11; WL 0.57; HFL 0.28; HBL 0.2; PeL 0.11; PeH 0.21; PeW 0.18; PS 0.17; CI 127.58; MI 48.64; SI 82.75; PeI 69.76; LPeI 52.94; DPeI 166.66.

Additional Material measurements (n=21). HL 0.45-0.46; HW 0.35-0.37; SL 0.3-0.32; ML 0.18-0.23; PrW 0.26-0.28; MeL 0.09-0.13; WL 0.53-0.59; HFL 0.28-0.32; HBL 0.18-0.21; PeL 0.1-0.11; PeH 0.2-0.23; PeW 0.14-0.19; PS 0.15-0.17 (mm). CI 120-129.31; MI 39.72-52.77; SI 80-89.65; PeI 65.11-71.42; LPeI 44.44-54.54; DPeI 143.75-193.75.

Description. Small-sized (WL 0.53-0.59 mm); body entirely brownish yellow.

Head. In full-face view subquadrate, with lateral margin broadly convex and posterior margin flat to slightly concave. Mandible with at least four apical teeth and indistinct denticles on the remainder of masticatory margin; external margin straight to broadly convex. Anterior margin of clypeus convex. Eye with one distinct ommatidia, reaching but not interrupting lateral cephalic margin; close to the posterior margin of the clypeus in lateral view (eye-mandible distance index less than 0.15). Antennal scape not reaching posterior margin of the head. Mandible surface sparsely punctate. Frons densely punctate and silky. Gena densely and evenly punctate and shiny. Head ventrum smooth medially and shallowly punctate laterally; shiny.

Mesosoma. In lateral view, anteroventral corner of pronotum rounded; promesonotal sulcus weak or absent, not clearly interrupting dorsal margin of mesosoma. Notopleural suture between mesonotum and mesopleuron absent; junction of upper and lower portion of the anterior margin of the mesopleuron forming an obtuse angle; dorsal margin of mesonotum flat, at the same level as the pronotum. Metanotum as a well-marked line, rarely forming a shallow sulcus which interrupts dorsal margin of mesosoma. Propodeum with dorsal margin at the same level as mesonotum, flat to broadly convex. Propodeal declivitous margin broadly convex, not crenulate, and slightly concave where the metapleural gland opens. Propodeal spiracle elliptical to rounded. In posterior view, lateral margins of propodeum slightly converging dorsally. Mesosoma with shallow and sparse punctae and shiny; metapleuron with few longitudinal strigulae ventrally. Pubescence appressed; long pilosity absent.

Metasoma. Petiolar node in lateral view subrectangular; anterior and posterior margins straight to broadly convex; dorsal margin convex. Petiolar sternite rounded but diminishing in height posteriorly; with a posteroventral notch. Petiole densely punctate and shiny. Prora not extending anteriorly and slightly extending ventrally forming a small ventral

concavity in lateral view. Girdling constriction of abdominal segment IV clearly cross-ribbed posteriorly on tergite and sternite. Gaster densely punctate and shiny; pubescence appressed to decumbent; long pilosity absent.

Remarks. The notch on the posteroventral corner of petiolar sternite is exclusive of *H.* AMD_M and can be used to distinguish it from the other *Hypoponera*. The only species as small as *H.* AMD_M is *H*. AMD_N. However, they can be separated by the scape, which reaches the posterior margin of head in *H*. AMD_N. Besides, girdling constriction of *H*. AMD_N is not conspicuously cross-ribbed, or, when conspicuous, it is very thin, in opposite to *H.* AMD_M. *Hypoponera* AMD_J and *H*. AMD_L also have short antennal scapes that fail to reach posterior margin of head, but in *H*. AMD_J the eye is distant from posterior clypeal margin, and in *H*. AMD_L the notopleural suture between mesonotum and mesopleuron is present, although weak (see more in *H*. AMD_L remarks).

Due to their size, some individuals of *H*. AMD_M have been misidentified in collections as *H. parva* (Forel, 1909), a species originally described in Guatemala. However, unlike *H*. AMD_M, the petiolar sternite of *H. parva* never has the posteroventral notch, and the prora will never project ventrally.

Hypoponera AMD_M also resembles *H. reichenspergeri* because of size, girdling constriction sculpture, and scape length. Nevertheless, *H. reichenspergeri* differs by having the notopleural suture between the mesonotum and mesopleuron conspicuous and the anterior margin of the mesopleuron forming an acute angle.

Natural history. All specimens were collected in leaf litter and in relatively preserved forests, which may indicate that this species is not very tolerant to disturbances.

Distribution. Brazil, Bahia: Mata de São João, Porto Seguro, and Uruçuca; Espírito Santo: Sooretama; Paraíba: João Pessoa; Paraná: Guaíra; Pernambuco: Recife; Sergipe: Areia Branca, Nossa Senhora das Dores, and Santa Luzia do Itanhi.

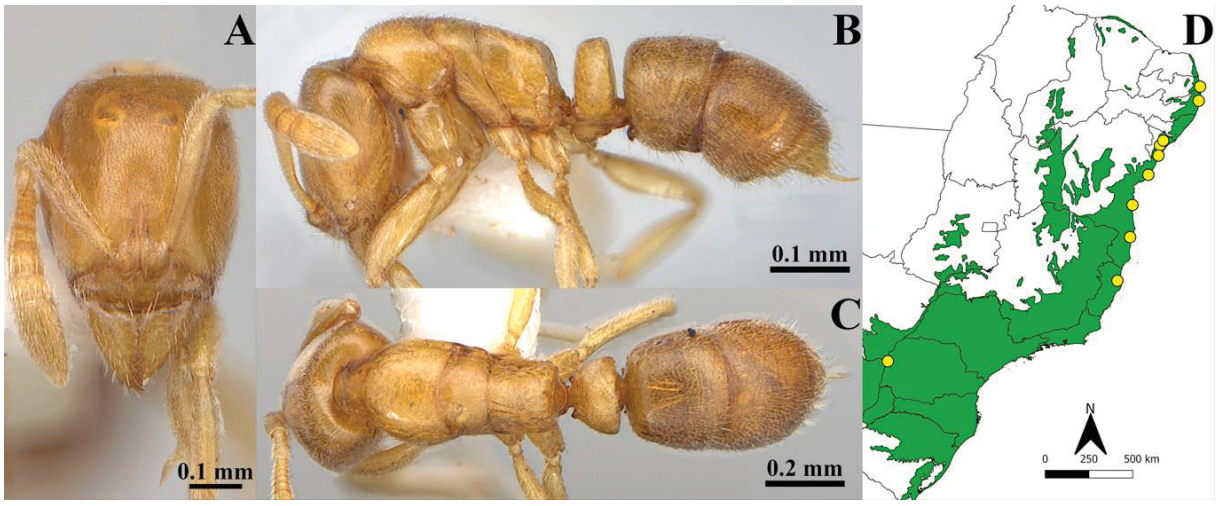

Figure 61. *Hypoponera* AMD_M. A. Full-face view. B. Full body in lateral view. C. Full body in dorsal view. D. Distribution map.

Hypoponera AMD_N New Species

Figure 62

Holotype worker: BRAZIL: Paraná, Tuneiras do Oeste, reserva Biológica de Perobas, 23°50'39"S 52°44'43.26"W, 18.IX.2015 (Busanello D. & Caron E.) DZUP550605 UP [DZUP].

Paratype workers: on the same pin as holotype, but MID and BOTTOM (2 ☿) [DZUP]; same data, but DZUP551918 (1 ☿) [MZSP]; same data, but DZUP551917 (1 ☿) [MZSP].

Diagnosis. Very small yellow ants (WL<0.6 mm), with antennal scape usually reaching posterior margin of head in full-face view, girdling constriction of abdominal segment IV not clearly cross-ribbed posteriorly (or with a very thin band cross-ribbed on sternite), and petiolar sternite without posteroventral notch.

Holotype measurements. HL 0.43; HW 0.36; SL 0.3; ML 0.22; PrW 0.25; MeL 0.13; WL 0.56; HFL 0.29; HBL 0.18; PeL 0.08; PeH 0.21; PeW 0.18; PS 0.16 (mm). CI 120.68; MI 51.42; SI 82.75; PeI 70.73; LPeI 41.17; DPeI 207.14.

Additional Material measurements (n=15). HL 0.42-0.45; HW 0.35-0.36; SL 0.28-0.32; ML 0.2-0.22; PrW 0.25-0.28; MeL 0.11-0.13; WL 0.53-0.58; HFL 0.28-0.3; HBL 0.17-0.2; PeL 0.08-0.1; PeH 0.19-0.22; PeW 0.16-0.2; PS 0.15-0.17 (mm). CI 118.96-126.31; MI 45.71-51.47; SI 82.14-89.47; PeI 63.04-78.04; LPeI 42.42-50; DPeI 175-207.14.

Description. Small-sized (WL 0.53-0.58 mm); body entirely brownish yellow.

Head. In full-face view subquadrate, with lateral margin broadly convex and posterior margin concave. Mandible with at least four apical teeth and indistinct denticles on the remainder of masticatory margin; external margin straight to broadly convex. Anterior margin of clypeus convex. Eye with one distinct ommatidia, reaching but not clearly interrupting lateral cephalic margin; close to the posterior margin of the clypeus in lateral view (eye-mandible distance index less than 0.15). Antennal scape usually reaching posterior margin of the head, never surpassing it. Mandible surface sparsely punctate. Frons densely punctate and silky. Gena densely and evenly punctate and shiny. Head ventrum smooth medially and shallowly punctate laterally; shiny.

Mesosoma. In lateral view, anteroventral corner of pronotum rounded; promesonotal sulcus weak or absent, not clearly interrupting dorsal margin of mesosoma. Notopleural suture between mesonotum and mesopleuron suture absent; junction of upper and lower portion of the anterior margin of the mesopleuron forming an obtuse angle; dorsal margin of mesonotum flat, at the same level as the pronotum. Metanotum as a well-marked line that does not interrupt the dorsal margin of the mesosoma. Propodeum with dorsal margin at the same level as mesonotum, flat to broadly convex. Propodeal declivitous margin broadly convex, not crenulate, and slightly concave where the metapleural gland opens. Propodeal spiracle rounded. In posterior view, lateral margins of propodeum slightly converging dorsally. Mesosoma with shallow and sparse punctate and shiny; metapleuron with longitudinal strigulae sometimes becoming sparser dorsally to propodeal spiracle. Pubescence appressed; long pilosity absent.

Metasoma. Petiolar node in lateral view subrectangular; anterior and posterior margins straight or convex; dorsal margin convex. Petiolar sternite rounded but diminishing in height posteriorly. Petiole densely punctate and shiny. Prora not extending anteroventrally. Girdling constriction of abdominal segment IV not clearly cross-ribbed posteriorly, or sometimes with a thin band cross-ribbed posteriorly on sternite. Gaster densely punctate and shiny; pubescence appressed to decumbent; long pilosity absent.

Remarks. The species that most resembles *H.* AMD_N is *H.* AMD_M, but they differ in petiolar node shape, scape length, and girdling constriction (see *H.* AMD_M remarks). *Hypoponera* AMD_N also closely resembles *H. parva* and *H. reichenspergeri*, mainly because of body size. However, it differs from *H. parva* by having a longer scape: the scape index of H. AMD_N is always greater than 80, while in the measured type of *H. parva* the index is 72. *Hypoponera reichenspergeri* differs from *H.* AMD_N by presenting the girdling constriction clearly cross-ribbed posteriorly and by having the notopleural suture between the mesonotum and mesopleuron conspicuous, features absent in *H.* AMD_N.

Natural history. Ground ants that probably forage in places with little space and low light. Although the specimens included in this study fall within the delimitation of the Atlantic Forest, label data indicate that some individuals were collected in Cerrado areas, indicating their ability to adapt to various phytophysiognomies and microclimates.

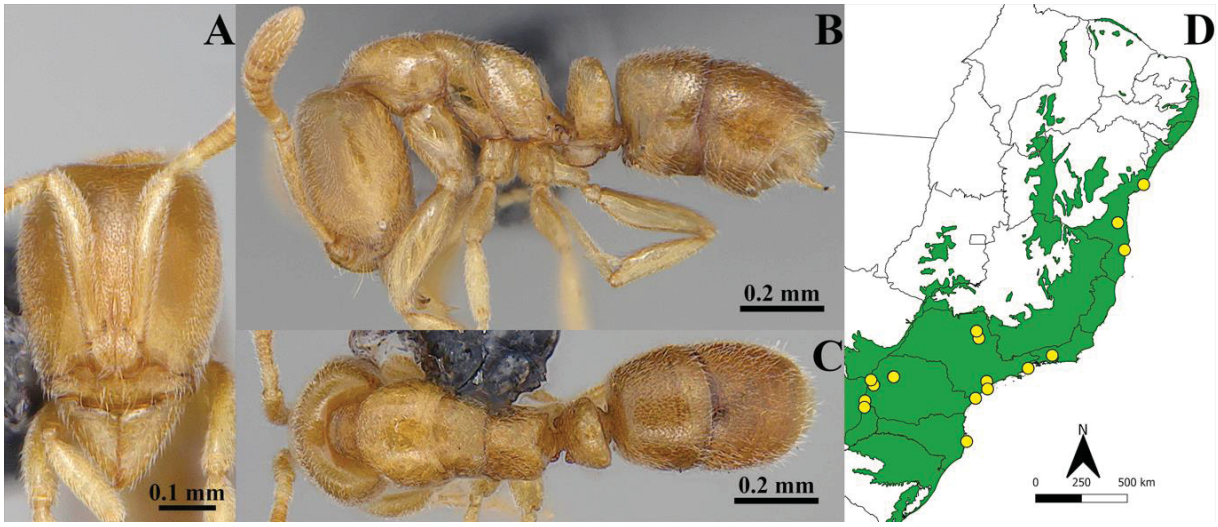

Figure 62. *Hypoponera* AMD_N (specimen DZUP550605). A. Full-face view. B. Full body in lateral view. C. Full body in dorsal view. D. Distribution map.

Distribution. Brazil, Goiás: Jataí; Paraná: Foz do Iguaçu, Guaíra, Palotina, and Tuneiras do Oeste; Santa Catarina: Florianópolis; São Paulo: Cananeia, and Iguape.

Hypoponera AMD_O New Species

Figure 63

Holotype worker: BRAZIL: Rio de Janeiro, P.N. Itatiaia, 22°24'41.90"S 44°38'18.84"W, 20.I.2015 (Lasmar et al.) winkler extractor, 1991m \ projeto gradiente altitudinal Mata Atlântica - transecto 6A \ ponto 5, DZUP554747 [DZUP].

Paratype worker: with the same data as the holotype, but pitfall epigeico, DZUP550601 (1 ☿) [MZSP].

Diagnosis. *H.* AMD_O is recognized by having small to medium size (WL<1.2 mm), eye reduced (less than six distinct ommatidia) and located distant from posterior margin of clypeus, metapleural gland opening interrupting declivitous margin of propodeum, petiolar node subrectangular and with anterior margin concave in lateral view, and girdling constriction of abdominal segment IV clearly cross-ribbed posteriorly.

Holotype measurements. HL 0.77; HW 0.64; SL 0.57; ML 0.41; PrW 0.51; MeL 0.23; WL 1.15; HFL 0.62; HBL 0.49; PeL 0.21; PeH 0.42; PeW 0.36; PS 0.33 (mm). CI 120.38; MI 53.22; SI 89.32; PeI 71.08; LPeI 50; DPeI 173.52.

Additional material measurements (n=2). HL 0.66-0.78; HW 0.5-0.66; SL 0.43-0.58; ML 0.29-0.43; PrW 0.35-0.5; MeL 0.18-0.23; WL 0.9-1.12; HFL 0.48-0.63; HBL 0.33-0.46; PeL 0.15-0.22; PeH 0.31-0.43; PeW 0.27-0.36; PS 0.24-0.34 (mm). CI 118.86-133.75; MI 43.92-54.76; SI 87.5-87.73; PeI 72.5-78.57; LPeI 48-51.42; DPeI 161.11-183.33.

Description. Small to medium-sized (WL 0.9-1.15 mm); body entirely light brown.

Head. In full-face view subquadrate, with lateral margin broadly convex and posterior margin flat to slightly concave. Mandible with at least four apical teeth and indistinct denticles on the remainder of masticatory margin; external margin concave. Anterior margin of clypeus convex. Eye with one distinct ommatidia (or up to six ommatidia partially fused), reaching but not clearly interrupting lateral cephalic margin; distant from the posterior margin of the clypeus in lateral view (eye-mandible distance index greater than 0.15). Antennal scape reaching and slightly surpassing posterior margin of the head by less than half length of pedicel. Mandible surface sparsely punctate. Frons densely punctate. Gena sparsely punctate, especially around the eye. Head ventrum smooth. Integument shiny.

Mesosoma. In lateral view, anteroventral corner of pronotum rounded; promesonotal sulcus shallow, slightly interrupting dorsal margin of mesosoma. Notopleural suture between

mesonotum and mesopleuron suture well-marked; junction of upper and lower portion of the anterior margin of the mesopleuron forming an acute angle; dorsal margin of mesonotum flat, at the same level as the pronotum. Metanotum forming a sulcus. Propodeum with dorsal margin virtually at the same level as mesonotum, concave. Propodeal declivitous margin broadly convex to straight, not crenulate, and with a notch where the metapleural gland opens. Propodeal spiracle elliptical to rounded. In posterior view, lateral margins of propodeum slightly converging dorsally. Mesosoma mostly punctate and shiny; mesopleuron may have a smooth anterior region and a rugulose posterior region or be completely rugulose; metapleuron completely covered by longitudinal strigulae; declivitous surface of propodeum mostly smooth. Pubescence appressed; pilosity usually sparse and suberect.

Metasoma. Petiolar node in lateral view subrectangular; anterior margin curved, concave; posterior margin straight to broadly convex; dorsal margin convex. Petiolar sternite with antero- and posteroventral angles rounded and ventral margin slightly concave. Petiole densely punctate and shiny. Prora not extending anteriorly and slightly extending ventrally forming a small ventral concavity in lateral view. Girdling constriction of abdominal segment IV clearly cross-ribbed posteriorly on tergite and sternite. Gaster densely punctate and shiny; pubescence appressed to decumbent; short suberect pilosity.

Remarks. *Hypoponera* AMD_O is more likely to be confused with *H.* AMD_K and *H.* AMD_P. However, *H.* AMD_K is smaller (WL<0.9 mm), and has the petiolar sternite diminishing in height posteriorly, while in *H.* AMD_O the petiolar sternite has the with antero- and posteroventral angles approximately even and ventral margin slightly concave. The main difference between *H.* AMD_P and *H.* AMD_O is the concave anterior margin of the petiole in lateral view in *H.* AMD_O. Moreover, *H.* AMD_O has the gena with sparse punctae, specially around the eye, while in *H.* AMD_P it is densely punctate.

Natural history. These soil ants are restricted to high altitudes, with collections made at approximately 2000 meters above sea level. All specimens were collected in one of the largest conservation units in Brazil, Parque Nacional do Itatiaia, recognized for its high rate of endemism (ICMBio 2013).

Distribution. All known specimens were collected at Brazil, Rio de Janeiro: Itatiaia.

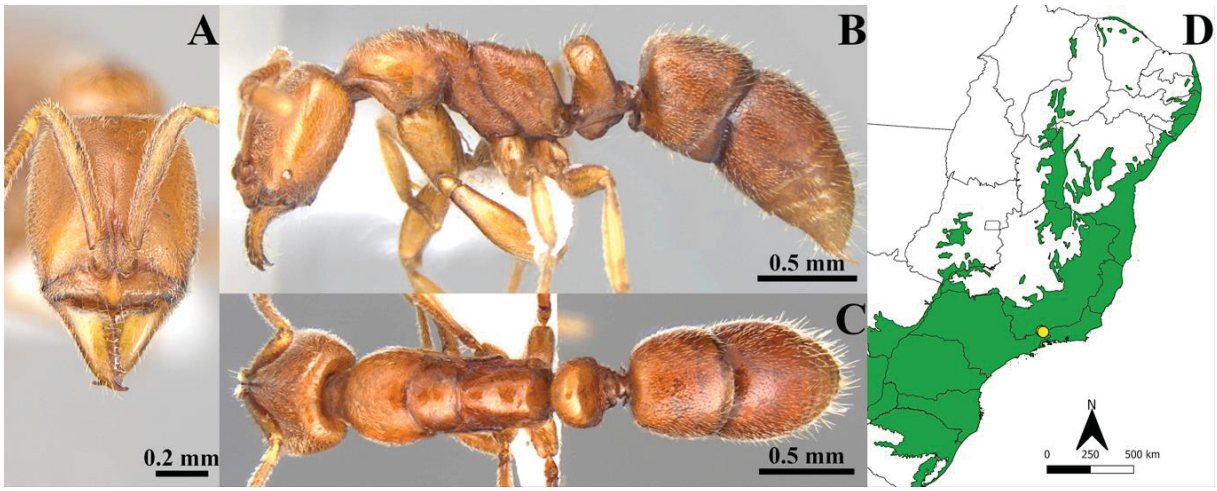

Figure 63. *Hypoponera* AMD_O (specimen DZUP554747). A. Full-face view. B. Full body in lateral view. C. Full body in dorsal view. D. Distribution map.

Hypoponera AMD_P New Species

Figure 64

Holotype worker: BRAZIL, Paraná, Tunas do Paraná, P.E. Lauráceas - Trilha Cemitério, 24º51'20.07"S, 48º42'38.08"W (Silva T.S.R., Ladino N. Feitosa R.M.) 2-4.V.2017 DZUP556173 [DZUP].

Paratype workers: with the same data as the holotype, but DZUP553684 (2 ☿) [DZUP]; same data, but DZUP553685 (2 ☿) [DZUP]; same data, but DZUP553687 (1 ☿) [DZUP]; same data, but DZUP553688 (1 ☿) [DZUP]; same data, but DZUP553690 (1 ☿) [DZUP].

Diagnosis. *H.* AMD_P is distinguished by the following combination: small to medium ants (WL 0.9-1.2 mm), metapleural gland opening in a concavity that clearly interrupts declivitous margin of propodeum, petiolar node with anterior and posterior margins subparallel in lateral view, and girdling constriction of abdominal segment IV clearly cross-ribbed posteriorly on tergite and sternite.

Holotype measurements. HL 0.73; HW 0.67; SL 0.53; ML 0.45; PrW 0.53; MeL 0.26; WL 1.12; HFL 0.63; HBL 0.48; PeL 0.25; PeH 0.44; PeW 0.39; PS 0.36 (mm). CI 108.95; MI 61.64; SI 80.59; PeI 73.58; LPeI 56.81; DPeI 156.

Additional material measurements (n=16). HL 0.66-0.8; HW 0.52-0.68; SL 0.46-0.56; ML 0.35-0.46; PrW 0.42-0.54; MeL 0.16-0.26; WL 0.96-1.2; HFL 0.5-0.63; HBL 0.37-0.49; PeL 0.18-0.26; PeH 0.34-0.46; PeW 0.31-0.42; PS 0.28-0.37 (mm). CI 113.76-129.41; MI 50.9-57.94; SI 82.56-93.02; PeI 71.42-80.48; LPeI 50-61.53; DPeI 150-186.66.

Description. Small to medium-sized (WL 0.96-1.2 mm); body entirely light brown.

Head. In full-face view subquadrate, with lateral margin broadly convex and posterior margin flat to slightly concave. Mandible with at least four apical teeth and indistinct denticles on the remainder of masticatory margin; external margin slightly concave to straight. Anterior margin of clypeus convex. Eye with up to six ommatidia, but almost fused and difficult to distinguish; it reaches but not clearly interrupts lateral cephalic margin; distant from the posterior margin of the clypeus in lateral view (eye-mandible distance index greater than 0.15). Antennal scape reaching and slightly surpassing posterior margin of the head by less than half length of pedicel. Mandible surface sparsely punctate. Frons densely punctate. Gena densely and evenly punctate. Head ventrum smooth. Integument shiny.

Mesosoma. In lateral view, anteroventral corner of pronotum rounded; promesonotal sulcus clearly interrupting dorsal margin of mesosoma. Notopleural suture between mesonotum and mesopleuron suture well-marked; junction of upper and lower portion of the anterior margin of the mesopleuron forming an acute angle; dorsal margin of mesonotum flat, slightly higher than pronotum. Metanotum forming a sulcus. Propodeum with dorsal margin slightly lower than mesonotum, flat to slightly concave. Propodeal declivitous margin straight, not crenulate, and with a notch where the metapleural gland opens. Propodeal spiracle slit-shaped. In posterior view, lateral margins of propodeum slightly converging dorsally. Mesosoma mostly punctate and shiny; mesopleuron may have a smooth anterior region and a rugulose posterior region or be completely rugulose; metapleuron completely covered by longitudinal strigulae; declivitous surface of propodeum mostly smooth. Pubescence appressed; pilosity, when present, sparse and suberect.

Metasoma. Petiolar node in lateral view rectangular; anterior and posterior margins straight; dorsal margin flat. Petiolar sternite with antero- and posteroventral angles rounded and ventral margin flat and slightly diminishing in height posteriorly. Petiole densely punctate and shiny. Prora not extending anteriorly and slightly extending ventrally forming a small ventral concavity in lateral view. Girdling constriction of abdominal segment IV clearly cross-ribbed posteriorly on tergite and sternite. Gaster densely punctate and shiny; pubescence appressed to decumbent; short suberect pilosity.

Remarks. *Hypoponera* AMD_P is very similar to *H.* AMD_O, but they can be easily separated by petiolar node shape. In *H.* AMD_P the petiole is virtually rectangular, with anterior and posterior margins straight in lateral view, while in *H.* AMD_O the anterior margin is concave. Additionally, they differ on punctae density of gena (see *H.* AMD_O remarks). *Hypoponera* AMD_I may resemble *H.* AMD_P in size, color, and eye size and position, but the first has a longer antennal scape that surpasses posterior margin of head by a length similar to pedicel length, while in *H.* AMD_P the scape barely surpass posterior margin of head.

Natural history. *Hypoponera* AMD_P forages on the soil and can be collected using various methods, such as epigaeic pitfall traps, Winkler extractor, Berlese funnel, and by extracting soil monoliths.

Figure 64. *Hypoponera* AMD_P (specimen DZUP556173). A. Full-face view. B. Full body in lateral view. C. Full body in dorsal view. D. Distribution map.

Distribution. Brazil, Paraná: Curitiba, Piraquara, Ponta Grossa, Quatro Barras, São José dos Pinhais, and Tunas do Paraná; Santa Catarina: Blumenau, Campo Belo do Sul, Indaial, Lages, São Bento do Sul, São Bonifácio, Otacílio Costa, and Timbó; São Paulo: Cunha, Iguape, Iporanga, Picinguaba, Tapiraí, and Ubatuba.

Hypoponera AMD_Q New Species

Figure 65

Holotype worker: BRAZIL, Paraná, Tuneiras do Oeste, REBIO das Perobas, 23°50'S 52°45'W, 18.ix.2015 (E. Caron) winkler, 540m, DZUP550600 [DZUP].

Paratype workers: with the same data as the holotype, but DZUP553653 (1 ☿) [DZUP]; same data, but DZUP552617 (2 ☿) [DZUP]; same data, but DZUP552616 (1 ☿) [DZUP]; same data, but DZUP552615 (1 ☿) [MZSP].

Diagnosis. *Hypoponera* AMD_Q is distinguished by the following characteristics combined: medium to large size (WL 0.95-1.45 mm), anterior margin of clypeus convex, eye with less than six distinct ommatidia located distant from the posterior margin of the clypeus in lateral view, petiolar node in lateral view with anterior margin straight and posterior margin convex and curving anteriorly, and propodeal declivitous margin continuous.

Holotype measurements. HL 0.98; HW 0.91; SL 0.79; ML 0.58; PrW 0.71; MeL 0.35; WL 1.42; HFL 0.92; HBL 0.67; PeL 0.28; PeH 0.59; PeW 0.5; PS 0.45 (mm). CI 107.69; MI 59.18; SI 86.81; PeI 70.42; LpeI 47.45; DpeI 178.57.

Non-type measurements (n=10). HL 0.76-1.01; HW 0.65-0.92; SL 0.61-0.85; ML 0.4-0.55; PrW 0.51-0.7; MeL 0.28-0.4; WL 0.95-1.45; HFL 0.63-0.92; HBL 0.49-0.71; PeL 0.2-0.27; PeH 0.43-0.61; PeW 0.38-0.51; PS 0.33-0.46 (mm). CI 1.07-1.17; MI 51.92-59.7; SI 84.09-94.62; PeI 70.9-77.08; LpeI 38.33-47.72; DpeI 180.48-221.73.

Description. Large-sized (WL 0.95-1.45 mm); body mostly brown, with mandible, antenna, and legs light brown.

Head. In full-face view subquadrate, with lateral margin broadly convex and posterior margin flat to slightly concave. Mandible with five or less distinct teeth, usually concentrated on apex, and several denticles on the remainder of the masticatory margin; external margin concave. Anterior margin of clypeus convex. Eye with less than six distinct ommatidia, reaching but not clearly interrupting lateral cephalic margin; distant from the posterior margin of the clypeus in lateral view (eye-mandible distance index greater than 0.15). Antennal scape surpassing posterior margin of the head by less than the pedicel length. Mandible surface sparsely punctate. Frons densely punctate. Gena densely and evenly punctate. Head ventrum smooth medially and shallowly punctate laterally. Integument shiny.

Mesosoma. In lateral view, anteroventral corner of pronotum rounded; promesonotal sulcus shallow, slightly interrupting dorsal margin of mesosoma. Notopleural suture between mesonotum and mesopleuron well-marked; junction of upper and lower portion of the anterior margin of the mesopleuron forming an acute angle; dorsal margin of mesonotum flat, at the same level to slightly higher than pronotum. Metanotum forming a shallow sulcus, which may slightly interrupt the dorsal margin of the mesosoma. Propodeum with dorsal margin at the same level to slightly lower than mesonotum, flat to broadly convex. Propodeal declivitous margin straight to broadly concave, not crenulate, and continuous. Propodeal spiracle elliptical. In posterior view, lateral margins of propodeum slightly converging dorsally. Mesosoma mostly shallowly punctate and shiny; mesopleuron mostly smooth and posteriorly with longitudinal rugulae; metapleuron longitudinally striate, with striae becoming sparser dorsally to propodeal spiracle; declivitous surface of propodeum mostly smooth. Pubescence appressed; pilosity usually sparse and suberect.

Metasoma. Petiolar node in lateral view subtriangular to subrectangular; anterior margin straight; posterior margin convex and curving anteriorly; dorsal margin convex. Petiolar sternite with antero- and posteroventral angles rounded and ventral margin slightly concave. Petiole sparsely punctate and shiny. Prora slightly extending anteroventrally and forming a small ventral concavity in lateral view. Girdling constriction of abdominal segment IV not clearly cross-ribbed posteriorly. Gaster sparsely punctate and shiny; pubescence appressed to decumbent; pilosity suberect to erect.

Remarks. *Hypoponera* AMD_Q can be easily distinguished from other species due to its distinct petiolar shape. The most similar species are *H.* AMD_R, *H. argentina*, and *H. opacior*. *Hypoponera* AMD_R differs by presenting the petiolar sternum with a sharp anteroventral angle, while in *H.* AMD_Q it is rounded. *Hypoponera argentina* has a petiole sternum with the ventral margin almost always convex, while in *H.* AMD_Q this is always concave or, at most, flattened. *Hypoponera opacior* never has the metanotum forming a sulcus, and furthermore, the dorsal profile of the mesosoma in *H. opacior* is always continuous and straight, whereas that of *H.* AMD_Q it may be interrupted by the metanotum and is more likely to be largely convex.

Natural history. This species inhabits the soil and can be found foraging in open, exposed areas. Specimens have been collected from a range of habitats, from well-preserved to disturbed environments, including forest edges and even pedestrian trails.

Distribution. Brazil, Minas Gerais: Poço Fundo; Paraná: Cascavel, Foz do Iguaçu, Irati, Mangueirinha, Palotina, Ponta Grossa, Santa Terezinha de Itaipu, Tibagi, and Tuneiras do Oeste; Rio de Janiero: Ilha Grande, and Santa Maria Madalena; Santa Catarina: Campo Belo do Sul, Chapecó, Lages, São Miguel do Oeste, and Xanxerê.

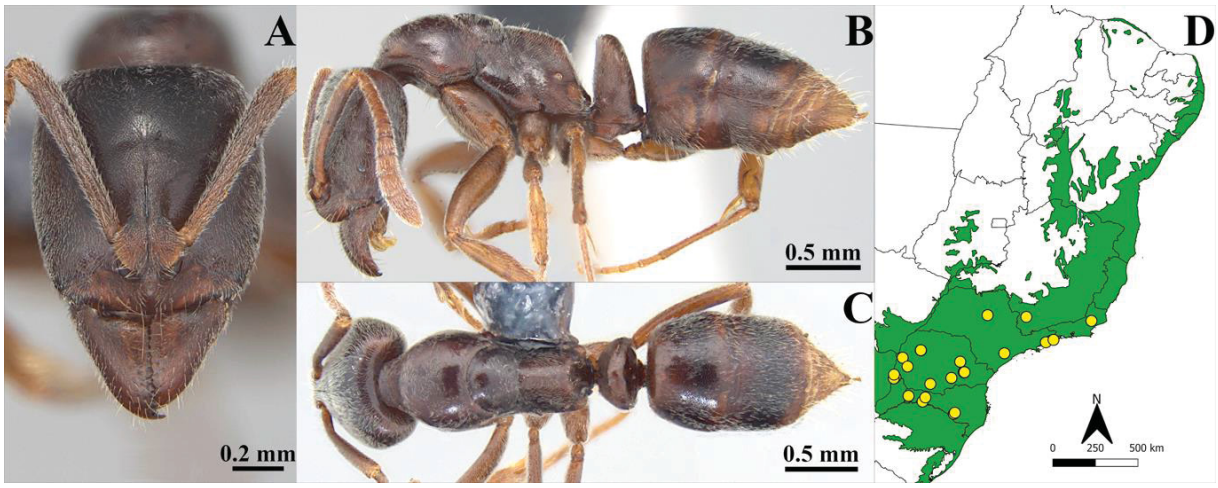

Figure 65. *Hypoponera* AMD_Q (specimen DZUP550600). A. Full-face view. B. Full body in lateral view. C. Full body in dorsal view. D. Distribution map.

Hypoponera AMD_R New Species

Figure 66

Holotype worker: BRAZIL, Minas Gerais, Boa Esperança, 21°04'44.5"S 45°35'19.7"W, Queiroz et al, 41717, pitfall epigeico, 780m \ projeto cerrado \ Eucaliptal - área 4 \ ponto 8, DZUP554735 [DZUP].

Diagnosis. Ants with medium size (WL>1.11 mm), subtriangular petiolar node, and petiolar sternite with anterior margin concave or straight and forming an acute angle with ventral margin.

Holotype measurements. HL 0.86; HW 0.76; SL 0.70; ML 0.5; PrW 0.6; MeL 0.31; WL 1.26; HFL 0.81; HBL 0.61; PeL 0.25; PeH 0.51; PeW 0.43; PS 0.4; CI 113.93; MI 58.27; SI 92.62; PeI 71.87; LPeI 50; DPeI 168.29.

Non-type measurements (n=2). HL 0.77-0.84; HW 0.66-0.73; SL 0.63-0.7; ML 0.43-0.46; PrW 0.52-0.56; MeL 0.25; WL 1.11-1.26; HFL 0.68-0.78; HBL 0.52-0.58; PeL

0.23-0.25; PeH 0.48; PeW 0.4-0.41; PS 0.37-0.38 (mm). CI 114.4-115.88; MI 54.81-56.45; SI 94.91-95.32; PeI 73.33-76.19; LpeI 48.71-51.28; DpeI 165-168.42.

Description. Medium-sized (WL 1.11 mm – 1.26 mm); body mostly brown, with mandible, antenna, and legs light brown.

Head. In full-face view subquadrate, with lateral margin broadly convex and posterior margin concave. Mandible with five or less distinct teeth, usually concentrated on apex, and indistinct denticles on the remainder of the masticatory margin; external margin slightly concave to straight. Anterior margin of clypeus convex. Eye with less than six distinct ommatidia, reaching but not clearly interrupting lateral cephalic margin; distant from the posterior margin of the clypeus in lateral view (eye-mandible distance index greater than 0.15). Antennal scape surpassing posterior margin of the head by less than the pedicel length. Mandible surface sparsely punctate. Frons densely punctate. Gena densely and evenly punctate. Head ventrum smooth. Integument shiny.

Mesosoma. In lateral view, anteroventral corner of pronotum rounded; promesonotal sulcus shallow, slightly interrupting dorsal margin of mesosoma. Notopleural suture between mesonotum and mesopleuron well-marked; junction of upper and lower portion of the anterior margin of the mesopleuron forming an acute angle; dorsal margin of mesonotum flat, at the same level to slightly higher than pronotum. Metanotum as a weak line that does not interrupt the dorsal margin of the mesosoma. Propodeum with dorsal margin at the same level as mesonotum, broadly convex. Propodeal declivitous margin broadly convex, not crenulate, and continuous. Propodeal spiracle elliptical. In posterior view, lateral margins of propodeum slightly converging dorsally. Mesosoma mostly shallowly punctate and shiny; mesopleuron very sparsely punctate to smooth; metapleuron with longitudinal striae ventrally to propodeal spiracle to completely smooth; declivitous surface of propodeum mostly smooth. Pubescence appressed; pilosity short and erect.

Metasoma. Petiolar node in lateral view subtriangular; anterior, posterior, and dorsal margins convex. Petiolar sternite with anteroventral angle sharp and posteroventral angle rounded; ventral margin broadly convex and slightly diminishing in height posteriorly. Petiole densely punctate and shiny. Prora extending anteroventrally and forming a ventral concavity in lateral view. Girdling constriction of abdominal segment IV not clearly cross-ribbed posteriorly, or sometimes with a thin band cross-ribbed posteriorly on tergite and sternite. Gaster densely punctate and shiny; pubescence appressed to decumbent; long pilosity absent.

Remarks. The species that most closely resembles *H.* AMD_R is probably *H. argentina*, sharing body size, scape length, petiolar shape, eye position and size, and mesosomal profile. However, these two species can be separated by the shape of the petiolar sternite, which in *H.* AMD_R always forms a sharp anteroventral angle, while in *H. argentina* it is rounded.

Natural history. This species is a ground-dwelling ant, and some species were collected under stones.

Distribution. Brazil: Espírito Santo: Sooretama; Minas Gerais: Betim, and Boa Esperança; Paraná: Guaíra; Pernambuco: Recife; Sergipe: Areia Branca, and Santa Luzia do Itanhi.

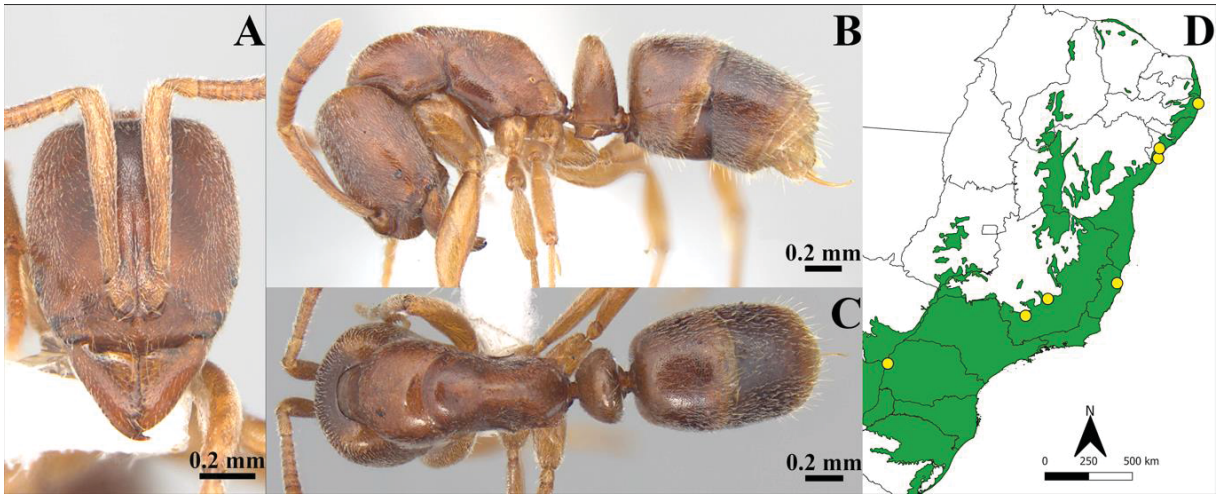

Figure 66. *Hypoponera* AMD_R (specimen DZUP550611). A. Full-face view. B. Full body in lateral view. C. Full body in dorsal view. D. Distribution map.

Hypoponera AMD_S New Species

Figure 67

Holotype worker: BRAZIL, Paraná, Tuneiras do Oeste, REBIO das Perobas, 23°50'S, 52°45'W (E. Caron) 18.ix.2015, DZUP551708 [DZUP].

Paratype workers: same as the holotype, but DZUP551718 (1☿) [DZUP]; same data, but DZUP551710 (1☿) [DZUP].

Diagnosis. *H*. AMD_S is distinguished by the small size (WL 0.75-0.95 mm), anterior margin of clypeus convex, eye with less than six distinct ommatidia and distant from clypeus, scape slightly surpassing posterior margin of the head in full-face view, metanotum not clearly interrupting dorsal margin of mesosoma in lateral view, lateral margins of propodeum strongly converging dorsally in posterior view, mesosoma profile broadly convex, petiolar node subrectangular, and girdling constriction of abdominal segment IV usually not clearly cross-ribbed posteriorly

Holotype measurements. HL 0.59; HW 0.48; SL 0.43; ML 0.27; PrW 0.36; MeL NA; WL 0.78; HFL 0.43; HBL 0.31; PeL 0.15; PeH 0.31; PeW 0.25; PS 0.23; CI 121.79; MI 46.31; SI 89.74; PeI 68.96; LPeI 48; DPeI 166.66.

Non-type measurements (n=21). HL 0.56-0.69; HW 0.48-0.56; SL 0.4-0.51; ML 0.26-0.35; PrW 0.36-0.43; MeL 0.16-0.21; WL 0.75-0.95; HFL 0.42-0.55; HBL 0.31-0.4; PeL 0.13-0.2; PeH 0.28-0.38; PeW 0.25-0.32; PS 0.23-0.28 (mm). CI 118.18-124.39; MI 38.73-53.19; SI 84-98.7; PeI 67.79-85.24; LPeI 42.3-69.56; DPeI 128.12-216.66.

Description. Small-sized (WL 0.75-0.95 mm); body entirely light brown or mostly brown, with mandible, antenna, and legs light brown.

Head. In full-face view subquadrate, with lateral margin broadly convex and posterior margin concave. Mandible with about four conspicuous teeth and indistinct denticles on the remainder of the masticatory margin; external margin very slightly concave to straight. Anterior margin of clypeus convex. Eye with less than six distinct ommatidia, reaching but not clearly interrupting lateral cephalic margin; distant from the posterior margin of the clypeus in lateral view (eye-mandible distance index greater than 0.15). Antennal scape reaching and slightly surpassing posterior margin of the head by less than half length of pedicel. Mandible surface sparsely punctate. Frons densely punctate and silky. Gena densely and evenly punctate and shiny. Head ventrum smooth and shiny.

Mesosoma. In lateral view, anteroventral corner of pronotum rounded; promesonotal sulcus weak or absent, not clearly interrupting dorsal margin of mesosoma. Notopleural suture between mesonotum and mesopleuron well-marked; junction of upper and lower portion of the anterior margin of the mesopleuron forming an acute angle; dorsal margin of mesonotum flat, at the same level as the pronotum. Metanotum as a well-marked line that does not interrupt the dorsal margin of the mesosoma. Propodeum with dorsal margin at the same level

as mesonotum, broadly convex. Propodeal declivitous margin broadly convex, not crenulate, and continuous. Propodeal spiracle elliptical to slit-shaped. In posterior view, lateral margins of propodeum strongly converging dorsally. Mesosoma mostly shallowly punctate and shiny; mesopleuron mostly smooth and posteriorly with longitudinal rugulae; metapleuron longitudinally strigulate; declivitous surface of propodeum mostly smooth. Pubescence appressed; long pilosity absent.

Metasoma. Petiolar node in lateral view subrectangular; anterior and posterior margins broadly convex; dorsal margin convex. Petiolar sternite rounded, but sometimes with posterior margin becoming straighter. Petiole densely punctate and shiny. Prora not extending anteroventrally. Girdling constriction of abdominal segment IV not clearly cross-ribbed posteriorly, or sometimes with a thin band cross-ribbed posteriorly on tergite and sternite. Gaster densely punctate and shiny; pubescence appressed to decumbent; long pilosity absent.

Remarks. This common species lacks any remarkable characteristics for easy identification. It closely resembles *H.* AMD_T, with the main difference being the lateral margins of the propodeum in posterior view, which are more convergent in *H.* AMD_S. Additionally, *H.* AMD_T has smoother mesopleuron and metapleuron compared to *H.* AMD_S.

Hypoponera AMD_S can also be confused with *H. opacior*, from which it differs mainly by the shape of the petiole in lateral view. In *H. opacior*, the petiole is usually subtriangular, whereas in *H.* AMD_S, it is subrectangular. Moreover, *H.* AMD_S is typically light brown, while *H. opacior* is dark brown with lighter appendages. Finally, the mesosoma profile of *H. opacior* is straight, while in *H.* AMD_S, it is broadly convex (further discussion can be found in the *H. opacior* remarks).

Hypoponera AMD_S closely resembles *H. viri,* and their distribution areas overlap. However, the metanotum in *H. viri* is well marked and slightly interrupts the dorsal border of the mesosoma, whereas in *H.* AMD_S it is weakly marked. Additionally, the declivitous margin of the propodeum in *H. viri* appears comparatively longer than the dorsal margin in lateral view, while in *H.* AMD_S, they are of subequal length.

Other species similar to *H.* AMD_S are *Hypoponera stoica* (Santschi, 1912) originally described from Uruguay, and *Hypoponera fiebrigi transiens* (Santschi, 1925) from Argentina. However, both have a well-marked metanotum, and the lateral margins of the propodeum in posterior view are not as convergent as in *H.* AMD_S.

Natural history. This is one of the most abundant species of *Hypoponera*, and it can be collected in leaf litter, below ground or even foraging in exposed areas above ground.

Distribution. Brazil: Espírito Santo: Santa Teresa; Minas Gerais: Belo Horizonte, and Boa Esperança; Paraná: Adrianópolis, Antonina, Céu Azul, Curitiba Morretes, Palmas Palotina, Piraquara, Ponta Grossa, Quatro Barras São José dos Pinhais, São Miguel do Iguaçu, Tibagi, Tunas do Paraná, and Tuneiras do Oeste; Rio de Janeiro: Itatiaia, Nova Iguaçu, and Santa Maria Madalena; Rio Grande do Sul: Porto Alegre; Santa Catarina: Blumenau, Campo Belo do Sul, Chapecó, Indaial, Joinville, Lages, Lauro Muller, Orleans, Otacílio Costa, Palhoça, São Bento do Sul, São Bonifácio, São Miguel do Oeste, Siderópolis, Timbó, Três Barras, and Xanxerê; São Paulo: Cananeia, Iguape, Mirassol, Picinguaba, Praia Grande, Ribeirão Grande, Salesópolis, and Tapiraí.

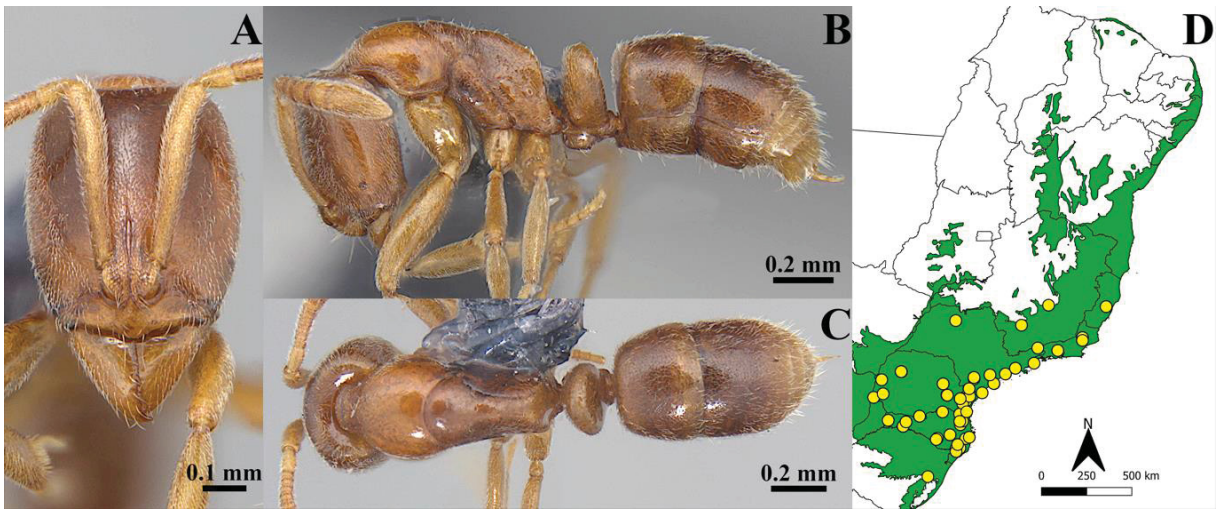

Figure 67. *Hypoponera* AMD_S (specimen DZUP550606). A. Full-face view. B. Full body in lateral view. C. Full body in dorsal view. D. Distribution map.

Hypoponera AMD_T New Species

Figure 68

Holotype worker: BRAZIL, Bahia, Mata São João, Reserva Sapiranga, 12° 33'29.3"S 33°02'35.2"W, 21-28.VII.2001 (Silva, R.R, Brandão, CRF) Winkler 5, *Hypoponera* sp. 22, Biota FAPESP, MZSP0098146 UP [MZSP].

Paratype workers: on the same pin as holotype, but MID and BOTTOM specimens (2 ☿) [MZSP].

Diagnosis. *Hypoponera* AMD_T is a small sized (WL≦0.85 mm) ant, recognized by the following characteristics combined: propodeum with lateral margins strongly convergent in dorsal view, eye with less than six distinct ommatidia and distant from clypeus, scape reaching and slightly surpassing posterior margin of the head by less than half length of pedicel, girdling constriction of abdominal segment IV usually not clearly cross-ribbed, metanotum impressed, but not forming a sulcus, and anterior margin of clypeus convex.

Holotype measurements. HL 0.57; HW 0.5; SL 0.45; ML 0.3; PrW 0.39; MeL 0.19; WL 0.8; HFL 0.45; HBL 0.31; PeL 0.15; PeH 0.35; PeW 0.3; PS 0.26 (mm). CI 115; MI 52.17; SI 90; PeI 77.77; LPeI 42.85; DPeI 204.16.

Non-type measurements (n=6). HL 0.55-0.6; HW 0.47-0.51; SL 0.41-0.47; ML 0.28-0.31; PrW 0.36-0.41; MeL 0.16-0.22; WL 0.77-0.85; HFL 0.43-0.48; HBL 0.3-0.36; PeL 0.13-0.14; PeH 0.31-0.34; PeW 0.27-0.31; PS 0.24-0.26 (mm). CI 114.63-118.42; MI 50.27-53.12; SI 84.61-92.68; PeI 75.86-80; LPeI 38.18-44; DPeI 200-228.57.

Description. Small-sized (WL 0.77-0.85 mm); body mostly brown, with mandible, antenna, and legs light brown.

Head. In full-face view subquadrate, with lateral margin broadly convex and posterior margin flat to slightly concave. Mandible with about four conspicuous teeth and indistinct denticles on the remainder of the masticatory margin; external margin very slightly concave to straight. Anterior margin of clypeus convex. Eye with less than six distinct ommatidia, reaching but not clearly interrupting lateral cephalic margin; distant from the posterior margin of the clypeus in lateral view (eye-mandible distance index greater than 0.15). Antennal scape reaching and slightly surpassing posterior margin of the head by less than half length of pedicel. Mandible surface sparsely punctate. Frons densely punctate and silky. Gena densely and evenly punctate and shiny. Head ventrum smooth medially and punctate laterally; shiny.

Mesosoma. In lateral view, anteroventral corner of pronotum rounded; promesonotal sulcus weak or absent, not clearly interrupting dorsal margin of mesosoma. Notopleural suture

between mesonotum and mesopleuron well-marked; junction of upper and lower portion of the anterior margin of the mesopleuron forming an acute angle; dorsal margin of mesonotum flat, at the same level as pronotum. Metanotum as a weak line that does not interrupt the dorsal margin of the mesosoma. Propodeum with dorsal margin at the same level as mesonotum, broadly convex. Propodeal declivitous margin broadly convex, not crenulate, and continuous. Propodeal spiracle elliptical, rarely slit-shaped. In posterior view, lateral margins of propodeum slightly converging dorsally. Mesosoma mostly shallowly punctate and shiny; mesopleuron punctae sparser; metapleuron with longitudinal strigulae only ventrally to propodeal spiracle; declivitous surface of propodeum sparsely punctate. Pubescence appressed; long pilosity absent.

Metasoma. Petiolar node in lateral view subrectangular; anterior margin straight or convex; posterior margin straight or convex; dorsal margin convex. Petiolar sternite rounded. Petiole densely punctate and shiny. Prora not extending anteroventrally. Girdling constriction of abdominal segment IV not clearly cross-ribbed posteriorly. Gaster densely punctate and shiny; pubescence appressed to decumbent; long pilosity absent.

Remarks. *Hypoponera* AMD_T is very similar to *H*. AMD_S, from which differs by having a smoother mesopleuron and metapleuron, while in *H*. AMD_S the metapleuron is completely strigulate. *Hypoponera* AMD_T also differs by having the lateral margins of propodeum slightly converging in posterior view, while in *H*. AMD_T they are strongly convergent. *Hypoponera opacior* also can be confused with *H*. AMD_S, but the first is larger (WL>0.9).

Hypoponera AMD_T shares similarities with *H. viri*, *H. stoica*, and *H. fiebrigi transiens*, but can be distinguished from all of them by the absence of a well-marked metanotum in profile.

Natural history. Ground dwelling ants, collected in leaf litter.

Distribution. Brazil: Bahia: Mata São João, and Porto Seguro; Espírito Santo: Sooretama; Paraíba: João Pessoa; Pernambuco: Recife; Sergipe: Areia Branca, and Santa Luzia do Itanhi.

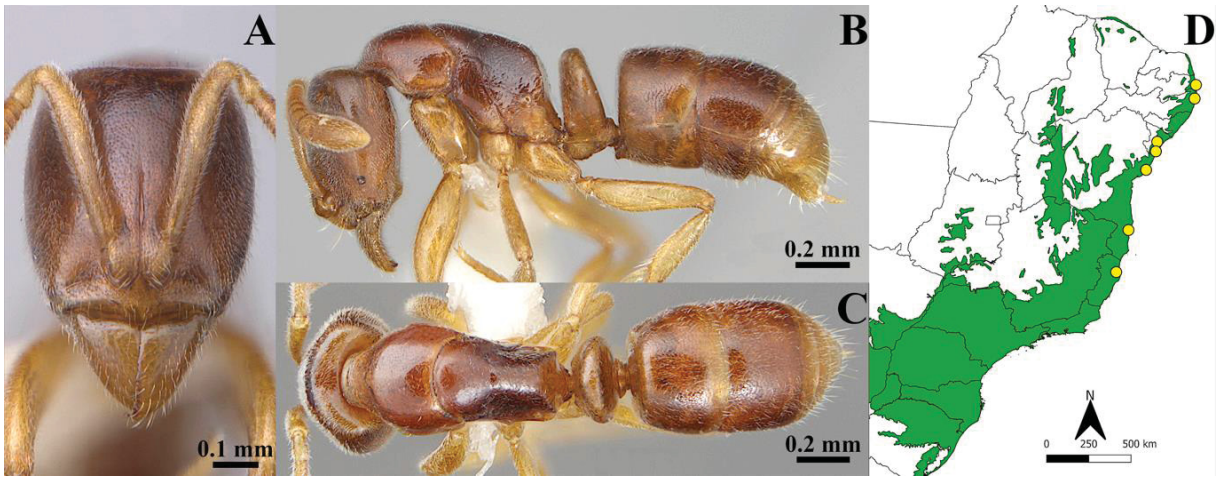

Figure 68. *Hypoponera* AMD_T (specimen MZSP0098146). A. Full-face view. B. Full body in lateral view. C. Full body in dorsal view. D. Distribution map.

5 Final considerations

In this study we found 32 species of *Hypoponera* in the Brazilian Atlantic Forest, 20 of which – about 60% – are described here for the first time. In proportional terms, our findings are similar to those of the review conducted in the Afrotropical and West Palearctic regions, where the number of new species about the total number was also around 60%. Therefore, it is possible to infer that the number of *Hypoponera* species tends to grow substantially as soon as new revisions are made in other regions of the world, or even when a higher number of specimens become available.

As seem, *Hypoponera* species may be very similar and difficult to separate, such as *H. opacior*, *H.* AMD_S, and *H.* AMD_T, but, in the other hand, several species possess unexplored morphological traits that make them easily distinguishable. That becomes evident when we observe the species *H.* AMD_A, *H.* AMD_C, *H.* AMD_G, *H.* AMD_*H,* and *H.* AMD_P, which have very striking and conspicuous diagnostic characteristics.

Although morphological uniformity is the first difficulty in delimiting *Hypoponera* species, it is probably not the greatest. Once the original descriptions are usually very incomplete, the examination of type specimens is a fundamental step in naming species. However, in addition to these specimens generally being deposited in collections on other continents, some of them are not even in the original depository institutions, making it more difficult to track or access them. In fact, some species and subspecies of *Hypoponera* registered to the Brazilian Atlantic Forest were not accessed here nor included in the identification key.

The types of *Hypoponera schmalzi paulina* and *Hypoponera schwebeli* (Forel, 1913), although examined, were not included here because they are known only by winged forms, which prevented from compare them with the workers examined in this study. The type of *H. aliena*, which is supposed to be in the Natural History Museum in London, has not been found by the curator, and it has not yet been possible to track it down.

Despite these challenges, we provide the most comprehensive taxonomic study of *Hypoponera* ever conducted for the Neotropical region, through the proposal of synonyms, description of new species and elaboration of an identification key. In addition, we have significantly improved the knowledge regarding species delimitation and distribution.

6 References

Agbogba, C. (1984) Tandem running behavior in 2 species of ponerine ants - *Mesoponera caffraria* (Smith) and *Hypoponera* sp. (Hymenoptera, Formicidae). *Insectes Sociaux*, 31 (3), 264–276. https://doi.org/10.1007/bf02223611

Agosti, D., Collingwood, C. A. (1987) A provisional list of the Balkan ants (Hym. Formicidae) with a key to the worker caste. II. Key to the worker caste, including the European species without the Iberian. *Mitteilungen der Schweizerischen Entomologischen Gesellschaft*, 60, 261–293.

Alayo, P. (1974) *Introducción al estudio de los Himenópteros de Cuba. Superfamilia Formicoidea. Serie Biológica. Academia de Ciencias de Cuba*, 53, 58 pp.

Andersen, A.N., Brault, A. (2010) Exploring a new biodiversity frontier: subterranean ants in northern Australia. *Biodiversity and Conservation*, 19, 2741–2750. https://doi.org/10.1007/s10531-010-9874-1

André, Ern. (1890). Matériaux pour servir à la faune myrmécologique de Sierra-Leone (Afrique occidentale). *Revue d'Entomologie (Caen)*, 9, 311–327.

AntWeb. Version 8.91.2. California Academy of Science. Available from: https://www.antweb.org (accessed 4 July 2023)

Arnol'di, K. V., Dlussky, G. M. (1978) Superfam. Formicoidea. 1. Fam. Formicidae - ants. [In Russian.] *In*: Medvedev, G. S. (ed.) *Keys to the insects of the European part of the USSR. Vol. 3. Hymenoptera. Part 1.* [In Russian.]. Opredeliteli Faune, 519–556.

Atanassov, N.; Dlussky, G. M. (1992) Fauna of Bulgaria. Hymenoptera, Formicidae. [In Bulgarian.]. *Fauna na Bûlgariya*, 22, 1–310.

Belshaw, R. & Bolton, B. (1994) A survey of the leaf litter ant fauna in Ghana, West Africa. *Journal of Hymenoptera Research*, 3, 5–16.

Bharti, H., Akbar, S.A., Wachkoo, A.A.; Singh, J. (2015) Taxonomic studies on ant genus *Hypoponera* (Hymenoptera: Formicidae: Ponerinae) from India. *Asian Myrmecology*, 7, 37–51.

Bolton, B. (2023) An online catalog of the ants of the world. Available from: http://antcat.org (accessed 19 April 2023)

Bolton, B., Fisher, B.L. (2011) Taxonomy of Afrotropical and West Palaearctic ants of the ponerine genus *Hypoponera* Santschi (Hymenoptera: Formicidae). *Zootaxa*, 2843, 1–118.

Bolton, B.; Brown, W. L., Jr. (2002) *Loboponera* gen. n. and a review of the Afrotropical Plectroctena genus group (Hymenoptera: Formicidae). *Bulletin of the Natural History Museum. Entomology Series*, 71, 1–18.

Borgmeier, T. (1923) Catalogo systematico e synonymico das formigas do Brasil. 1 parte. Subfam. Dorylinae, Cerapachyinae, Ponerinae, Dolichoderinae. *Archivos do Museu Nacional*, 24, 33–103.

Borowiec, L., Salata, S. (2022). *A monographic review of ants of Greece (Hymenoptera: Formicidae). Vol. 1. Introduction and review of all subfamilies except the subfamily Myrmicinae. Part 1: text. Bytom: Natural History Monographs of the Upper Silesian Museum*, 1-297.

Brady, S.G., Schultz, T.R., Fisher, B.L., Ward, P.S. (2006) Evaluating alternative hypotheses for the early evolution and diversification of ants. *Proceedings of the National Academy of Sciences (USA)*, 103 (48), 18172–18177. https://doi.org/10.1073/pnas.0605858103

Braga, D.L., Louzada J.N.C., Zanetti R. & Delabie J. (2010) Avaliação rápida da diversidade de formigas em sistemas de uso do solo no sul da Bahia. *Neotrop. entomol*., 39 (4), 464-469. https://doi.org/10.1590/S1519-566X2010000400002

Brown, W.L.Jr. (1995) Taxonomic changes in *Pachycondyla* and *Neoponera* attributed to Brown. *In*: Bolton, B. (Ed.), *A new general catalogue of the ants of the world*. Harvard University, Cambridge, Massachusetts, pp. 302-311.

Collingwood, C. A., Agosti, D. (1996) Formicidae (Insecta: Hymenoptera) of Saudi Arabia (part 2). *Fauna of Saudi Arabia*, 15, 300–385.

Corff, J.L. & Horvitz, C.C. (1995) Dispersal of seeds from chasmogamous and cleistogamous flowers in an ant-dispersed neotropical herb. *Oikos*, 73 (1), 59–64. https://doi.org/10.2307/3545725

da Silva, O.G.M., Fernandes, T.T., Silva R.R., Souza-Campana, D.R. & Morini, M.S.C. (2016) Twigs of Albizia niopoides (Spruce ex Benth.) Burkart as a nesting resource for ants (Hymenoptera: Formicidae). *Rev. Bras. entomol*., 60 (2), 182–185. https://doi.org/10.1016/j.rbe.2016.01.001

Dash, S.T. & Mackay, W.P. (2019) Género *Hypoponera*. *In*: Fernández, F., Guerrero, R.J. & Delsinne, T. (Eds.), *Hormigas de Colombia. Universidad Nacional de Colombia, Bogotá*, pp. 555-569.

Dash, S.T. (2011) A taxonomic revision of the New World *Hypoponera* Santschi, 1938 (Hymenoptera: Formicidae). Dissertation - Faculty of the Graduate School of The University of Texas at El Paso.

Delabie, J.H.C. & Blard, F. (2002) The tramp ant Hypoponera punctatissima (Roger) (Hymenoptera: Formicidae: Ponerinae): new records from the southern hemisphere. *Neotrop. entomol*., 31 (1), 149–151. https://doi.org/10.1590/S1519-566X2002000100020

Divieso, R., Rorato, A., Feitosa, R.M., Rorato, A., Meyer, A.L.S. & Pie, M.R. (2020) How to prioritize areas for new ant surveys? Integrating historical data on species occurrence records and habitat loss. *J Insect Conserv*, 24, 901–911. https://doi.org/10.1007/s10841-020-00262-y

Dlussky, G. M., Soyunov, O. S., Zabelin, S. I. (1990) Ants of Turkmenistan. [In Russian.]. *Ashkabad: Ylym Press*, pp. 273.

Emery, C. (1890) Voyage de M. E. Simon au Venezuela (Décembre 1887 - Avril 1888). Formicides. *Annales de la Société Entomologique de France*, 10 (6), 55–76. https://doi.org/10.5281/zenodo.25428

Emery, C. (1894) Descrizione di una nuova Formica di Sicilia. *Il Naturalista Siciliano*, 14, 28.

Emery, C. (1895) Beiträge zur Kenntniss der nordamerikanischen Ameisenfauna. (Schluss). *Zoologische Jahrbücher. Abteilung für Systematik, Geographie und Biologie der Tiere* 8, 257–360. https://doi.org/10.5281/zenodo.25455

Emery, C. (1896) Studi sulle formiche della fauna neotropica. XVII-XXV. *Bullettino della Società Entomologica Italiana*, 28, 33–107. https://doi.org/10.15468/dxvqbz

Emery, C. (1906) Studi sulle formiche della fauna Neotropica. XXXVII. *Bullettino della Società Entomologica Italiana*, 37, 107–194.

Emery, C. (1911) Hymenoptera. Fam. Formicidae. Subfam. Ponerinae. *Genera Insectorum*, 118, 1–125. https://doi.org/10.5281/zenodo.54863

Emery, C. 1900. Formicidarum species novae vel minus cognitae in collectione Musaei Nationalis Hungarici quas in Nova-Guinea, colonia germanica, collegit L. Biró. Publicatio secunda. *Természetrajzi Füzetek*, 23, 310–338. https://doi.org/10.5281/zenodo.25487

Emery, C. 1901. Notes sur les sous-familles des Dorylines et Ponérines (Famille des Formicides). *Annales de la Société Entomologique de Belgique* 45, 32–54.

Feitosa, R.M., Camacho, G.P., Silva, T.S.R., Ulysséa, M.A, Ladino, N., Oliveira, A.M., Albuquerque, E.Z., Schmidt, F.A., Ribas, C.R., Nogueira, A., Baccaro, F.B., Queiroz, A.C.M., Dáttilo, W., Silva, R.R., Santos, J.C., Rabello, A.M., Morini, M.S.C., Quinet, Y.P., Del-Claro, K., Harada, A.Y., Carvalho, K.S., Sobrinho, T.G., Moraes, A.B., Vargas, A.B., Torezan-Silingardi, H.M., Souza, J.L.P., Marques, T., Izzo, T., Lange, D., Santos, I.A., Nahas, L., Paolucci, L., Soares, S.A., Costa-Milanez, C.B., Diehl-Fleig, E., Campos, R.B.F., Solar, R., Frizzo, T. & Darocha, W. (2022) Ants of Brazil: an overview based on 50 years of diversity studies. *Systematics and Biodiversity*, 20 (1), 1–27. https://doi.org/10.1080/14772000.2022.2089268

Fellers, J.H. & Fellers G.M. (1982) Status and distribution of ants in the Crater District of Haleakala National Park. *Pacific Science*, 36 (4), 427-437.

Fernandes, T.T., Silva, R.R., Souza, D.R., Araújo, N., Morini, M.S.C. (2012) Undecomposed Twigs in the Leaf Litter as Nest-Building Resources for Ants (Hymenoptera: Formicidae) in Areas of the Atlantic Forest in the Southeastern Region of Brazil. *Psyche*, p. 1–8. https://doi.org/10.1155/2012/896473

Foitzik, S., Fröba, J., Rüger, M.H. & Witte, V. (2011) Competition over workers: fertility signalling in wingless queens of *Hypoponera opacior*. *Insect. Soc*, 58, 271–278. https://doi.org/10.1007/s00040-011-0147-0

Foitzik, S., Heinze, J., Oberstadt, B. & Herbers, J.M. (2002) Mate guarding and alternative reproductive tactics in the ant *Hypoponera opacior*. *Animal Behaviour*, 63, 597–604. http://dx.doi.org/10.1006/anbe.2001.1945

Foitzik, S., I. M. Kureck, M. H. Rüger, and D. Metzler. (2010). Alternative reproductive tactics and the impact of local competition on sex ratios in the ant *Hypoponera opacior*. *Behavioral Ecology and Sociobiology*, 64, 1641-1654.

Foitzik, S., Kureck, I.M., Rüger, M.H. & Metzler, D. (2010) Alternative reproductive tactics and the impact of local competition on sex ratios in the ant *Hypoponera opacior*. *Behav Ecol Sociobiol*, 64, 1641–1654. https://doi.org/10.1007/s00265-010-0977-1

Foitzik, S., Rüger M.H., Kureck I.M. & Metzler, D. (2011) Macro- and microgeographic genetic structure in an ant specieswith alternative reproductive tactics in sexuals. *Journal Of Evolutionary Biology*, 24 (12), 2721–2730. https://doi.org/10.1111/j.1420-9101.2011.02397.x

Forel, A. (1893) Formicides de l'Antille St. Vincent, récoltées par Mons. H. H. Smith. *Transactions of the Entomological Society of London*, 333–418. https://doi.org/10.1111/j.1365-2311.1893.tb02073.x

Forel, A. (1894) Les Formicides de la Province d'Oran (Algérie). *Bulletin de la Société Vaudoise des Sciences Naturelles*, 30, 1–45. https://doi.org/10.5281/zenodo.14520

Forel, A. (1899) Heterogyna (Formicidae). *Fauna Hawaiiensis*, 1, 116–122. https://doi.org/10.5281/zenodo.14514

Forel, A. (1908) Ameisen aus Sao Paulo (Brasilien), Paraguay etc. gesammelt von Prof. Herm. v. Ihering, Dr. Lutz, Dr. Fiebrig, etc. *Verhandlungen der Kaiserlich-Königlichen Zoologisch-Botanischen Gesellschaft in Wien*, 58, 340–418.

Forel, A. (1913) Fourmis d'Argentine, du Brésil, du Guatémala & de Cuba reçues de M. M. Bruch, Prof. v. Ihering, Mlle Baez, M. Peper et M. Rovereto. *Bulletin de la Société Vaudoise des Sciences Naturelles*, 49, 203–250. https://doi.org/10.5281/zenodo.14172

Guénard, B., Weiser, M., Gomez, K., Narula, N., Economo, E.P. (2017) The Global Ant Biodiversity Informatics (GABI) database: a synthesis of ant species geographic distributions. *Myrmecological News*, v. 24, 83–89.

Harris, R.A. (1994) *A glossary of surface sculpturing*. California Department of Food and Harvard University Press. 222 p.

Harris, A.C. (2003) A first record of *Hypoponera punctatissima* (Roger) (Formicidae: Ponerinae) established in Dunedin, New Zealand. *The Weta*, 26, 7–11.

Hashimoto, Y., Yamauchi, K. & Hasegawa, E. (1995) Unique habits of stomodeal trophallaxis in the ponerine ant *Hypoponera* sp. *Ins. Soc*, 42, 137–144. https://doi.org/10.1007/BF01242450

Herrera, H.W., Longino, J.T. & Dekoninck, W. (2014) New records of nine ant species (Hymenoptera: Formicidae) for the Galapagos Islands. *The Pan-Pacific Entomologist*, 90 (2), 72–81. https://doi.org/10.3956/2014-90.2.72

Herrera-Rangel, J., Jiménez-Carmona, E. & Armbrecht, I. (2015) Monitoring the Diversity of Hunting Ants (Hymenoptera: Formicidae) on a Fragmented and Restored Andean Landscape, *Environmental Entomology*, 44 (5), 1287–1298. https://doi.org/10.1093/ee/nvv103

Heterick, B.E. (2009) A guide to the ants of south-western Australia. *Records of the Western Australian Museum Supplement*, 76, 1–206.

ICZN. 1999. International Code of Zoological Nomenclature. Fourth edition. Available from: https://www.iczn.org/the-code/the-code-online/ (accessed 14 July 2023)

Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio), (2013) Plano de Manejo do Parque Nacional do Itatiaia. Available from: https://www.gov.br/icmbio/pt-br/assuntos/biodiversidade/unidade-de-conservacao/unidades-de-biomas/mata-atlantica/lista-de-ucs/parna-do-itatiaia/arquivos/pm_parna_itatiaia_enc1.pdf (accessed 5 August 2023)

Janicki, J., Narula, N., Ziegler, M., Guénard, B., Economo, E.P. (2016) Visualizing and interacting with large-volume biodiversity data using client-server web-mapping applications: *The design and implementation of antmaps.org. Ecological Informatics*, 32, 185–193. https://doi.org/10.1016/j.ecoinf.2016.02.006

Kempf, W.W. (1962) Miscellaneous studies on neotropical ants. II. (Hymenoptera, Formicidae). *Studia Entomologica*, 5, 1–38.

Kempf, W.W. (1972) Catálogo abreviado das formigas da região Neotropical. *Studia Entomologica*, 15, 3–344.

Kim, B.-J., Kim, J.-H., Kim, K.-G. (1998) Systematic study of Ponerinae (Hymenoptera: Formicidae) from Korea. *Korean Journal of Entomology*, 28, 145–154.

Kureck I.M., Neumann A. & Foitzik S. (2011) Wingless ant males adjust mate-guarding behavior to the competitive situation in the nest. *Animal Behaviour*, 82 (2), 339–346. https://doi.org/10.1016/j.anbehav.2011.05.008.

Kureck I.M., Nicolai B. & Foitzik S. (2013a) Selection for early emergence, longevity and large body size in wingless, sib-mating ant males. *Behav Ecol Sociobiol*, 67, 1369–1377. https://doi.org/10.1007/s00265-013-1566-x

Kureck, I. M., Jongepier, E., Nicolai, B. & Foitzik, S. (2012) No inbreeding depression but increased sexual investment in highly inbred ant colonies. *Molecular Ecology*, 21 (22), 5613–5623. https://doi.org/10.1111/mec.12060

Kureck, I. M., Nicolai, B. & Foitzik, S. (2013b). Similar Performance of Diploid and Haploid Males in an Ant Species without Inbreeding Avoidance. *Ethology*, 119 (5), 360–367. https://doi.org/10.1111/eth.12073

Kutter, H. (1977) Hymenoptera, Formicidae. *Insecta Helvetica. Fauna*, 6, 1–298.

Latreille, P. A. (1804) Tableau méthodique des insectes. *In*: Société de Naturalistes et d'Agriculteurs. Nouveau dictionnaire d'histoire naturelle. Tome 24. Paris: Déterville, pp. 34.

Lattke, J.E. (2003) Subfamilia Ponerinae. *In*: Fernandez, F (Ed). *Introducion a las hormigas de la region neotropical*. Bogotá, Colombia: Acta Nocturna. P. 261–276.

Lemaire, M., Meillour, P.N., Clement, J.L., Lange, C., Péru L. & Basselier J.J. (1990) Geranyllinalool (Diterpene Alcohol): An insecticidal component of pine wood and termites (Isoptera: Rhinotermitidae) in four European ecosystems. *Journal of Chemical Ecology*, 16 (6), 2067–2079. https://doi.org/10.1007/BF01020517

Mayr, G. (1861) Die europäischen Formiciden. Nach der analytischen Methode bearbeitet. Wien: C. Gerolds Sohn, 80 pp.

Mayr, G. (1866). Diagnosen neuer und wenig gekannter Formiciden. *Verhandlungen der Kaiserlich-Königlichen Zoologisch-Botanischen Gesellschaft in Wien*, 16, 885–908.

Mayr, G. (1887) Südamerikanische Formiciden. *Verhandlungen der Kaiserlich-Königlichen Zoologisch-Botanischen Gesellschaft in Wien*, 37, 511–632.

Mayr, E. (1942) Systematics and the Origin of Species (Columbia Univ. Press, New York).

Morisita, M., Kubota, M., Onoyama, K., Ogata, K., Terayama, M., Kondoh, M., Imai, H. T. (1989) A guide for the identification of Japanese ants. I. Ponerinae, Cerapachyinae, Pseudomyrmecinae, Dorylinae, and Leptanillinae (Hymenoptera: Formicidae). [In Japanese.]. *Tokyo: Myrmecological Society of Japan*, pp. 42.

Muylaert, R.L., Vancine, M.H., Bernardo, R., Oshima, J.E.F., Sobral-Souza, T., Tonetti, V.R., Niebuhr, B.B., Ribeiro, M.C. (2018) Uma nota sobre os limites territoriais da Mata Atlântica. Oecologia Australis, 22(3). doi:https://doi.org/10.4257/oeco.2018.2203.09

Nuhn, T.P. & Charles, G. (1979) An Ecological Survey of Ants (Hymenoptera: Formicidae) in a Landscaped Suburban Habitat. *The American Midland Naturalist*, 102 (2), 353–362. https://www.jstor.org/stable/2424662

Ouellette, G.D., Fisher, B.L., Girman, D.J. (2006) Molecular systematics of basal subfamilies of ants using 28S rRNA (Hymenoptera: Formicidae). *Molecular Phylogenetics and Evolution*, 40, 359–369. https://doi.org/10.1016/j.ympev.2006.03.017

Roger, J. (1859) Beiträge zur Kenntniss der Ameisenfauna der Mittelmeerländer. *Berliner Entomologische Zeitschrift*, 3, 225–259. https://doi.org/10.1002/mmnd.18590030209

Roger, J. (1861) Die Ponera-artigen Ameisen (Schluss). *Berliner Entomologische Zeitschrift*, 5, 1-54.

Rüger, M.H., Fröba, J. & Foitzik, S. (2008) Larval cannibalism and worker-induced separation of larvae in *Hypoponera* ants: a case of conflict over caste determination? *Insect. Soc.* 55, 12–21. https://doi.org/10.1007/s00040-007-0965-2

Rüger, M.H., Heinze, J. & Foitzik, S. (2005) Polymorphic microsatellite loci in the ponerine ant, *Hypoponera opacior* (Hymenoptera, Formicidae). *Molecular Ecology Notes*, 5, 236 –238. https://doi.org/10.1111/j.1471-8286.2005.00888.x

Santschi, F. (1922) Description de nouvelles fourmis de l'Argentine et pays limitrophes. *Anales de la Sociedad Cientifica Argentina*, 94, 241–262.

Santschi, F. (1923) Descriptions de quelques nouvelles fourmis du Brésil. *Revista do Museu Paulista*, 13, 1255–1264. https://doi.org/10.5281/zenodo.14209

Santschi, F. (1925a) Nouvelles fourmis brésiliennes. *Annales de la Société Entomologique de Belgique*, 64, 5–20.

Santschi, F. (1925b) Fourmis des provinces argentines de Santa Fe, Catamarca, Santa Cruz, Córdoba et Los Andes. *Comunicaciones del Museo Nacional de Historia Natural "Bernardino Rivadavia"*, 2, 149–168.

Santschi, F. (1938) Notes sur quelques Ponera Latr. *Bulletin de la Société Entomologique de France*, 43, 78–80.

Sarnat, E.M., Economo, E.P. (2012) The ants of Fiji. *University of California Publications in Entomology*, 132, 1–384.

Schmidt, C. (2013) Molecular Phylogenetics of Ponerine Ants (Hymenoptera: Formicidae: Ponerinae). *Zootaxa*, 3647 (2), 201–250. http://dx.doi.org/10.11646/zootaxa.3647.2.1

Schmidt, C.A.; Shattuck, S.O. (2014) The Higher Classification of the Ant Subfamily Ponerinae (Hymenoptera: Formicinae), with review of Ponerinae ecology and Behavior. *Zootaxa*, 3817, (1), 1–242. http://dx.doi.org/10.11646/zootaxa.3817.1.1

Seifert B. (2013) *Hypoponera ergatandria* (Forel, 1893) – a cosmopolitan tramp species different from *H. punctatissima* (Roger, 1859) (Hymenoptera: Formicidae). *Soil Organisms*, 85 (3), 189–201.

Seifert, B. (2009) Cryptic species in ants (Hymenoptera: Formicidae) revisited: we need a change in the alpha-taxonomic approach. *Myrmecological News*, 12, 149–166.

Silva, R.R., Feitosa, R.M. & Eberhardt, F. (2007) Reduced ant diversity along a habitat regeneration gradient in the southern Brazilian Atlantic Forest. *Forest Ecology and Management*, 240 (1), 61–69. https://doi.org/10.1016/j.foreco.2006.12.002

Silva, R.R., Martello, F., Feitosa, R.M., Silva, O.G.M., Prado, L.P., Brandão, C.R.F., et al. (2022) Atlantic ants: a data set of ants in Atlantic Forests of South America. *Ecology*, 103, e03580. https://doi.org/10.1002/ecy.3580

Smith, F. (1858). *Catalogue of hymenopterous insects in the collection of the British Museum. Part VI. Formicidae*. London: British Museum, 216 pp.

Smith, M.R. & Haug, G.W. (1931) An ergatandrous from in Ponera opaciceps Mayr. *Annals of the Entomological Society of America*, 24, 507–509. https://doi.org/10.1093/aesa/24.3.507

Smith, M.R. (1929) Descriptions of five new North American ants, with biological notes. *Annals of the Entomological Society of America*, 22, 543–551. https://doi.org/10.1093/aesa/22.3.543

Soares, S.M. & Schoereder, J.H. (2001) Ant-nest distribution in a remnant of tropical rainforest in southeastern Brazil. *Insectes Sociaux*, 48, 280–286. https://doi.org/10.1007/PL00001778

Taylor, R.W. (1967) A monographic revision of the ant genus *Ponera* Latreille (Hymenoptera: Formicidae). *Pacific Insects Monograph*, 13, 1-112.

Taylor, R.W. (1968) Nomenclature and synonymy of the North American ants of the genera Ponera and Hypoponera (Hymenoptera: Formicidae). *Entomological News*, 79, 63–66. https://doi.org/10.11646/zootaxa.2843.1.1

Tinaut, A. (2001) *Hypoponera ragusai* (Emery, 1895) a cavernicolous ant new for the Iberian Peninsula (Hymenoptera, Formicidae). *Graellsia*, 57 (1), 3–8. https://doi.org/10.3989/GRAELLSIA.2001.V57.I1.290

Vieira, L., Costa, C., Vaz-de-Mello, F.Z. & Louzada, J. (2022) Riverine barrier hypothesis explains the structure of dung beetle communities in Brazilian Coastal Sand-dune forests. *Acta Oecologica*, 115, 103835. https://doi.org/10.1016/j.actao.2022.103835.

Ward, P.S. (2000) Broad-scale patterns of diversity in leaf litter ant communities. *In*: Agosti, D., Majer, J., Alonso, E.; Schultz, T.R (Ed.). Ants: Standard Methods for Measuring and Monitoring Biodiversity. Washington, D.C.: Smithsonian Institution Press. pp. 99–131.

Wetterer, J.K. & Wetterer, A.L. (2004) Ants (Hymenoptera: Formicidae) of Bermuda. *The Florida Entomologist*, *87* (2), 212–221. http://www.jstor.org/stable/3496927

Wheeler, G.C. & Wheeler, J. (1964) The ant larvae of the subfamily Ponerinae: supplement. *Annals of the Entomological Society of America*, 57, 443–462.

Wheeler, G.C. & Wheeler, J. (1971) Ant larvae of the subfamily Ponerinae: second supplement. *Annals of the Entomological Society of America*, 64, 1197–1217.

Wilson, E.O. (1955) A monographic revision of the ant genus *Lasius*. *Bulletin of the Museum of Comparative Zoology*, 113, 1–201.

Wild, A.L. (2007) A catalogue of the ants of Paraguay (Hymenoptera: Formicidae). *Zootaxa*, 1622, 1–55. https://doi.org/10.11646/zootaxa.1622.1.1

Wilson, E.O. & Taylor, R.W. (1967) The ants of Polynesia (Hymenoptera: Formicidae). *Pacific Insects Monograph*, 14, 1–109.

Wilson, E.O. (1958) Studies on the ant fauna of Melanesia III. *Rhytidoponera* in western Melanesia and the Moluccas. IV. The tribe Ponerini. *Bulletin of the Museum of Comparative Zoology*, 119, 303–371. https://doi.org/10.5281/zenodo.25299

Wong, M.K.L.; Guénard, B. (2017) Subterranean ants: summary and perspectives on field sampling methods, with notes on diversity and ecology (Hymenoptera: Formicidae). *Myrmecological News*, 25, p. 1-16.

Wu, J., Wang, C. (1995). The ants of China. [In Chinese.]. *Beijing: China Forestry Publishing House*, pp. 214 pp.

Yamauchi, K, Oguchi, S, Nakamura, Y, Suetake, H, Kawasa, N and Kinomura, K (2001). Mating behaviour of dimorphic reproductives of the ponerine ant, *Hypoponera nubatama*. *Insectes Sociaux*, 48, 83–87.

Yamauchi, K., Kimura, Y., Corbara, B., Kinomura, K. & Tsuji, K. (1996) Dimorphic ergatoid males and their reproductive behavior in the ponerine ant Hypoponera bondroiti. *Insectes Sociaux*, 43, 119–130. http://dx.doi.org/10.1007/bf01242564

Zayed, A. & Packer L. (2005) Complementary sex determination substantially increases extinction proneness of haplodiploid populations. *PNAS*, 102, (30), 10742–10746. https://doi.org/10.1073/pnas.0502271102

Supplementary material

Supplementary materials 1 and 2 are available at the link: https://doi.org/10.5281/zenodo.8225020