



# A GUIDE TO THE ANTS OF JAMBI (SUMATRA, INDONESIA)

Identification Key to Ant Genera  
and Images of the EForTS collection



Rizky Nazarreta • Damayanti Buchori • Yoshiaki Hashimoto  
Purnama Hidayat • Stefan Scheu • Jochen Drescher



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*Tetraponera rufonigra*  
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foto: Andian Lutfi (2019)

Ghost ant *Tapinoma melanocephalum* eating aphids honeydew drop

Euku mi tidak diperjualbelikan

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*Polyrhachis bihamata*

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As a scientific publisher, LIPI Press holds on high responsibility to provide only the finest quality of publications. It is the epitome of our enduring efforts to participate in educating the life of the nation, as stated in The 1945 Constitution of the Republic of Indonesia.

This book, *A Guide to the Ants of Jambi (Sumatra, Indonesia): Identification Key to Ant Genera and Images of the EFForTS Collection* offers important findings from the exploration in Jambi forests, done by a team from the Ecological and Socioeconomic Functions of Tropical Lowland Rainforest Transformation Systems (EForTS) project. Members of the team are assembled from scientists, students, and staff from Institut Pertanian Bogor (IPB University) and University of Göttingen. The exploration focused in continuing the documentation of ants in Jambi forests. Through this book, we can witness the marvel of their findings, which undoubtedly will be an important piece of scientific data on the diversity of ant species, especially in Indonesia.

We surely hope this book could give new insights and invaluable information for our readers. As a final note, we would like to deliver our heartfelt gratitude to everyone taking part in the publishing process of this book.

LIPI Press





Buku ini tidak diperjualbelikan.

Weaver ants *Oecophylla smaragdina* attack a  
loopers cutworm (photo: M. Badrus Sholih)





## FOREWORD

Ants, with an estimated number of over 20,000 species, are major ecological players in terrestrial ecosystems. Since their origin in Cretaceous about 120 million years ago, ants have undergone enormous diversification and have occupied variety of niches. The levels of sociality and remarkable phenotypic plasticity are some of their key traits, which have led to their sheer ecological dominance among other arthropods. The amazing natural history has fascinated the naturalists for ages. Hence, ants have now occupied center stage in the field of ecology and evolutionary biology. However, the authentic count of their species number is far from complete. Most of the diversity-rich ecosystems are yet to be explored, as our efforts are too trivial. On the face of it, the traditional methods used to delimit species boundaries fail to recognize the plethora of cryptic species. Given this background, the major challenge before us is to make a count of what exists on this planet. Of course, this has to be carried at a fast pace, as most of the biodiversity is currently threatened in the wake of climate change and other anthropogenic activities. Undoubtedly, we will lose a substantial piece of natural history information before it is documented. Under such a scenario, it is heartening to see that a panoramic work documenting the ant fauna of an important region is being published. This book, *A Guide to the Ants of Jambi (Sumatra, Indonesia)*, embodies a valuable piece of scientific information. It is amazing to see that the authors have sorted more than 130,000 ant specimens into more than 330 ant species, with a phenomenal effort spanning five years. The updated identification key to ant genera of Jambi supplemented with illustrations (modified version of earlier keys) is a notable contribution, as good identification keys are fundamental to taxonomic analysis. It can also encourage the amateurs as well. The interesting findings



of the story is the significant number of cryptic species encountered in the study. Hopefully, these taxonomically challenging cases would be resolved in near future. The authors have provided digital images of the taxa, which would lead to better comparisons with already defined species. The documentation provides first-hand information about the ant diversity status of Jambi and adds a body of knowledge to the global ant fauna. With incorporation of glossary, identification key to ant genera, the book will surely benefit the upcoming Asian ant researchers. A wonderful treatise with a commendable effort deserves appreciation, with the hope that authors would come up soon with a more elaborate, explicit, and comprehensive ant guide of the region depicting minute morphological details integrated with other relevant data, deciphering the phylogeographic patterns of these lineages.

**Dr. Himender Bharti**

*Punjabi University Patiala - India*

*Odontoponera* sp. foraging  
around her territory





### On Ants and Their Shapes.

A rare book is published! I say rare because basic science writings are not easily found in Indonesian scientific literatures. There are a lot of scientific writings in this country, but very often they are not considered scientific if they do not possess the practical aspect pertaining to the (economic) development. Consequently, many scientists and academicians are dancing to that tune: applied science—and technology—is more preferable than basic science.

That is why the publication of this taxonomic treatise on ants from Jambi, a tiny province in the middle of Sumatera island of Indonesia (*A Guide to the Ants of Jambi (Sumatra, Indonesia)*) is very much welcomed. It is indeed a very interesting subject. However, it also makes us wonder. Why Jambi? Why ants? With the vast area of Indonesia which span east–west from Aceh to Papua, north–south from Talaud in North Sulawesi to Rote in East Nusa Tenggara, what makes Jambi unique? Furthermore, regarding the ants, there are a lot more economically important insects which make some Indonesian insect fauna so notorious, if not famous, so why the authors choose ants?

However, once you open the book, you do not bother about those things. They are too trivial to be compared with what inside the book. Sure, it is about ants in Jambi, but the book can be useful not only exclusively for ants from Jambi. Parts of the book may be used to recognize ants anywhere in Indonesia, maybe even in the world. Pages 7 to 33 of this book contains the way to identify ants' subfamilies and genera. It can also be used for any ants, anywhere, if you are going to know them up to genera level. Well, knowing



ants to the taxon of genera is something any myrmecologists and ant's enthusiasts should devote themselves to, if they want to be called as someone who know ants.

Furthermore, we will understand that ants live almost in any places in this wide world. Although these Jambi ants were taken from four distinguishable land-use systems (lowland secondary rainforest, rubber jungle, rubber monoculture, and oil palm monoculture estates), those places had already yielded more than 325 ants morphospecies. This means there are still a lot of other ants in different land-use system out there in Jambi waiting to be examined, described, and identified. That's talking about Jambi. How about other places in Sumatera? In Java? In Borneo? In Indonesia? Tropical rainforest is said to be one of the important places where ants live and flourish all the year round. However, do not forget that E.O. Wilson, the greatest world's myrmecologist, found a new species in the 1990s inside a high rise building in an urban area. Therefore, Jambi is just a mere little point to start our next adventure with ants, which can be done almost anywhere using the identification keys from this book.

No, we will not find much about the life of ants in Jambi, as this book is telling us more about the ants as individual entity with regards to their anatomy (therefore, morphospecies); complete with morphological *antspeak*, since you may learn a lot from the glossary of ant morphology near the end of this book. Therefore, if you want to read more about the life of ants, whether in Jambi or anywhere else, try to start writing the book yourself. This book will serve conveniently yet scientifically as reference guide. I think this was part of what inside the authors' mind when they start the writing project: writing a book so that it will generate many other books on ants from anywhere on earth. A really commendable and laudable effort, which must be appreciated not only with words, but also with further study, research, observation and, maybe later, conservation.

Bulaksumur, last day of August, 2020

**Prof. Dr. Edhi Martono**

*Gadjah Mada University - Indonesia*



# PREFACE

## PREFACE

This book has been compiled to serve several purposes.

First, we document the current state of our ongoing taxonomic evaluation of the canopy and litter ant fauna in four land-use systems in Jambi Province, Sumatra, Indonesia. Indonesia's ant fauna is species-rich and abundant, especially in rainforests. Currently, more than 16,000 valid species and subspecies of ants roam the globe, of which almost 10% are found in Indonesia (Antweb, 2020). There are likely many more extant ant species, possibly around 30,000 (Steiner, 2018). Many of the thousands of ant species that have yet to be described are expected to occur in the rainforests of the Amazon, the Congo basin, and Indomalaya. Indonesia, in particular, should be home to a large number of ant species due to its archipelago structure and landmasses that are fragmented by past and ongoing volcanic activity. However, the ant fauna of Indonesia in general, and Sumatra in particular, has received very little scientific attention. With this guide to the ants of Jambi Province, we take a first step toward improving this situation.

Second, we hope to attract the attention of taxonomical experts to the plethora of ant species that may still be discovered from Indonesia. Despite having sorted more than 130,000 ant specimen into more than 330 species for almost five years, and having consulted with nine distinguished international myrmecologists, almost 2/3rd of the taxa in this book are on the level of 'morphospecies.' In these cases, we have groups of individuals from known genera showing distinct morphological differences to described species, and which could not be identified using existing identification keys, be assigned species names by the consulted experts. This suggests that a considerable part of the morphospecies in this book are in fact undescribed species. Thus, with this book, we aim to support communication between international taxonomists and Indonesian scientists to support taxonomic studies of the mesmerising Indonesian ant fauna.



Finally, this book aims at attracting and facilitating the work of young scientists from Indonesia and Southeast Asia. We have included an updated identification key to subfamily and genera, based on previous versions of an identification key to Bornean ant genera (Hashimoto, 2003; Faile et al., 2014). While there may be shortcomings when undescribed species with unknown sets of morphological traits are encountered, this book contains the most up-to-date dichotomous key to ant subfamilies and genera in Southeast Asia. In addition, this book contains images of more than 330 ant morphospecies, giving ant researchers in the region a reference to compare their findings, providing a common ground between projects. We thus hope that this book will support the education and research of emerging and established myrmecologists working in Indonesia and Southeast Asia by providing a taxonomic platform of ant communities in rural Sumatra.

This book is the product of a combined effort of scientists, students and technical staff from Institut Pertanian Bogor (IPB University) and University of Göttingen, brought together under the umbrella of the Ecological and Socioeconomic Functions of Tropical Lowland Rainforest Transformation Systems (EFForTS) project rainforest transformation systems (Drescher et al., 2016). We hope you will find this book useful and that it will foster new knowledge on the diversity, ecology, and evolution of Indonesian ants.

26. Aug. 2020, Göttingen, Germany

On behalf of all co-authors

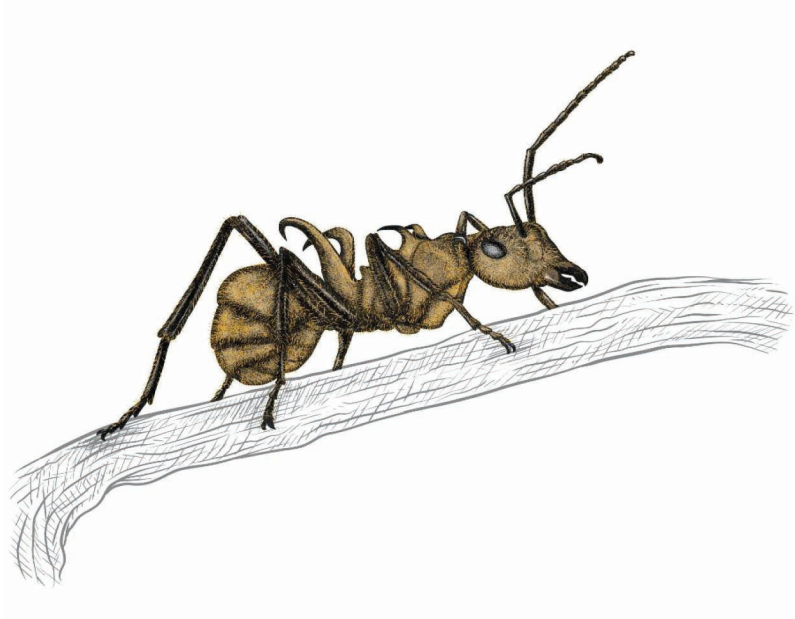
**Dr. Jochen Drescher**

*University of Göttingen - Germany*



## ACKNOWLEDGEMENTS

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*"Ants are everywhere, but only occasionally noticed. They run much of the terrestrial world as the premier soil turners, channelers of energy, dominatrices of the insect fauna – yet receive only passing mention in textbooks on ecology. [...] The neglect of ants in science and natural history is a shortcoming that should be remedied, for they represent the culmination of insect evolution, in the same sense that human beings represent the summit of vertebrate evolution"*

**[Bert Hölldobler & Edward O. Wilson, 1990]**



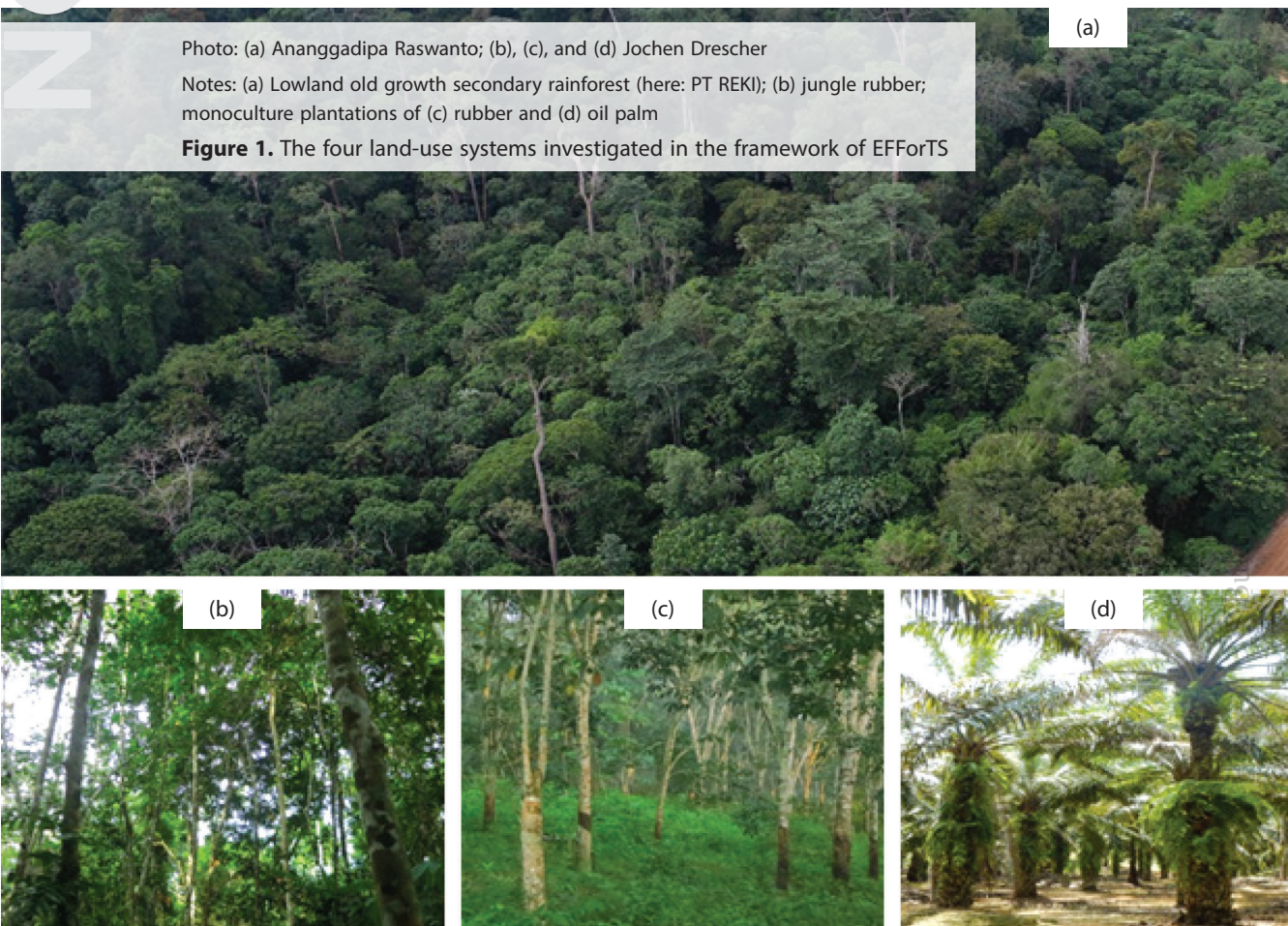
# INTRODUCTION

Ants (Hymenoptera: Formicidae) are the most diverse and numerous social insects on earth, only rivaled by termites in overall abundance. These two kinds of insects, along with bees and wasps, can make up more than 75 percent of the total insect biomass in terrestrial tropical ecosystems (Hölldobler & Wilson, 1990). Worldwide, there are more than 16,000 confirmed ant species, with many more awaiting discovery and description. In Indonesia, over 1,300 species/subspecies have been confirmed, belonging to 117 genera from 10 subfamilies. Of those, 721 species are listed as endemic, while 13 are introduced (Antweb, 2020).

Photo: (a) Ananggadipa Raswanto; (b), (c), and (d) Jochen Drescher

Notes: (a) Lowland old growth secondary rainforest (here: PT REKI); (b) jungle rubber; monoculture plantations of (c) rubber and (d) oil palm

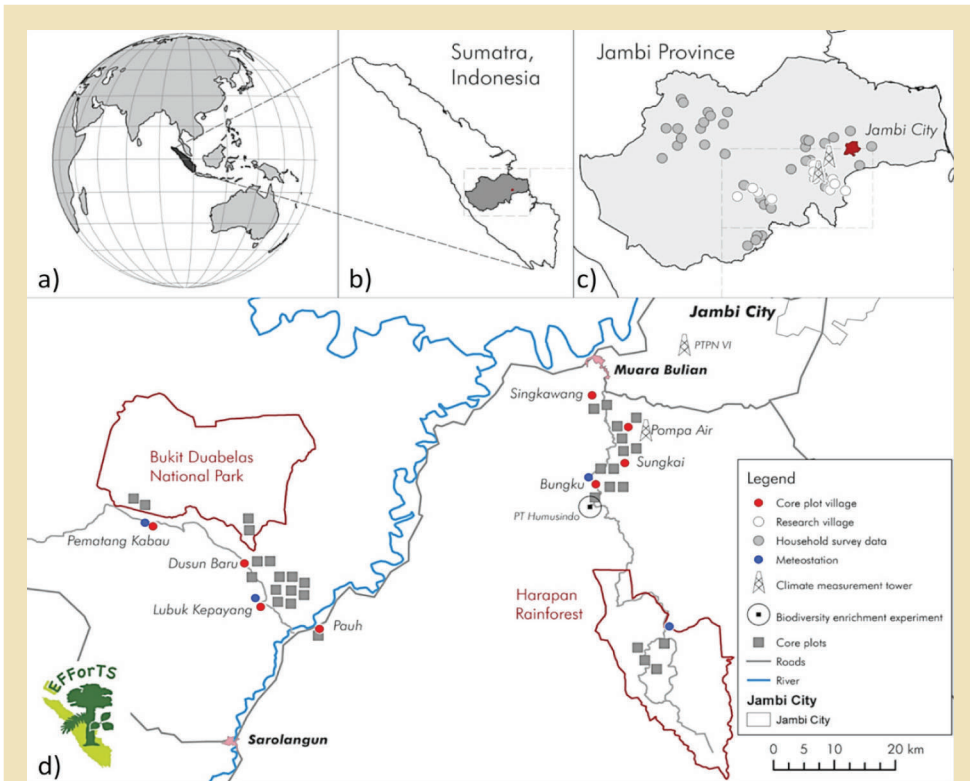
**Figure 1.** The four land-use systems investigated in the framework of EFForTS





Within the framework of EForTS (Drescher, 2016), we collected ants from leaf litter and the canopy in a nested design in four land-use systems in Jambi Province, Sumatra, Indonesia: Old growth secondary lowland rainforest, jungle rubber (extensive rubber cultivation [Gouyon et al., 1993]), and monocultures of rubber and oil palm (Fig. 1 a-d).

The EForTS study sites are located in and around two forest reserves, i.e. the Bukit Duabelas National Park and the lowland rainforest restoration concession of PT Restorasi Ekosistem Indonesia (PT REKI), also called Harapan Rainforest. In each of the two 'landscapes', we established a mirrored design of four plots of each land use type in each of the two landscapes, resulting in  $4 \times 4 \times 2 = 32$  'core plots' (Fig. 2). Each core plot measures  $50 \times 50$  m. Canopy ants were collected from three sites per core plot via canopy fogging (16 traps  $1 \text{ m}^2$  underneath each site) both in the dry season 2013 and the rainy season 2013/14, while leaf litter ants were collected by sieving litter from three randomly placed  $1 \text{ m}^2$  frames per core plot in the dry season 2012.



Note: Location of EForTS study sites in Sumatra (a, b) and Jambi Province (c, d). The core plot design (grey squares) is mirrored in two landscapes within and adjacent to two lowland rainforests, i.e. the Bukit Duabelas National Park and the Harapan Rainforest. Circles represent study villages and sites for the socioeconomic surveys also carried out in EForTS.

Source: Drescher et al., 2016

**Figure 2.** Map of the Study Region

This guide includes an identification key to the ant genera of Sumatra, which is updated from *Identification Guide to Ant Genera of Borneo* (Hashimoto, 2003), and a glossary of ant morphology based on the *Identification Guide to the Ant Genera of the World* (Bolton, 1994). The main body of this guide, consists of images of our collection of (morpho-) species. In the current version, we include 335 (morpho-) species from 71 genera and 10 subfamilies in 629 images.

## IDENTIFICATION KEY

Ants are eusocial insects that live in colonies which contain anywhere between a few dozen to hundreds of millions of individuals (Keller & Gordon, 2009). Individual ants belong to certain 'castes,' which is a term used to describe groups of workers which are physiologically different from each other and perform specific tasks within the colony 'superorganism' (Hölldobler & Wilson, 2009). Generally, three castes in an adult ant colony are differentiated as follows: queens (reproductive females), reproductive males, and workers (sterile females) (see Fig. 3). Ant queens are the only caste which can lay eggs, and they are usually larger than the workers and males due to their large ovaries and wing muscles. Males of similar size are workers, have wings, and are usually only visible during mating flights. Workers perform a number of tasks ranging from nest construction and maintenance, rearing of larvae, foraging for food, nest defense, to resource monopolization and expansion of territory (Hölldobler & Wilson, 2009). In many species, there is only one physical form of workers (monomorphism). In others species, workers are polymorphic, meaning that there are different physical forms of workers. In most of the polymorphic ant species, workers are divided into 'minors' and 'majors.' While minor workers have physical proportions similar

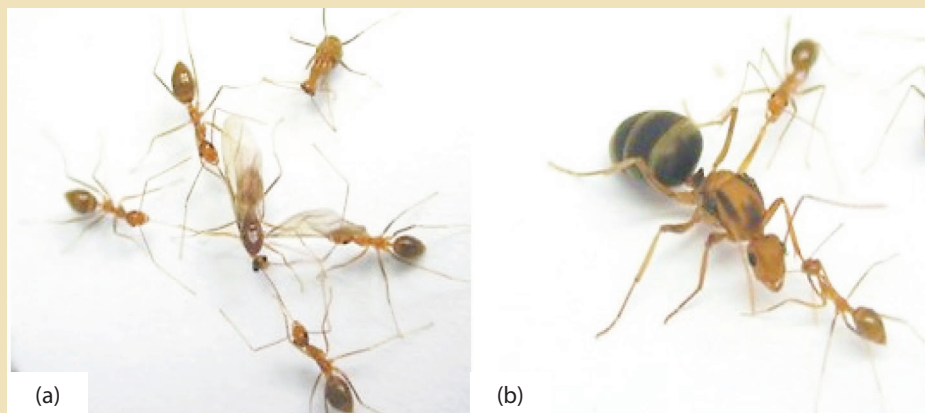


Photo: Jochen Drescher

Notes: (a) Workers attack a male from a different colony; (b) two workers investigate a queen from a different colony.

**Figure 3.** Three castes of ants in the Yellow Crazy Ant *Anoplolepis gracilipes*.



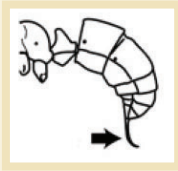
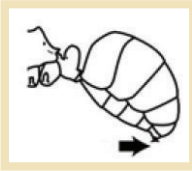
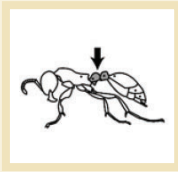
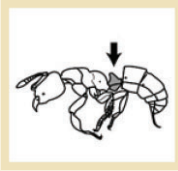
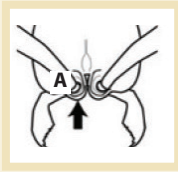
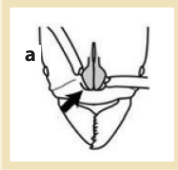
to workers of monomorphic ant species, the majors have enlarged heads, which carry an abundance of muscle for their powerful mandibles. Those are mostly used for cutting plant and animal tissue, but are also useful in construction and warfare.

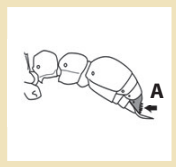

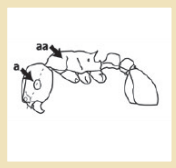
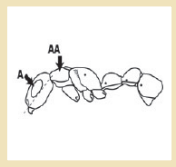
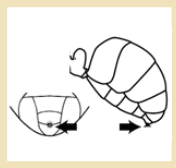
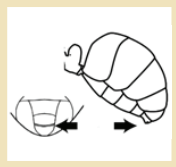
The identification keys provided in this guide are designed to identify workers caste only. The reason is that workers are the most commonly encountered caste of ants, while queens usually stay within the nests and males are only produced for mating flights. Moreover, worker ants have morphological characters that allow differentiation between species, while those characters are often obscure in queens or males.

The identification key presented here is technical and requires a sound entomological-morphological vocabulary specific to ants. We provide a glossary at the end of the guide, in which we define and describe the most important terms used in the identification key. At the same time, many traits can be easily identified on sight by the illustrations added to the identification key. For non-taxonomists and taxonomists alike, the photographs displayed in the image section shows the variety of morphology of the ants we found. This will hopefully be helpful in determining ants to genera, or possible even (morpho-)species.



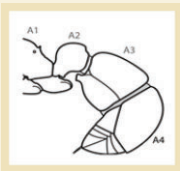
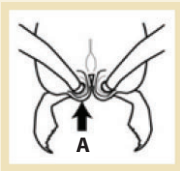
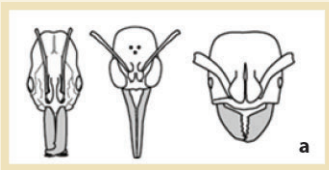

# IDENTIFICATION KEY TO ANT SUBFAMILIES

Based on Hashimoto (2003). Additional images are marked with \*.

No.	Characters	Go to
1.	a. Sting is present. 	2
	b. Sting is absent. Either tube-like opening fringed with hairs (acidoporus) or a rather slit-like opening. 	6
2.	a. Mesosoma is attached to the gaster by 2 segments (petiole and postpetiole), each separated by distinct constrictions. 	3
	b. Mesosoma is attached to the gaster by one segment (petiole). 	7
3.	a. Frontal lobes and clypeus are absent or frequently reduced so that the bases of the antennae are completely visible (A). Propodeum is always unarmed. 	4
	b. Frontal lobes and clypeus are almost always present and expanded towards the sides to cover the inner part of the antennal bases (a). If frontal lobes are absent, then propodeum is armed with a pair of spines (only in Acanthomyrmex). 	5

No.	Characters		Go to
4.	a. Eyes are present. Pygidium (upper surface of tip of the gaster) is transversely flattened and with a row of small spines (A).		<b>Dorylinae</b> (ex Cerapachyinae)
	b. Eyes are absent. Pygidium is round and has no teeth (a).		<b>Dorylinae</b> (ex Aenictinae)
5.	a. Eyes are present, generally small and round (a). Pronotum (first segment of the mesosoma) is fused to mesonotum (second segment of the mesosoma) (aa).		<b>Myrmecinae</b>
	b. Eyes are present, very large and elongated (A). Pronotum (first segment of the mesosoma) is connected to mesonotum (second segment of the mesosoma) by a flexible joint (AA).		<b>Pseudo-myrmecinae</b> ( <i>Tetraponera</i> )
6.	a. Tip of gaster has a circular or semicircular opening (acidopore), which is often fringed with short hairs.		<b>Formicinae</b>
	b. Tip of the gaster is slit-like and never with a fringe of short hairs.		<b>Dolichoderinae</b>

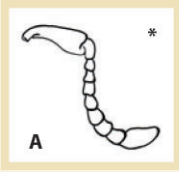
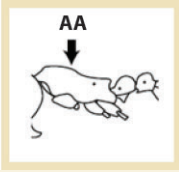
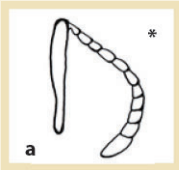
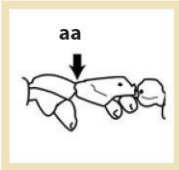
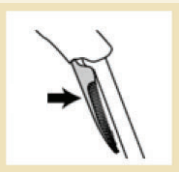


No.	Characters	Go to
7.	a. Petiole is broadly attached to gaster (entire height).	 <b>Amblyoponinae</b>
	b. Petiole is narrowly or intermediately attached to gaster.	 <b>8</b>
8.	a. Second gaster segment (A4) is strongly arched at 90°.	 <b>Ectatomminae Proceratiinae</b>
	b. Second gaster segment (A4) is not strongly arched.	<b>9</b>
9.	a. Frontal lobes and clypeus are absent or frequently reduced so that the bases of the antennae are completely visible (A). Propodeum is always unarmed.	 <b>Dorylinae</b>
	b. Mandibles varies from linear to triangular (a). Frontal lobes are rounded (aa).	  <b>Ponerinae</b>

# IDENTIFICATION KEY TO ANT GENERA

Based on Hashimoto (2003) and Ward et al. (2016). Additional images marked with \*.

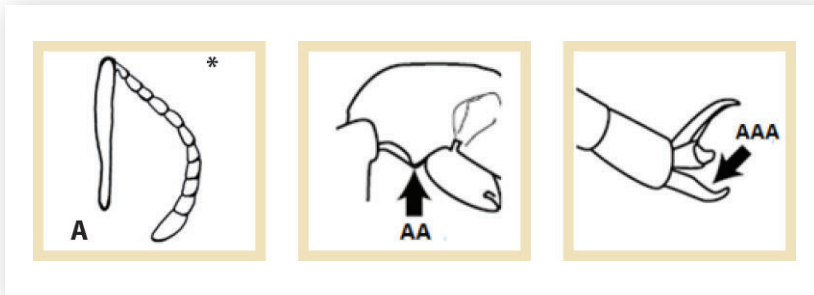
## 1. Dorylinae

No.	Characters	Go to
1.	a. Pygidium is not armed. Propodeal lobes are short or absent.	2
	b. Pygidium is armed with numerous specialized. Propodeal lobes are conspicuous.	3
2.	a. Antenna is with 8-10 segments (including the scape; A). Promesonotal suture is absent (AA). 	 <i>Aenictus</i>
	b. Antenna is with 7-12 segments (including the scape; a). Promesonotal suture is dorsally conspicuous (aa). 	 <i>Dorylus</i>
3.	a. Middle tibia is always with a pectinate spur. 	<i>Cerapachys</i>
	b. Abdominal tergite IV is not folding over sternite in lateral view. Metabasitarsal glands are absent.	<i>Ooceraea</i>

## 2. Ectatomminae

(only encountered genus: *Rhytidoponera*)

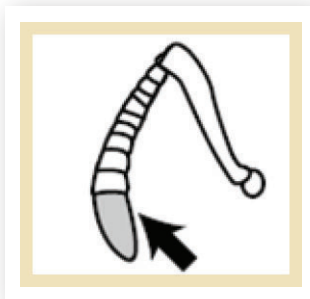
- Antenna has 12 segments (including the scape; A).
- Anteroventral margin of pronotum is rounded (AA).
- Hind pretarsal claw has no median tooth (AAA).



## 3. Proceratiinae

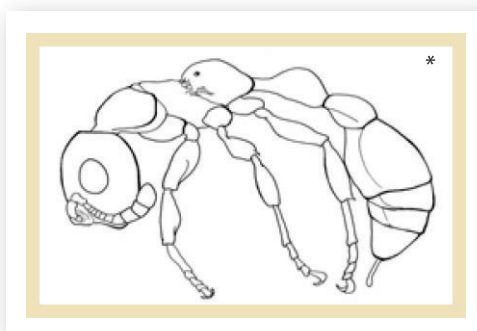
(only encountered genus: *Discothyrea*)

- Apical segment of antennal club is extremely large and bulbous.

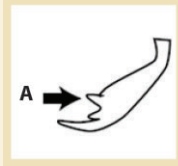
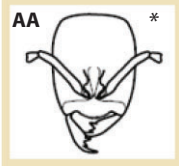
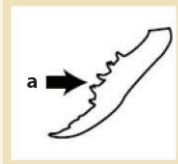
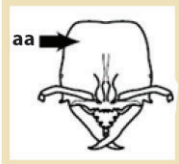


## 4. Pseudomyrmecinae


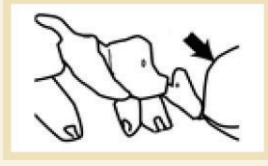
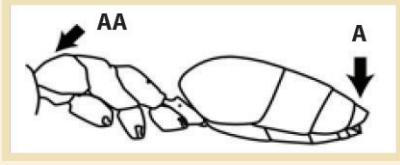
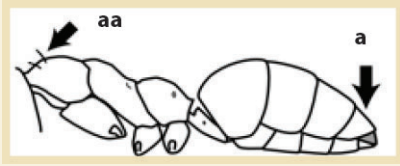
(*Tetraponera* is the only valid genus)



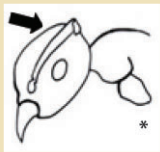
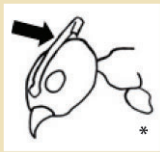
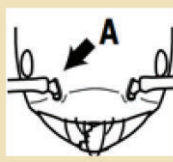

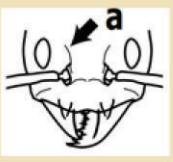

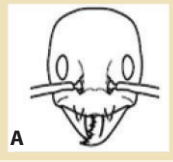
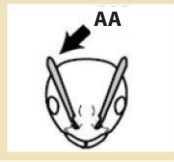
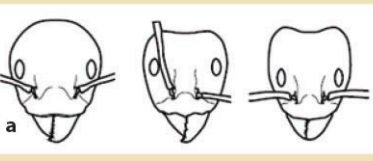
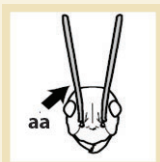
## 5. Amblyoponinae


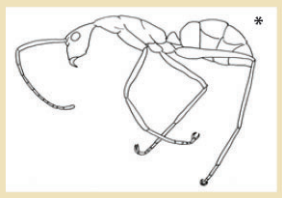
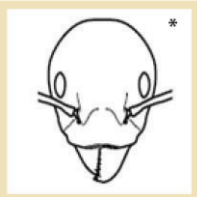
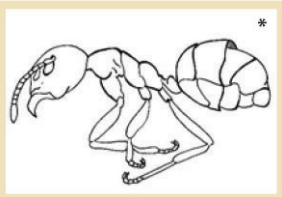
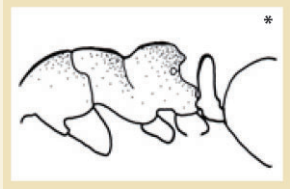
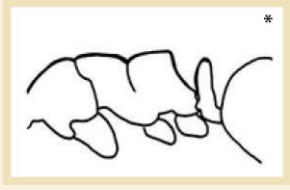
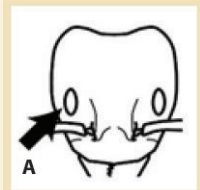
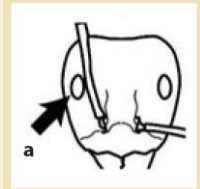
No.	Characters	Go to
1.	<p>a. Mandibles are short and narrow, with only 3 teeth (A). Posterior margin of head is flat or slightly concave (AA).</p>  	<i>Prionopelta</i>
	<p>b. Mandibles are long, slender and linear, with more than 3 teeth (a). Posterior margin of head is at most weakly concave, hairs and head are long and thin (aa).</p>  	<i>Stigmatomma</i> (ex <i>Amblyopone</i> )

## 6. Dolichoderinae

No.	Characters	Go to
1.	<p>a. Petiole is overhung by the first gastral segment.</p> 	2
	<p>b. Petiole is not overhung by the first gastral segment.</p> 	3
2.	<p>a. Gaster is with 4 visible tergites, the fifth tergite segment is reflexed below the fourth (A). Pronotum is generally lacking erect hairs (AA).</p> 	<i>Tapinoma</i>
	<p>b. Gaster is with 5 visible tergites, the fifth tergite is small but not reflexed below the fourth (a). Pronotum commonly has erect hairs (aa).</p> 	<i>Technomyrmex</i>

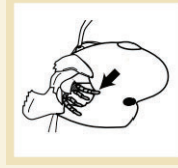
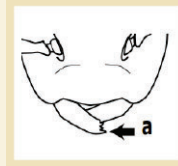
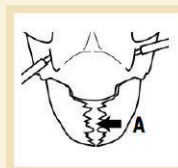



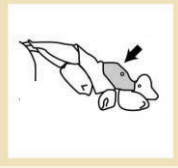
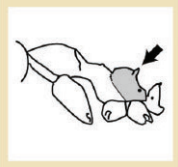
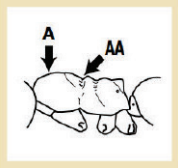

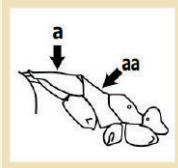
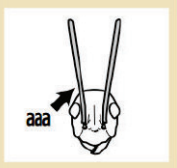
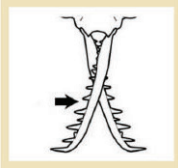
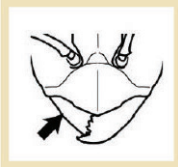
No.	Characters	Go to
	<p>b1. Scape is short, extending to the rear margin of head when viewed in profile, body color is black.</p> 	<i>Technomyrmex albipes</i>
	<p>b2. Scape is longer, extending beyond rear margin of head when viewed in profile, body color is brown or dark brown.</p> 	<i>Technomyrmex vitiensis</i>
3.	<p>a. Frontal carina is reduced or absent (A). Mesosoma has a compact appearance. Palps are short with a formula of 2:2 (2 segments maxillary palps and 2 segments labial palps; AA).</p>  	<i>Chronoxenus</i>
	<p>b. Frontal carina is present (a). Palps are long with a formula of 6:4 (6 segments maxillary palps and 4 segments labial palps; aa).</p>  	4
	<p>a. Head vertex is convex (with a very slight central concavity; A). Scape is short, at most surpassing the vertex by less than one-third its length (AA).</p>  	<i>Loweriella</i>
4.	<p>b. Head vertex is convex to very weakly concave (a). Scape is long, surpassing the vertex by about one-half its length (aa).</p>  	5

No.	Characters	Go to
	<p>a. Head and mesosoma are much longer rather than broad. Compound eyes are present, approximately round, and relatively posterior on the head. Legs are extremely elongated.</p> <div data-bbox="346 338 840 536">   </div>	<b><i>Leptomyrmex</i></b>
5.	<p>b. Head is roughly triangular, and mesosoma is not elongated. Compound eyes are present, approximately round, positioned on head variable. Legs are not elongated.</p> <div data-bbox="346 670 840 868">   </div>	<b>6</b>
6.	<p>a. Mesosoma is often heavily sculptured integument. Rear face of the propodeum is generally concave (sometimes flat).</p> <div data-bbox="628 910 920 1100">  </div>	<b><i>Dolichoderus</i></b>
6.	<p>b. Mesosoma is with thin and generally smooth integument.</p> <div data-bbox="628 1138 920 1328">  </div>	<b>7</b>
7.	<p>a. Eyes are located relatively downward on the head (A). Posterior margin of the head is distinctly depressed or strongly concave.</p> <div data-bbox="672 1361 873 1551">  </div>	<b><i>Philidris</i></b>
	<p>b. Eyes are located relatively upward on the head (a). Posterior margin of the head is generally rounded, occasionally weakly depressed.</p> <div data-bbox="672 1580 873 1770">  </div>	<b><i>Iridomyrmex</i></b>

## 7. Formicinae

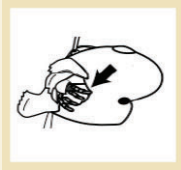
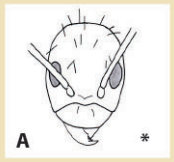
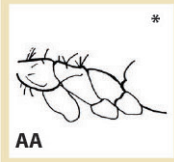


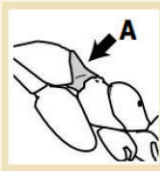
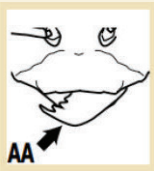
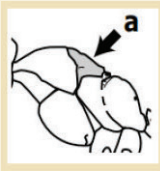


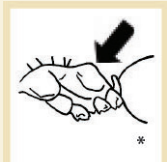
No.	Characters	Go to
1.	a. Antennae has 8 segments (including the scape).	2
	b. Antennae has 9 – 12 segments (including the scape).	3
2.	a. Apical margin of mandible has more than 4 teeth (A). Eyes are large. Antennae are folding back below the eye.	<i>Gesomyrmex</i>
	b. Apical margin of mandible has 4 teeth (a). Eyes are small. Antennae are folding back above the eye.	<i>Cladomyrma</i>
3.	a. Antennae has 9 – 11 segments (including the scape).	4
	b. Antennae has 12 segments (including the scape).	7
4.	a. Palp formula of 5:3 or less (5 segments maxillary palps and 3 segments labial palps).	<i>Acropyga</i>



No.	Characters	Go to
	b. Palp formula of 6:4 (6 segments maxillary palps and 4 segments labial palps). 	5
5.	a. Propodeum is armed with a pair of spines. 	<i>Lepisiota</i>
	b. Propodeum is unarmed (without a pair of spines). 	6
6.	a. Pronotum is compact (A). Metanotal groove is present (AA). Antennal scape is short (surpassing the rear margin of the head by less than one-quarter of their length) (AAA).  	<i>Plagiolepis</i>
	b. Pronotum elongate (a). Metanotal groove is absent (aa). Antennal scape is extremely long, surpassing the rear margin of the head by two-thirds of their length or more (aaa).  	<i>Anoplolepis</i>
7.	a. Mandibles are extremely long and slender, with 10 or more teeth. 	<i>Myrmoteras</i>
	b. Mandibles are subtriangular or elongate-triangular, with less than 10 teeth. 	8

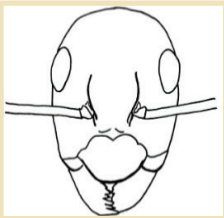
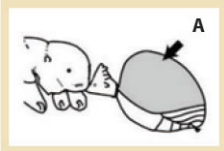
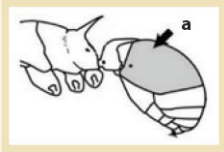


No.	Characters	Go to
8.	a. Antennal sockets are very close to the rear margin of the clypeus.	9
	b. Antennal sockets are separated from the rear margin of the clypeus.	15
9.	a. Dorsal surface of head and thorax have no pairs of erect hairs.	<b>Overbeckia</b>
	b. Dorsal surface of head and thorax have pairs of erect hairs.	10
10.	a. Mesosoma is long and slender.	11
	b. Mesosoma is short and compact.	14
11.	a. Palps are long with a formula of 6:4 (6 segments maxillary palps and 4 segments labial palps).	12


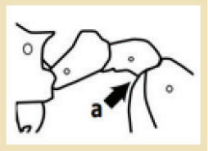
No.	Characters	Go to
	<p>b. Palps are short with a formula of 2:3, 3:3 or 4:3 (2, 3 or 4 segments maxillary palps and 3 segments labial palps).</p> 	13
12.	<p>a. Erect setae on the surface of the head is randomly scattered (A). Pronotum is slightly convex (AA).</p>  	<i>Paratrechina</i>
	<p>b. Erect setae on the surface of the head is with two parallel rows (a). Pronotum is convex (aa).</p>  	<i>olepis</i>
13	<p>a. Mesonotum and anepisternum together are not forming a rough triangular (A). External margin of mandible is strongly curved in apical half</p>  	<i>Euprenolepis</i>
	<p>b. Mesonotum and anepisternum together roughly form a triangular (a). Lateral margin of mandible is shallowly curved in apical half (aa).</p>  	<i>Pseudolasius</i>
14.	<p>a. Propodeum is with one pair of erect setae.</p> 	<i>Para-paratrechina</i>
	<p>b. Propodeum is without one pair of erect setae.</p> 	<i>Nylanderia</i>





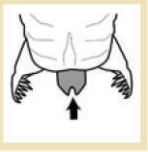




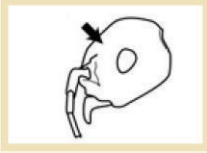
No.	Characters	Go to
15.	a. Petiole is reduced to an elongated, low node.	<b><i>Oecophylla</i></b>
	b. Petiole is with an erect node.	<b>16</b>
16.	a. Tergite of first gastral segment at most is slightly longer than the second (A). Petiole node is unarmed.	<b>17</b>
	b. Tergite of first gastral segment is distinctly much longer than the second (a). Petiole node is armed with spines.	<b>19</b>
17.	a. It is/they are very large in size (>20 mm). Antennae and legs are not elongated.	<b><i>Dinomyrmex</i></b>
	b. It is/they are medium to large in size (less than 20 mm). Antennae and legs are not elongated	<b>18</b>
18.	a. It is/they are generally small species (HW 0.65 – 1.70). Antennal insertions are relatively well separated, occurring at mid-length of frontal carinae. Anterolateral extremities of clypeus are set off from rest of clypeus by a sulcus or impression, so clypeus appears to lack of prominent anterolateral extensions.	<b><i>Colobopsis</i></b>



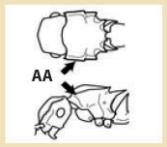
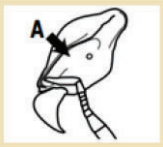







No.	Characters	Go to
	<p>b. It is/they are small to large species (HW 0.70 – 3.00). Antennal insertions are less well separated. Antennal insertions are usually occurring in front of mid-length of frontal carinae. Clypeus is typically with prominent anterolateral extensions.</p>	 <p><b>Camponotus</b></p>
19.	<p>a. First gastral tergite is more than half the total length of the gaster (A). Body is usually covered with short hairs.</p>	 <p><b>Echinopla</b></p>
	<p>b. First gastral tergite is less than half the total length of the gaster (a). Body is usually covered with long erect hairs.</p>	 <p><b>Polyrhachis</b></p>

## 8. Myrmicinae



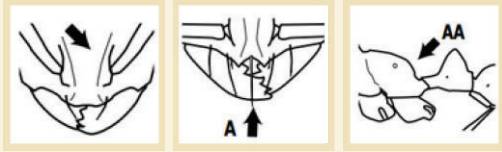

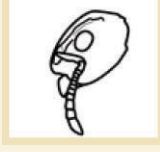

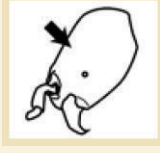
No.	Characters	Go to
1.	<p>a. Postpetiole is attached to the upper surface of the gaster (A). Gaster viewed from above is roughly heart-shaped.</p>	 <p><b>Crematogaster</b></p>
	<p>b. Postpetiole is attached to the front of the gaster (a). Gaster viewed from above is not particularly heart-shaped.</p>	 <p><b>2</b></p>


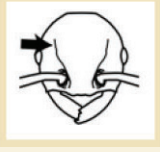
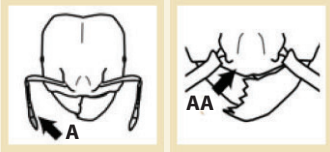

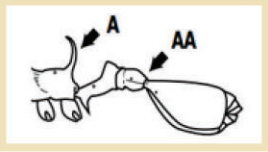
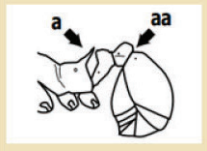
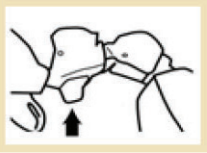
No.	Characters	Go to
2.	a. Antennae has 4-6 segments (including the scape). 	3
	b. Antennae has more than 7-12 segments (including the scape). 	4
3.	a. Shield of labrum is roughly T-shaped.  	<b><i>Strumigenys</i> (all)</b>
	b. Shield of labrum is never T-shaped.  	<b><i>Strumigenys</i> (ex <i>Pyramica</i>)</b>
4.	a. Antennae has 7 segments (including the scape). 	5
	b. Antennae has with 8-12 segments (including the scape). 	6
5.	a. Antennal scrobes are present below the eyes. 	<b><i>Eurhopalothrix</i></b>
	b. Antennal scrobes are absent. 	<b><i>Myrmicaria</i></b>

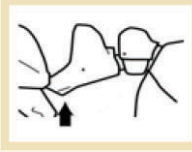
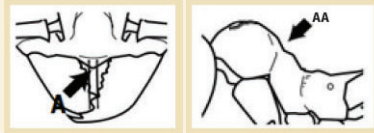

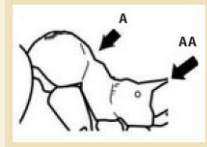
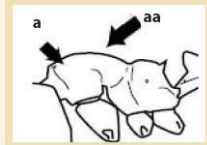





No.	Characters	Go to
6.	a. Antennae has 9 segments (including the scape). Antennal scrobes are present (A). Upper surface of the mesosoma is forming a broad shield (AA). Propodeal spines are short. <div></div>	<i>Meranoplus</i>
	b. Antennae has 10–12 segments (including the scape). <div></div>	7
7.	a. Antennae has 10 segments (including the scape). <div></div>	8
	b. Antennae has 11–12 segments (including the scape). <div></div>	12
8.	a. Upper surface of the head has deep groove (antennal scrobe). <div></div>	<i>Mayriella</i>
	b. Upper surface of the head is lacking groove (antennal scrobe). <div></div>	9
9.	a. Antennae has 3 segmented club. <div></div>	<i>Monomorium</i> (part)


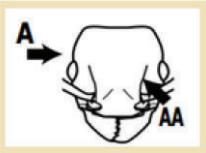
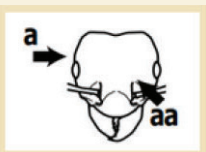

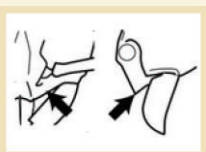
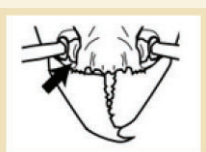







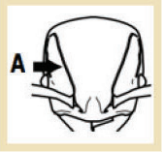
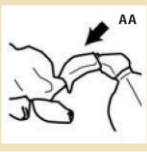



No.	Characters	Go to
	b. Antennae has 2 segmented club. 	10
	a. Frontal lobes are very close, nearly touching. 	<i>Rhopalomastix</i>
10.	b. Frontal lobes are separated. Front margin of the clypeus with a single central elongate setae (A). Propodeum is rounded and without spines (AA). 	<i>Solenopsis</i>
	a. Antennae has 11 segments (including the scape). 	12
11.	b. Antennae has 12 segments (including the scape). 	20
	a. Antennal scrobes are present. 	13
12.	b. Antennal scrobes are absent. 	14

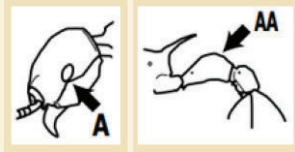
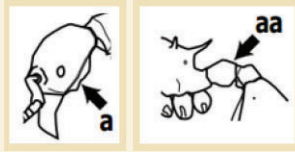
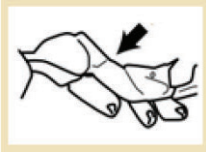


No.	Characters	Go to
13.	a. Antennal scrobes are present below the eyes.	 <i>Cataulacus</i>
	b. Antennal scrobes are present above the eyes and very feeble.	 <i>Tetramorium (part)</i>
14.	a. Antenna has 2 segmented club (apical and preapical antennal segments much larger than funicular segments) (A). Clypeus is smooth without longitudinal ridges (AA).	 <i>Carebara</i>
	b. Antenna has 3 segmented club.	 15
15.	a. Propodeum is armed with a pair of spines that curve upwards and forwards (A). Junction of postpetiole and gaster is strongly dorsoventrally compressed and very narrow in profile (AA).	 <i>Recurvidris</i>
	b. Propodeum is unarmed or with a pair of straight spines (a). Junction of postpetiole and gaster is not strongly compressed (aa).	 16
16.	a. Petiole has a large to very large process	 <i>Vollenhovia (part)</i>

No.	Characters	Go to
	<p>b. Petiole is lacking process or with a small process</p> 	17
17.	<p>a. Anterior margin of clypeus is with a median anteriorly protruding point (A). Pronotum is forming a high, dome-like arc (AA).</p> 	18
	<p>b. Anterior margin of clypeus has no median anteriorly protruding point.</p> 	19
18.	<p>a. Pronotum is forming a high, dome-like arc (A). Propodeal spines are long and sharp (AA).</p> 	<i>Lophomyrmex</i>
	<p>b. Pronotum is flat to compact (a). Propodeal spines are short and blunt (aa).</p> 	<i>Gauromyrmex</i>
19.	<p>a. Postpetiole is swollen, wide rather than long (A). Lateral portions of clypeus are flattened and projecting as a shelf over the mandibles (AA).</p> 	<i>Cardiocondyla</i> (part)
	<p>b. Postpetiole at most is only slightly wider than long (a). Lateral portions of clypeus are not flattened, not projecting as a shelf over the mandibles (aa).</p> 	<i>Monomorium</i> (part)
20.	<p>a. Area of the clypeus is immediately below the antennal sockets, raised into a sharp-edged ridge.</p> 	21


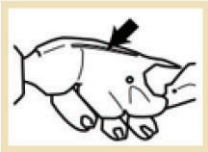



No.	Characters		Go to
20.	b. Area of the clypeus is immediately below the antennal sockets, without sharp-edged ridge.		22
21.	a. Head shape is roughly square or rectangular (A). Frontal carinae is present (AA).		<i>Tetramorium</i> (part)
	b. Head is roughly heart-shaped (a); frontal carinae is absent (aa).		<i>Tetramorium</i> (ex <i>Rhoptromyrmex</i> )
22.	a. Lateral portions of clypeus are flattened and projecting as a shelf over the mandibles.		<i>Cardiocondyla</i> (part)
	b. Lateral portions of clypeus are not flattened, not as a shelf over the mandibles.		23
23.	a. Frontal lobes are absent and antennal articulations are exposed.		<i>Acanthomyrmex</i>
	b. Frontal lobes are present and covering antennal articulations.		24

No.	Characters	Go to
24.	a. Front margin of the clypeus has a single central elongated setae. 	<b>Monomorium (part)</b>
	b. Front margin of the clypeus has not a single central elongated setae. 	25
25.	a. Occipital region of head has 3 pairs of similar prominences. 	<b>Proatta</b>
	b. Occipital region of head has no 3 pairs of similar prominences. 	26
26.	a. Antennal scrobes are present above the eyes (A). Petiole is rounded and barrel-shaped (AA).  	<b>Dilobocondyla</b>
	b. Antennal scrobes are absent. 	27
27.	a. Head is with an elongated groove. 	28
	b. Head behind the eye is without an elongated groove. 	31

No.	Characters	Go to	
28.	a. Elongated ridge is touching the eye (A). Petiole is with a distinct, arched node on its upper surface (AA)		<b><i>Vombisidris</i></b>
	b. Antennal scrobe is absent (or present but incapable of concealing scape).	<b>29</b>	
29.	a. Elongated ridge is passing well below the eye (a). Petiole is low and without a distinct node (aa).		<b><i>Myrmecina</i></b>
	b. Without elongated ridge below the eye.	<b>30</b>	
30.	a. Antennal socket is fully exposed; three or more denticles in anterior margin of clypeus. Masticatory margin of mandible is with 5 conspicuous teeth.	<b><i>Pristomyrmex</i></b>	
	b. Median clypeal carina is present. Masticatory margin of mandible is with 5 – 6 teeth.	<b><i>Temnothorax</i></b>	
31.	a. Pronotum is forming a high, dome-like arc.		<b>32</b>
	b. Pronotum is forming a very shallowly convex curve.		<b>34</b>
32.	a. Palp formula of 2:2 or 3:2 or 5: 3 (2 or 3 or 5 segmented maxillary palps, 2 or 3 segmented labial palps).		<b>33</b>


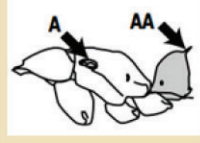
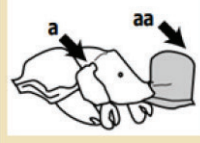
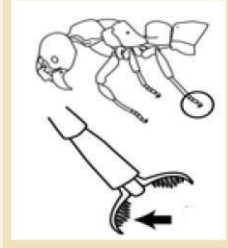
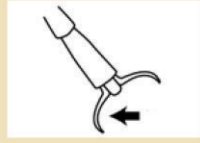
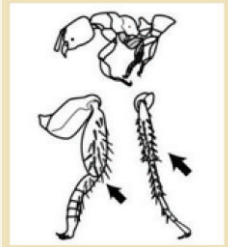
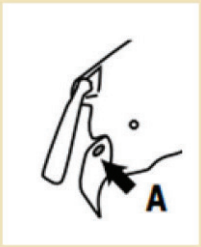


No.	Characters	Go to
	<p>b. Palp formula of 4:3 (4 segmented maxillary palps, 3 segmented labial palps).</p>	 <p><b><i>Aphaenogaster</i></b></p>
33.	<p>a. Palp formula of 2:2 or 3:2 (2 or 3 segmented maxillary palps, 2 segmented labial palps). Promesonotum is distinctly higher than anterior border of propodeal dorsum.</p>	<b><i>Pheidole</i></b>
	<p>b. Palp formula of 5:3 (5 segmented maxillary palps, 3 segmented labial palps). Promesonotum is not or only a little higher than anterior border of propodeal dorsum.</p>	<b><i>Paratopula</i></b>
34.	<p>a. Mesonotum and propodeum marginate laterally.</p>	 <p><b><i>Rotastruma</i></b></p>
	<p>b. Mesonotum and propodeum are without rugulae.</p>	 <p><b><i>Vollenhovia</i></b></p>

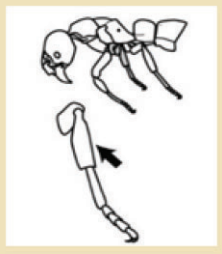

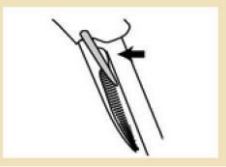

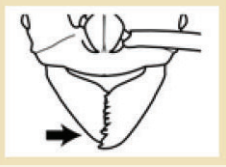
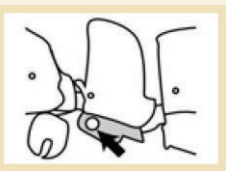
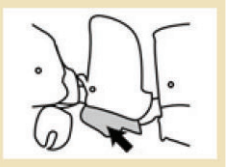


## 9. Ponerinae



No.	Characters	Go to
1.	a. Mandibles are long and straight.	2
	b. Mandibles are triangular.	
2.	a. Top of the head has V-shaped lines (A). Upper front of the head is sometimes with shallow groove (AA).	<i>Odontomachus</i>
	b. Top of the head has no V-shaped lines (a). Upper front of the head is usually smooth (aa).	
3.	a. Frontal lobes are broadly separated by posteromedian portion of clypeus. Tibiae of the hind legs are each with two comb-like (pectinate) spurs.	<i>Platythyrea</i>
	b. Frontal lobes are narrowly separated by posteromedian portion of clypeus. Tibiae of the hind legs are each with a comb-like (pectinate) spur and a simple one.	
4.	a. Anterior clypeal margin is armed with 7-9 of distinct teeth (A). Pronotum with a pair of laterally directed triangular teeth (AA).	<i>Odontoponera</i>

No.	Characters	Go to
	<p>b. Anterior clypeal margin did not have a series of distinct teeth.</p> 	5
5.	<p>a. Side of the mesosoma has a conspicuous pocket-like pit just below its upper surface (A). Petiole is with a pair of spines on its upper surface (AA).</p> 	<i>Diacamma</i>
	<p>b. Side of the mesosoma is smooth, and never with a pocket-like pit (a). Petiole is usually rounded above and unarmed (aa).</p> 	6
6.	<p>a. Claws on the hind legs are usually has a series of small teeth on their inner surface (pectinate), but always with at least 1 tooth present.</p> 	<i>Leptogenys</i>
	<p>b. Claws on the hind legs are simple, without teeth on their inner surface.</p> 	7
7.	<p>a. Outer surfaces of the tibiae of the middle legs has thickened peg-like setae (A). Side of the mandible near its insertion into the head is with a small oval or round depression or pit.</p>  	<i>Cryptopone</i>



No.	Characters	Go to
	<div>b. Outer surfaces of the tibiae of the middle legs either have all thin hairs or lacking hairs.</div> <div></div>	8
8.	<div>a. Each of the Tibiae of the hind legs has two comb-like spurs.</div> <div></div>	9
	<div>b. Each of the Tibiae of the hind legs has a comb-like (pectinate) spur and a simple one.</div> <div></div>	11
9.	<div>a. Mandible is elongate-triangular and armed with 5 long teeth.</div> <div></div>	<i>Emeryopone</i>
	<div>b. Mandible is triangular, not armed with 5 spiniform teeth.</div> <div></div>	10
10	<div>a. Subpetiolar process has a translucent thin spot.</div> <div></div>	<i>Ponera</i>
	<div>b. Subpetiolar process has no translucent thin spot.</div> <div></div>	<i>Hypoponera</i>



No.	Characters	Go to
11	<p>a. Orifice of propodeal spiracle is round or oval. Prora is reduced and not externally visible.</p> 	<b><i>Brachyponera</i></b>
	<p>b. Orifice of propodeal spiracle is elongated or slit-shaped. Prora is conspicuous. Mesopleuron is divided by a transverse groove.</p> 	<b><i>Ectomomyrmex</i></b>



*Mysidium camillae*

Foto: Kamil Stajnak (2021)



## SPECIES LIST OF EFForTS (MORPHO-)SPECIES

This is a checklist of the ants encountered in the canopy and litter in the framework of *EFForTS*. The list contains a mix of confirmed Linnéan species and morphospecies we defined as *de novo* due to the large number of undescribed species in Sumatra. The following list uses five categories, and is sorted alphabetically according to subfamily and (morpho-) species:

1. (Morpho-) Species: Genus plus species denominator. Partially reviewed by Doug Booher, Dmitry Dubovikoff, Brian Fisher, Shingo Hosoichi, Weejawat Jaitrong, Petr Klimes, Dirk Mezger, Wendy Wang, Phil S. Ward and Seiki Yamane.
2. MSp Code: Internal *EFForTS* identifier, containing information regarding the respective *EFForTS* project, taxonomic information and running number for each defined morphospecies.
3. Land Use: The land-use system in which the respective ant species was found, i.e. lowland rainforest (F), jungle rubber (J), rubber plantation (R), and/or oil palm plantation (O).
4. Stratum: Sampling stratum, either leaf litter or canopy, where the particular MSp was encountered.
5. Figures: Image number of the respective morphospecies. NA: No image available in this guide.



(Morpho-) Species	MSp Code	Land Use	Stratum	Figures
<b>Amblyoponinae</b>				
<i>Prionopelta</i> sp.01	Z02.HymFrm330.rn	R	canopy	4
<i>Stigmatomma</i> sp.01	Z02.HymFrm160.rn	J, O, R	canopy	5
<i>Stigmatomma</i> sp.02	B01.HymFrm230.jw	F	litter	NA
<b>Dolichoderinae</b>				
<i>Chronoxenus rossi</i>	Z02.HymFrm104.rn	F, J, O, R	canopy	6
<i>Dolichoderus</i> cf. <i>affinis</i>	Z02.HymFrm108.rn	F, J	canopy	7
<i>Dolichoderus</i> cf. <i>cuspidatus</i>	Z02.HymFrm151.rn	F	canopy	8
<i>Dolichoderus cuspidatus</i>	Z02.HymFrm045.rn	F, J	canopy	9
<i>Dolichoderus gibbus</i>	B01.HymFrm291.jw	F	litter	10
<i>Dolichoderus</i> sp.01	Z02.HymFrm284.rn	F, J	canopy	11
<i>Dolichoderus</i> sp.06	Z02.HymFrm094.rn	F, J	canopy	12
<i>Dolichoderus sulcaticeps</i>	Z02.HymFrm293.rn	F	canopy	13
<i>Dolichoderus thoracicus</i>	Z02.HymFrm009.rn	F, J, O, R	canopy	14
<i>Dolichoderus thoracicus</i> complex	Z02.HymFrm020.rn	F, J, O, R	canopy	15
<i>Loweriella</i> sp.01	Z02.HymFrm216.rn	O	canopy	16
<i>Philidris cordata</i>	Z02.HymFrm008.rn	F, J, R	canopy	17
<i>Philidris</i> sp.02	Z02.HymFrm191.rn	F	canopy	NA
<i>Tapinoma glaucum-andamanensis</i> group sp.01	Z02.HymFrm035.rn	F, J, O, R	canopy	18
<i>Tapinoma melanocephalum</i>	Z02.HymFrm014.rn	F, J, O, R	canopy	19
<i>Tapinoma</i> sp.05	B01.HymFrm249.rn	O	litter	NA
<i>Tapinoma</i> sp.06	B01.HymFrm285.rn	F, J	litter	20
<i>Technomyrmex albipes</i>	Z02.HymFrm005.rn	F, J, O, R	canopy	21
<i>Technomyrmex albipes</i> cf. <i>vitiensis</i> sp.01	Z02.HymFrm033.rn	F, J, O, R	canopy	22
<i>Technomyrmex albipes</i> cf. <i>vitiensis</i> sp.02	Z02.HymFrm149.rn	F, J, O, R	canopy	23



(Morpho-) Species	MSp Code	Land Use	Stratum	Figures
<i>Technomyrmex dubius</i>	Z02.HymFrm097.rn	F, J	canopy	24
<i>Technomyrmex elatior</i>	Z02.HymFrm003.rn	F, J, O, R	canopy	25
<i>Technomyrmex grandis</i>	Z02.HymFrm199.rn	F	canopy	26
<i>Technomyrmex horni</i> cf. <i>schimmeri</i>	B01.HymFrm266.jw	F, J	litter	27
<i>Technomyrmex kraepelini</i>	B01.HymFrm265.jw	F, J, O, R	litter	28
<i>Technomyrmex lisae</i>	Z02.HymFrm336.rn	F	canopy	29
<i>Technomyrmex</i> sp.05	Z02.HymFrm190.rn	F	canopy	NA
<i>Technomyrmex textor</i>	Z02.HymFrm502.jd	F, J	canopy	30
<i>Technomyrmex wheeleri</i>	Z02.HymFrm503.jd	J	canopy	31
<b>Dorylinae</b>				
<i>Cerapachys</i> sp.01	Z02.HymFrm034.rn	F, J, O, R	canopy	32
<i>Cerapachys</i> sp.03	Z02.HymFrm331.rn	F	canopy	33
<i>Ooceraea</i> sp.01	Z02.HymFrm265.rn	J	canopy	34
<i>Aenictus inflatus</i>	Z02.HymFrm146.rn	F, J	canopy	35
<i>Aenictus</i> cf. <i>glabrinotum</i>	Z02.HymFrm109.rn	F, J, O	canopy	36
<b>Ectatomminae</b>				
<i>Rhytidoponera</i> sp.01	B01.HymFrm221.jw	F, J	litter	37
<b>Formicinae</b>				
<i>Anoplolepis gracilipes</i>	Z02.HymFrm056.rn	J, R, O	canopy	38
<i>Camponotus</i> ( <i>Karavaievia</i> ) <i>dolichoderoides</i>	Z02.HymFrm050.rn	F	canopy	39
<i>Camponotus</i> ( <i>Karavaievia</i> ) <i>gombaki</i>	Z02.HymFrm188.rn	F	canopy	40
<i>Camponotus</i> ( <i>Myrmamblys</i> ) sp.27 of SKY	Z02.HymFrm270.rn	J, O	canopy	41
<i>Camponotus</i> ( <i>Myrmamblys</i> ) sp.40 of SKY	Z02.HymFrm178.rn	O, R	canopy	42
<i>Camponotus</i> ( <i>Myrmamblys</i> ) sp.100 of SKY	Z02.HymFrm099.rn	F	canopy	43
<i>Camponotus</i> ( <i>Myrmamblys</i> ) sp.101	Z02.HymFrm215.rn	F, J, R	canopy	44
<i>Camponotus</i> ( <i>Myrmamblys</i> ) <i>bedoti</i>	Z02.HymFrm179.rn	F, J, O, R	canopy	45



(Morpho-) Species	MSP Code	Land Use	Stratum	Figures
<i>Camponotus (Tanaemyrmex)</i> sp.72 of SKY	Z02.HymFrm049.rn	F, J, O	canopy	46
<i>Camponotus (Tanaemyrmex)</i> sp.129 of SKY	Z02.HymFrm040.rn	F, J, O, R	canopy	47-48
<i>Camponotus (Tanaemyrmex)</i> sp.01	Z02.HymFrm335.rn	F	canopy	49
<i>Camponotus (Tanaemyrmex)</i> sp.02	Z02.HymFrm403.rn	F	canopy	50
<i>Camponotus</i> cf. <i>carin</i>	Z02.HymFrm505.jd	F, R	canopy	51
<i>Camponotus</i> cf. <i>korthalsiae</i>	Z02.HymFrm290.rn	F	canopy	52
<i>Camponotus festinus</i>	Z02.HymFrm504.jd	J	canopy	53
<i>Camponotus</i> sp.05	Z02.HymFrm180.rn	F, J, O	canopy	54
<i>Camponotus</i> sp.09	Z02.HymFrm075.rn	F	canopy	55
<i>Camponotus</i> sp.15	Z02.HymFrm177.rn	F, J	canopy	56
<i>Camponotus</i> sp.18	B01.HymFrm296.rn	R	litter	NA
<i>Camponotus</i> sp.21	Z02.HymFrm192.rn	F	canopy	57
<i>Camponotus</i> sp.24	Z02.HymFrm212.rn	J	canopy	58
<i>Camponotus</i> sp.26	Z02.HymFrm010.rn	F, J, O, R	canopy	59
<i>Camponotus</i> sp.28	Z02.HymFrm337.rn	F	canopy	60
<i>Camponotus</i> sp.29	Z02.HymFrm417.rn	R	canopy	61
<i>Camponotus</i> sp.42 of SKY	Z02.HymFrm059.rn	F, J, O	canopy	62
<i>Camponotus</i> sp.93 of SKY	Z02.HymFrm182.rn	F, J	canopy	63
<i>Camponotus</i> sp.103	Z02.HymFrm415.rn	F	canopy	64
<i>Cladomyrma</i> cf. <i>nudidorsalis</i>	Z02.HymFrm218.rn	F	canopy	65
<i>Colobopsis leonardi</i> group sp.01	Z02.HymFrm032.rn	F, J, O, R	canopy	66-67
<i>Colobopsis saundersi</i> group sp.01	Z02.HymFrm155.rn	F	canopy	68
<i>Colobopsis saundersi</i> group sp.02	Z02.HymFrm048.rn	F	canopy	69
<i>Colobopsis saundersi</i> group sp.03	Z02.HymFrm219.rn	F	canopy	70
<i>Colobopsis saundersi</i> group sp.04	Z02.HymFrm090.rn	F	canopy	71
<i>Colobopsis</i> sp. ( <i>Camponotus</i> sp.28 of SKY)	Z02.HymFrm186.rn	F, J	canopy	72

(Morpho-) Species	MSp Code	Land Use	Stratum	Figures
<i>Colobopsis</i> sp. ( <i>Camponotus</i> sp.65 of SKY)	Z02.HymFrm195.rn	F, J	canopy	73
<i>Colobopsis</i> sp.15	B01.HymFrm228.jw	F	litter	NA
<i>Colobopsis vitrea</i> group sp.01	Z02.HymFrm211.rn	F, J, R	canopy	NA
<i>Colobopsis vitrea praerufa</i>	Z02.HymFrm187.rn	F, J, O, R	canopy	74
<i>Dinomyrmex gigas</i>	Z02.HymFrm063.rn	F, J, R	canopy	75-76
<i>Echinopla lineata</i>	Z02.HymFrm143.rn	F, J, R	canopy	77
<i>Echinopla striata</i>	Z02.HymFrm013.rn	F, J, R	canopy	78
<i>Echinopla tritschleri</i>	Z02.HymFrm334.rn	F	canopy	79
<i>Euprenolepis procera</i>	B01.HymFrm213.jw	F, J	litter	80
<i>Gesomyrmex kalshoveni</i>	Z02.HymFrm101.rn	F, J	canopy	81-82
<i>Lepisiota</i> sp.01	Z02.HymFrm210.rn	J	canopy	83
<i>Myrmoteras estrudae</i>	B01.HymFrm210.jw	F	litter	84
<i>Myrmoteras</i> sp.01	Z02.HymFrm046.rn	F	canopy	85
<i>Nylanderia bourbonica</i>	B01.HymFrm304.jw	J	litter	86
<i>Nylanderia</i> cf. <i>kraepelini</i>	B01.HymFrm241.jw	F, J, R	litter	87
<i>Nylanderia kraepelini</i>	Z02.HymFrm115.rn	F, J, O, R	canopy	88
<i>Nylanderia</i> cf. <i>vaga</i>	Z02.HymFrm207.rn	F, O, R	canopy	89
<i>Nylanderia</i> cf. <i>vividula</i>	Z02.HymFrm281.rn	J, R	canopy	90
<i>Oecophylla smaragdina</i>	Z02.HymFrm062.rn	R, O	canopy	91
<i>Overbeckia</i> sp.01	Z02.HymFrm031.rn	F, J, O	canopy	92
<i>Overbeckia subclavata</i>	Z02.HymFrm285.rn	J, R	canopy	93
<i>Paraparatrechina</i> cf. <i>opaca</i>	Z02.HymFrm068.rn	F, J, O, R	canopy	94
<i>Paraparatrechina dichroa</i>	Z02.HymFrm001.rn	F, J, O, R	canopy	95
<i>Paraparatrechina</i> sp.01	B01.HymFrm026.jw	F, J, O, R	canopy	96
<i>Paraparatrechina</i> sp.102	B01.HymFrm251.jw	F	litter	NA
<i>Paraparatrechina</i> sp.103	B01.HymFrm317.jw	R	litter	NA
<i>Paraparatrechina</i> sp.104	B01.HymFrm318.jw	J	litter	NA





(Morpho-) Species	MSp Code	Land Use	Stratum	Figures
<i>Paratrechina longicornis</i>	Z02.HymFrm208.rn	J, O, R	canopy	97
<i>Plagiolepis</i> cf. <i>alluaudi</i>	Z02.HymFrm246.rn	O, R	litter	NA
<i>Plagiolepis</i> sp.02	Z02.HymFrm217.rn	F, J	canopy	98
<i>Polyrhachis</i> ( <i>Cyrtomyrma</i> ) cf. <i>lepida</i>	Z02.HymFrm064.rn	F, J, O, R	canopy	99
<i>Polyrhachis</i> ( <i>Myrma</i> ) <i>nigropilosa</i>	Z02.HymFrm130.rn	F, J	canopy	100
<i>Polyrhachis</i> ( <i>Myrma</i> ) <i>proxima</i>	Z02.HymFrm070.rn	F, J, O, R	canopy	101
<i>Polyrhachis</i> ( <i>Myrma</i> ) sp. cf. <i>inermis</i>	Z02.HymFrm170.rn	F, O	canopy	102
<i>Polyrhachis</i> ( <i>Myrmatopa</i> ) <i>schang</i>	Z02.HymFrm025.rn	F, J, O, R	canopy	103
<i>Polyrhachis</i> ( <i>Myrmatopa</i> ) <i>simillima</i>	Z02.HymFrm166.rn	F, J, R	canopy	104
<i>Polyrhachis</i> ( <i>Myrmatopa</i> ) sp.01	Z02.HymFrm052.rn	F, O	canopy	105
<i>Polyrhachis</i> ( <i>Myrmhopla</i> ) <i>abdominalis</i>	Z02.HymFrm069.rn	F, J, O, R	canopy	106
<i>Polyrhachis</i> ( <i>Myrmhopla</i> ) <i>armata</i>	Z02.HymFrm011.rn	F, J, O, R	canopy	107
<i>Polyrhachis</i> ( <i>Myrmhopla</i> ) <i>armata</i> group sp.01	Z02.HymFrm015.rn	F, J, O, R	canopy	108
<i>Polyrhachis</i> ( <i>Myrmhopla</i> ) <i>armata</i> group sp.02	Z02.HymFrm163.rn	F, J, O	canopy	109
<i>Polyrhachis</i> ( <i>Myrmhopla</i> ) <i>armata</i> group sp.03	Z02.HymFrm507.jd	F, J, O, R	canopy	110
<i>Polyrhachis</i> ( <i>Myrmhopla</i> ) <i>armata</i> group sp.04	Z02.HymFrm.333.rn	F, J, O, R	canopy	111
<i>Polyrhachis</i> ( <i>Myrmhopla</i> ) <i>bicolor</i> group sp.01	Z02.HymFrm024.rn	F, J, O, R	canopy	112
<i>Polyrhachis</i> ( <i>Myrmhopla</i> ) <i>bicolor</i> group sp.02	Z02.HymFrm078.rn	F, O	canopy	113
<i>Polyrhachis</i> ( <i>Myrmhopla</i> ) <i>bicolor</i> group sp.03	Z02.HymFrm508.jd	F, J, O, R	canopy	114
<i>Polyrhachis</i> ( <i>Myrmhopla</i> ) <i>bicolor</i> group sp.04	Z02.HymFrm291.rn	F	canopy	115
<i>Polyrhachis</i> ( <i>Myrmhopla</i> ) <i>bicolor</i> group sp.05	Z02.HymFrm221.rn	F, O	canopy	116
<i>Polyrhachis</i> ( <i>Myrmhopla</i> ) <i>bicolor</i> group sp.06	Z02.HymFrm509.jd	F, J, O, R	canopy	117

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<i>Polyrhachis (Myrmhopla) bicolor</i> group sp.07	Z02.HymFrm510.jd	F, J, O	canopy	118
<i>Polyrhachis (Myrmhopla) flavoflagellata</i> group sp.1	Z02.HymFrm200.rn	F	canopy	119
<i>Polyrhachis (Myrmhopla) mucronata</i> group sp.01	Z02.HymFrm023.rn	F, J	canopy	120
<i>Polyrhachis (Myrmhopla) ochracea</i> group sp.01	Z02.HymFrm220.rn	F	canopy	NA
<i>Polyrhachis (Myrmhopla) rufipes</i>	Z02.HymFrm138.rn	J	canopy	121
<i>Polyrhachis (Myrmhopla) sp. near basirufa</i>	Z02.HymFrm172.rn	F	canopy	122
<i>Polyrhachis (Myrmotherinx) near thrinax</i> sp.01	Z02.HymFrm071.rn	F, J, O, R	canopy	123
<i>Polyrhachis (Myrmotherinx) near thrinax</i> sp.02	Z02.HymFrm124.rn	F, J	canopy	124
<i>Polyrhachis (Myrmotherinx) near thrinax</i> sp.03	Z02.HymFrm222.rn	O, R	canopy	125
<i>Polyrhachis (Myrmotherinx) near thrinax</i> sp.04	Z02.HymFrm259.rn	F	canopy	NA
<i>Polyrhachis (Myrmotherinx) near thrinax</i> sp.05	Z02.HymFrm080.rn	F, J, O	canopy	126
<i>Polyrhachis (Polyrhachis) olybria</i>	Z02.HymFrm267.rn	F, J	canopy	127
<i>Polyrhachis (Polyrhachis) ypsilon</i>	Z02.HymFrm148.rn	F	canopy	128
<i>Polyrhachis</i> sp.21	B01.HymFrm247.jw	O	litter	NA
<i>Polyrhachis</i> sp.38	Z02.HymFrm414.rn	F	canopy	NA
<i>Polyrhachis</i> sp.101	Z02.HymFrm113.rn	F, J, O, R	canopy	129
<i>Polyrhachis</i> sp.103	Z02.HymFrm.413.rn	F, J, O, R	canopy	130
<i>Prenolepis</i> sp.01	Z02.HymFrm066.rn	F, J, O, R	canopy	131
<i>Prenolepis subopaca</i>	B01.HymFrm286.jw	J	litter	132
<i>Pseudolasius</i> sp.01	B01.HymFrm214.jw	F	litter	NA
<i>Pseudolasius</i> sp.02	B01.HymFrm215.jw	F	litter	NA



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<b>Myrmicinae</b>				
<i>Acanthomyrmex ferox</i>	B01.HymFrm220.jw	F, J	litter	133-134
<i>Aphaenogaster feae</i>	B01.HymFrm211.jw	F	litter	135
<i>Aphaenogaster</i> sp.01	Z02.HymFrm161.rn	F	canopy	136
<i>Cardiocondyla wroughtonii</i>	Z02.HymFrm021.rn	F, J, O, R	canopy	137
<i>Cardiocondyla</i> sp.01	Z02.HymFrm206.rn	F	canopy	138
<i>Cardiocondyla</i> sp.02	B01.HymFrm227.jw	F, J, R	litter	139
<i>Cardiocondyla</i> sp.03	B01.HymFrm303.jw	R	litter	NA
<i>Carebara pygmaea</i>	Z02.HymFrm141.rn	F, J	canopy	140-141
<i>Carebara</i> sp.01	B01.HymFrm223.jw	F, O, R	litter	142-143
<i>Carebara</i> sp.02	B01.HymFrm224.jw	F	litter	144-145
<i>Carebara</i> sp.03	B01.HymFrm225.jw	O	litter	146
<i>Carebara</i> sp.04	Z02.HymFrm201.rn	F, J	canopy	147
<i>Carebara</i> sp.61	Z02.HymFrm061.rn	F, J, O, R	canopy	148
<i>Carebara</i> sp.99	Z02.HymFrm154.rn	F	canopy	NA
<i>Carebara</i> sp.104	B01.HymFrm226.jw	O	litter	149
<i>Cataulacus hispidulus</i>	Z02.HymFrm091.rn	F, J, O, R	canopy	150
<i>Cataulacus horridus</i>	Z02.HymFrm159.rn	F	canopy	151
<i>Cataulacus latissimus</i>	Z02.HymFrm030.rn	F, J, O, R	canopy	152
<i>Cataulacus praetextus</i>	Z02.HymFrm004.rn	F, J, O	canopy	153
<i>Crematogaster borneensis</i> gr. sp.01	Z02.HymFrm239.rn	F, J, R	canopy	154
<i>Crematogaster borneensis</i> gr. sp.02	Z02.HymFrm252.rn	F, J, O, R	canopy	155
<i>Crematogaster borneensis</i> gr. sp.03	Z02.HymFrm256.rn	J	canopy	156
<i>Crematogaster borneensis</i> gr. sp.04	Z02.HymFrm407.rn	J	canopy	157
<i>Crematogaster</i> cf. <i>cylindriceps</i>	Z02.HymFrm074.rn	F, J, O, R	canopy	158
<i>Crematogaster</i> cf. <i>discinodis</i>	Z02.HymFrm226.rn	F, J, R	canopy	159
<i>Crematogaster</i> cf. <i>indosinensis</i>	Z02.HymFrm242.rn	F, J, O	canopy	160
<i>Crematogaster</i> cf. <i>pfeifferi</i>	Z02.HymFrm247.rn	F, J, R	canopy	161



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<i>Crematogaster coriaria</i>	Z02.HymFrm225.rn	F, J, O, R	canopy	162
<i>Crematogaster ferrarii</i>	Z02.HymFrm237.rn	F, J, O	canopy	163
<i>Crematogaster fraxatrix</i>	Z02.HymFrm254.rn	F, J, O, R	canopy	164
<i>Crematogaster fraxatrix</i> group <i>simboloni</i> sp.01	Z02.HymFrm244.rn	F, J, O, R	canopy	165
<i>Crematogaster inflata</i>	Z02.HymFrm313.rn	F	canopy	166
<i>Crematogaster modiglianii</i>	Z02.HymFrm301.rn	F, J	canopy	167
<i>Crematogaster reticulata</i>	Z02.HymFrm234.rn	F, J, R	canopy	168
<i>Crematogaster rogenhoferi</i> group sp.01	Z02.HymFrm017.rn	F, J, O, R	canopy	169
<i>Crematogaster rogenhoferi</i> group sp.02	Z02.HymFrm117.rn	F, J, O, R	canopy	170
<i>Crematogaster rogenhoferi</i> group sp.03	Z02.HymFrm229.rn	J, R	canopy	171
<i>Crematogaster sewardi</i>	Z02.HymFrm245.rn	F	canopy	172
<i>Crematogaster treubi</i>	Z02.HymFrm238.rn	F, J, O, R	canopy	173
<i>Crematogaster treubi</i> group sp.01	Z02.HymFrm248.rn	F, J	canopy	174
<i>Crematogaster treubi</i> group sp.02	Z02.HymFrm295.rn	J	canopy	175
<i>Crematogaster tumidula</i>	Z02.HymFrm253.rn	F, J, O, R	canopy	176
<i>Crematogaster</i> sp.02 of SH	Z02.HymFrm236.rn	F, J, O, R	canopy	177
<i>Crematogaster</i> sp.02	Z02.HymFrm044.rn	F, J, O, R	canopy	178
<i>Crematogaster</i> sp.06	B01.HymFrm232.jw	F, J	litter	179
<i>Crematogaster</i> sp.07	B01.HymFrm233.jw	F	litter	180
<i>Crematogaster</i> sp.09	B01.HymFrm235.jw	F	litter	NA
<i>Crematogaster</i> sp.10	B01.HymFrm236.jw	O, R	litter	181
<i>Crematogaster</i> sp.11	B01.HymFrm237.jw	F	litter	NA
<i>Crematogaster</i> sp.12	B01.HymFrm238.jw	F, J	litter	182
<i>Crematogaster</i> sp.13	B01.HymFrm239.jw	F, J	litter	183
<i>Crematogaster</i> sp.14	B01.HymFrm305.jw	R	litter	184
<i>Crematogaster</i> sp.16	B01.HymFrm307.jw	J, R	litter	185



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<i>Crematogaster</i> sp.17	Z02.HymFrm299.rn	O	canopy	NA
<i>Crematogaster</i> sp.18	B01.HymFrm309.jw	J	litter	186
<i>Crematogaster</i> sp.30	Z02.HymFrm249.rn	F	canopy	187
<i>Crematogaster</i> sp.47	Z02.HymFrm303.rn	F	canopy	188
<i>Crematogaster</i> sp.71	Z02.HymFrm327.rn	F	canopy	NA
<i>Crematogaster</i> sp.77	Z02.HymFrm409.rn	O	canopy	189
<i>Crematogaster</i> sp.78	Z02.HymFrm410.rn	F	canopy	190
<i>Crematogaster</i> sp.79	Z02.HymFrm411.rn	F	canopy	191
<i>Crematogaster</i> sp.101	Z02.HymFrm235.rn	F, J, O	canopy	192
<i>Crematogaster</i> sp.102	Z02.HymFrm246.rn	F, J	canopy	193
<i>Crematogaster</i> sp.103	Z02.HymFrm251.rn	F, J, O	canopy	194
<i>Crematogaster</i> sp.104	Z02.HymFrm307.rn	F, J	canopy	195
<i>Crematogaster</i> sp.105	Z02.HymFrm321.rn	F, R	canopy	196
<i>Crematogaster</i> sp.106	Z02.HymFrm327.rn	F	canopy	197
<i>Crematogaster</i> sp.107	Z02.HymFrm404.rn	F, J	canopy	198
<i>Dilobocondyla borneensis</i>	Z02.HymFrm093.rn	F, J, R	canopy	199
<i>Dilobocondyla</i> sp.01	Z02.HymFrm054.rn	F, J	canopy	200
<i>Dilobocondyla</i> sp.02	Z02.HymFrm153.rn	F, J, R	canopy	201
<i>Dilobocondyla</i> sp.03	Z02.HymFrm401.rn	F	canopy	202
<i>Eurhopalothrix</i> sp.01	B01.HymFrm301.jw	J	litter	203
<i>Gauromyrmex</i> sp.01	Z02.HymFrm037.rn	F, J	canopy	204
<i>Gauromyrmex</i> sp.02	Z02.HymFrm338.rn	F	canopy	205
<i>Lophomyrmex bedoti</i>	B01.HymFrm209.jw	F, J, O, R	litter	206
<i>Lophomyrmex</i> sp.01	Z02.HymFrm418.rn	F	canopy	207
<i>Meranoplus castaneus</i>	Z02.HymFrm133.rn	F, O, R	canopy	208
<i>Meranoplus mucronatus</i>	Z02.HymFrm332.rn	J	canopy	209
<i>Monomorium floricola</i>	Z02.HymFrm006.rn	F, J, O, R	canopy	210
<i>Monomorium chinense</i>	Z02.HymFrm019.rn	F, J, O, R	canopy	211

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<i>Monomorium</i> sp.03	Z02.HymFrm111.rn	F, J, R	canopy	212
<i>Monomorium</i> sp.04	Z02.HymFrm036.rn	F, J, O, R	canopy	213
<i>Monomorium</i> sp.05	B01.HymFrm244.jw	F, J, O	litter	214
<i>Monomorium</i> sp.06	B01.HymFrm245.jw	F, O, R	litter	215
<i>Myrmecina</i> sp.01	B01.HymFrm217.jw	F	litter	NA
<i>Myrmecina</i> sp.02	B01.HymFrm218.jw	F	litter	NA
<i>Paratopula</i> sp.01	Z02.HymFrm203.rn	F	canopy	216
<i>Myrmicaria adpressipilosa</i>	Z02.HymFrm339.rn	F	canopy	217
<i>Myrmicaria luteiventris</i>	Z02.HymFrm416.rn	F	canopy	218
<i>Pheidole aristotelis</i>	B01.HymFrm262.jw	F	litter	219-220
<i>Pheidole</i> cf. <i>annexa</i>	B01.HymFrm255.jw	F, O	litter	221
<i>Pheidole</i> cf. <i>poringensis</i>	B01.HymFrm314.jw	J	litter	222-223
<i>Pheidole</i> cf. <i>rugifera</i>	B01.HymFrm312.jw	J	litter	224-225
<i>Pheidole</i> cf. <i>sauberi</i>	B01.HymFrm311.jw	J	litter	226-227
<i>Pheidole clypeocornis</i>	B01.HymFrm261.jw	F	litter	228-229
<i>Pheidole ghigi</i>	B01.HymFrm313.jw	R	litter	230-231
<i>Pheidole hortensis</i>	B01.HymFrm264.jw	F, J	litter	232-233
<i>Pheidole huberi</i>	B01.HymFrm315.jw	J	litter	234-235
<i>Pheidole jacobsoni</i>	B01.HymFrm259.jw	F	litter	236-237
<i>Pheidole parvicorpus</i>	B01.HymFrm256.jw	F	litter	238-239
<i>Pheidole plagiaria</i>	B01.HymFrm257.jw	O	litter	240-241
<i>Pheidole rabo</i>	B01.HymFrm263.jw	F	litter	242-243
<i>Pheidole retivertex</i>	B01.HymFrm252.jw	F	litter	244-245
<i>Pheidole submonticola</i>	B01.HymFrm316.jw	J	litter	246
<i>Pheidole tjibodana</i>	B01.HymFrm253.jw	F	litter	247-248
<i>Pheidole upeneci</i>	B01.HymFrm258.jw	F	litter	249-250
<i>Pheidole</i> sp.01	Z02.HymFrm038.rn	F, J, O, R	canopy	251





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<i>Pheidole</i> sp.02	Z02.HymFrm067.rn	F, J, O, R	canopy	252
<i>Pheidole</i> sp.03	Z02.HymFrm081.rn	F, J, O	canopy	253
<i>Pheidole</i> sp.04	Z02.HymFrm122.rn	F, J, O	canopy	254
<i>Pheidole</i> sp.05	Z02.HymFrm197.rn	O, R	canopy	255
<i>Pheidole</i> sp.06	Z02.HymFrm292.rn	F	canopy	256
<i>Pheidole</i> sp.07	B01.HymFrm254.jw	F, J	litter	257-258
<i>Pheidole</i> sp.08	B01.HymFrm260.jw	F	litter	NA
<i>Pristomyrmex</i> sp.01	Z02.HymFrm269.rn	R	canopy	259
<i>Proatta butteli</i>	Z02.HymFrm116.rn	J, O	canopy	260-261
<i>Recurvidris kemneri</i>	B01.HymFrm200.jw	F	litter	262
<i>Rhopalomastix</i> sp.01	Z02.HymFrm042.rn	F, J	canopy	263
<i>Rotastruma</i> sp.01	Z02.HymFrm029.rn	F, J, O	canopy	264
<i>Strumigenys indagatrix</i>	Z02.HymFrm060.rn	F, J, O, R	canopy	265
<i>Strumigenys treptodens</i>	Z02.HymFrm271.rn	F, J	canopy	266
<i>Strumigenys rogeri</i>	B01.HymFrm250.jw	F	litter	267
<i>Strumigenys</i> cf. <i>sydorata</i>	B01.HymFrm297.jw	R	litter	268
<i>Strumigenys mitis</i>	Z02.HymFrm107.rn	F, J, R	canopy	269
<i>Temnothorax</i> sp.01	Z02.HymFrm402.rn	F	canopy	270
<i>Tetramorium</i> cf. <i>curtulum</i>	B01.HymFrm206.jw	F, O	litter	271
<i>Tetramorium</i> cf. <i>noratum</i>	B01.HymFrm268.jw	F, J	litter	272
<i>Tetramorium simillimum</i>	B01.HymFrm205.jw	O	litter	273
<i>Tetramorium</i> sp.01	Z02.HymFrm098.rn	F, J	canopy	274
<i>Tetramorium</i> sp.02	Z02.HymFrm110.rn	F, J, O, R	canopy	275
<i>Tetramorium</i> sp.03	Z02.HymFrm120.rn	F, J, O, R	canopy	276
<i>Tetramorium</i> sp.05	Z02.HymFrm224.rn	F, O, R	canopy	277
<i>Tetramorium</i> sp.08	B01.HymFrm207.jw	F	litter	278
<i>Tetramorium</i> sp.09	B01.HymFrm271.jw	O, R	litter	279

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<i>Tetramorium</i> sp.10	Z02.HymFrm257.rn	R	canopy	280
<i>Tetramorium</i> sp.11	Z02.HymFrm289.rn	F	canopy	281
<i>Tetramorium</i> sp.99	B01.HymFrm203.jw	F	litter	NA
<i>Tetramorium</i> sp.101	Z02.HymFrm511.jd	F, J	canopy	282
<i>Tetramorium</i> sp.104	B01.HymFrm267.jw	F, J, R	litter	283
<i>Tetramorium</i> sp.107	B01.HymFrm208.jw	F, J, R	litter	284
<i>Vollenhovia</i> sp.01	Z02.HymFrm007.rn	F, J, O, R	canopy	285
<i>Vollenhovia</i> sp.02	Z02.HymFrm131.rn	F, J, O, R	canopy	286
<i>Vollenhovia</i> sp.03	Z02.HymFrm202.rn	F, J	canopy	287
<i>Vollenhovia</i> sp.04	B01.HymFrm248.jw	O	litter	288
<i>Vombisidris</i> sp.01	Z02.HymFrm204.rn	F, J	canopy	289
<i>Vombisidris</i> sp.02	Z02.HymFrm205.rn	F, J	canopy	290
<i>Vombisidris</i> sp.03	Z02.HymFrm223.rn	F	canopy	291
<b>PONERINAE</b>				
<i>Anochetus myops</i>	B01.HymFrm212.jw	O	litter	292
<i>Anochetus</i> sp.01	Z02.HymFrm012.rn	F	canopy	293
<i>Brachyponera</i> sp.01	B01.HymFrm281.jw	F, J, O, R	litter	294
<i>Cryptopone</i> sp.01	Z02.HymFrm283.rn	F	canopy	NA
<i>Diacamma rugosum</i>	Z02.HymFrm022.rn	F	canopy	295
<i>Diacamma</i> sp.01	Z02.HymFrm329.rn	F, J	canopy	296
<i>Ectomomyrmex</i> sp.01	B01.HymFrm273.jw	F, J	litter	297
<i>Ectomomyrmex</i> sp.02	B01.HymFrm274.jw	F	litter	298
<i>Emeryopone buttelreepeni</i>	Z02.HymFrm282.rn	J	canopy	299-300
<i>Hypoconera</i> sp.01	Z02.HymFrm085.rn	F, J, O, R	canopy	301
<i>Hypoconera</i> sp.02	B01.HymFrm278.jw	F, J	litter	302
<i>Hypoconera</i> sp.03	Z02.HymFrm261.rn	O	canopy	303
<i>Hypoconera</i> sp.04	Z02.HymFrm262.rn	O	canopy	304
<i>Hypoconera</i> sp.05	B01.HymFrm275.jw	O	litter	NA



(Morpho-) Species	MSp Code	Land Use	Stratum	Figures
<i>Hypoponera</i> sp.06	B01.HymFrm276.jw	F	litter	NA
<i>Hypoponera</i> sp.07	B01.HymFrm277.jw	F	litter	NA
<i>Hypoponera</i> sp.08	B01.HymFrm279.jw	O	litter	NA
<i>Hypoponera</i> sp.09	B01.HymFrm300.jw	R	litter	NA
<i>Hypoponera</i> sp.10	B01.HymFrm280.jw	F, J	litter	305
<i>Leptogenys</i> sp.01	B01.HymFrm216.jw	F	litter	306
<i>Leptogenys</i> sp.02	B01.HymFrm288.jw	J	litter	NA
<i>Odontomachus rixosus</i>	B01.HymFrm219.jw	F, J, O	litter	307
<i>Odontomachus</i> sp.01	Z02.HymFrm260.rn	O	canopy	308
<i>Odontoponera denticulata</i>	B01.HymFrm201.jw	O, R	litter	309
<i>Odontoponera</i> sp.01	Z02.HymFrm196.rn	O	canopy	310
<i>Odontoponera transversa</i>	B01.HymFrm202.jw	F, J	litter	311
<i>Platythyrea</i> sp.01	Z02.HymFrm065.rn	F, J, O, R	canopy	312
<i>Ponera</i> sp.01	B01.HymFrm282.jw	F, J	litter	313
<i>Ponera</i> sp.03	Z02.HymFrm258.rn	O, R	canopy	314
<i>Ponera</i> sp.04	B01.HymFrm283.jw	F, J, R	litter	315
<i>Ponera</i> sp.05	B01.HymFrm284.jw	F	litter	316
<i>Discothyrea</i> sp.01	Z02.HymFrm266.rn	J, R	canopy	317
<i>Proceratium</i> sp.01	B01.HymFrm222.jw	F	litter	NA
<b>PSEUDOMYRMECINAE</b>				
<i>Tetraponera alloborans</i>	B01.HymFrm298.rn		litter	318
<i>Tetraponera attenuata</i>	Z02.HymFrm112.rn	F, J, O, R	canopy	319
<i>Tetraponera crassiuscula</i>	Z02.HymFrm193.rn	F, J, R	canopy	320
<i>Tetraponera difficilis</i>	Z02.HymFrm043.rn	F, J, R	canopy	321

(Morpho-) Species	MSp Code	Land Use	Stratum	Figures
<i>Tetraponera extenuata</i>	Z02.HymFrm128.rn	F, J, R	canopy	322
<i>Tetraponera modesta</i>	Z02.HymFrm018.rn	F, J, R	canopy	323
<i>Tetraponera nitida</i>	Z02.HymFrm002.rn	F, J, R	canopy	324
<i>Tetraponera nodosa</i>	Z02.HymFrm500.rn	F, J, R	canopy	325
<i>Tetraponera pilosa</i>	Z02.HymFrm072.rn	F, J, O, R	canopy	326
<i>Tetraponera polita</i>	Z02.HymFrm506.rn	J	canopy	327
<i>Tetraponera rufonigra</i>	Z02.HymFrm268.rn	R	canopy	328
<i>Tetraponera</i> sp.06	Z02.HymFrm096.rn	F, J, R	canopy	NA





Foto: Kamil Stajnak (2021)  
*Echinopla striata*



## IMAGES OF THE EFFORTS ANT COLLECTION

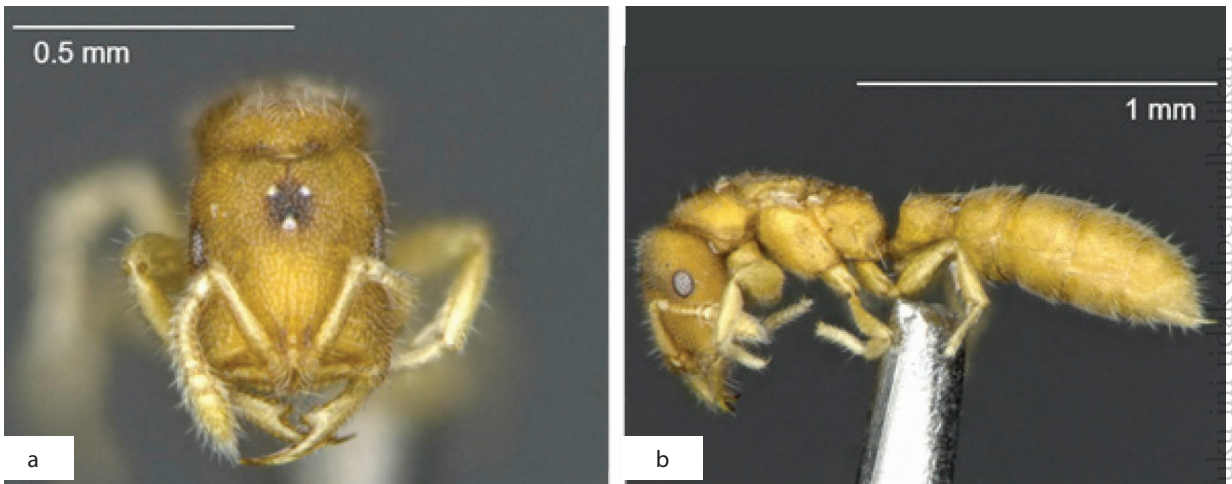
For the majority of the *EFFORTS* (morpho-) species collection, mounted specimens have been photographed using the KEYENCE VHX-2000 digital microscope. All images shown here, as well as further images and data on genus and species level are available on the Ecotaxonomy Database (Potapov et al., 2019). (Morpho-) Species whose images are not available are usually singletons or very rare morphospecies, which we have not mounted yet. Below, we show frontal and lateral images—denoted by (a) and (b), respectively—of one specimen per morphospecies. Further images are available.



## 1. Amblyoponinae



**Figure 4.** *Prionopelta* sp.01, Z02.HymFrm330.rn. Dealate queen.

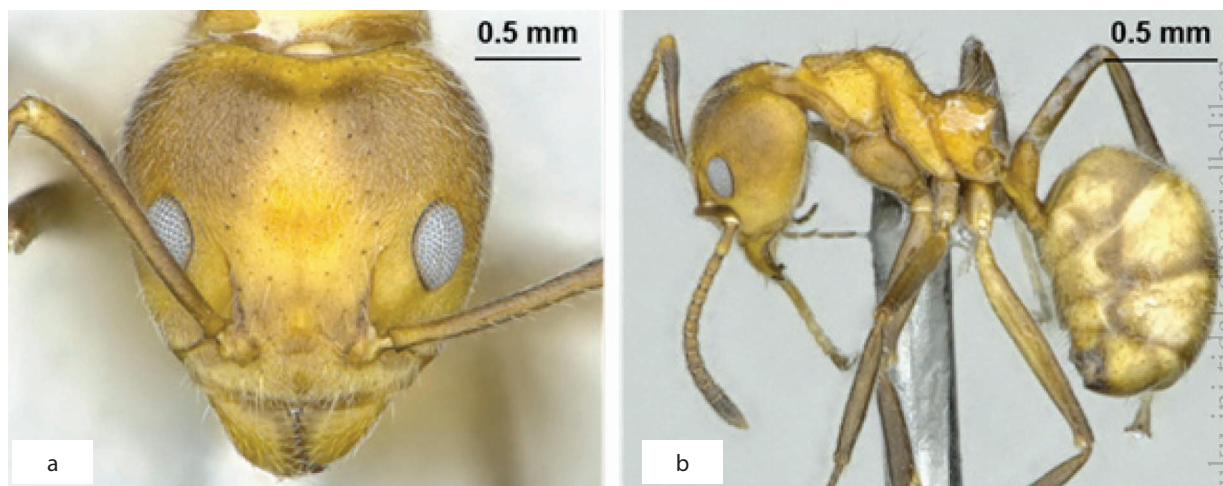


**Figure 5.** *Stigmatomma* sp.01, Z02.HymFrm160.rn. Dealate queen.

## 2. Dolichoderinae

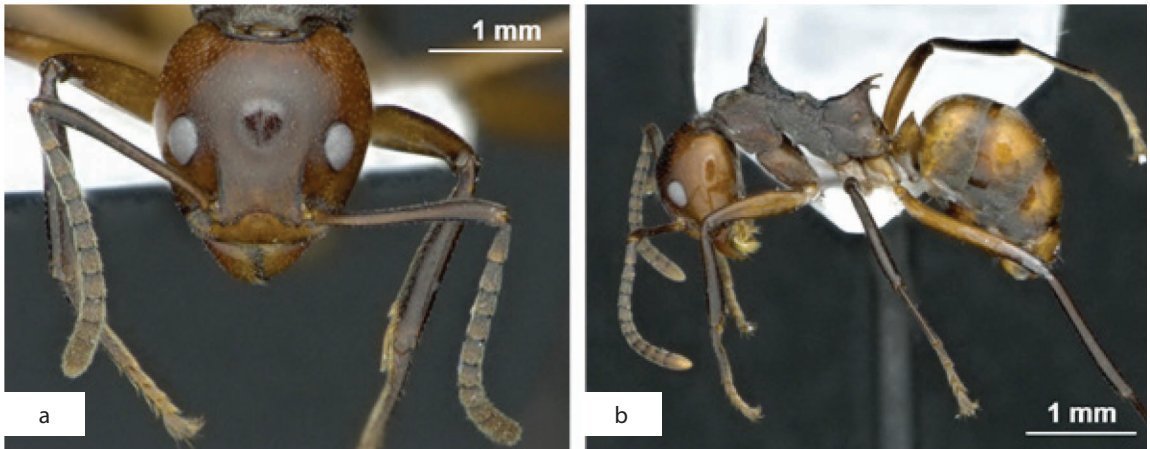


**Figure 6.** *Chronoxenus rossi*, Z02.HymFrm104.rn. Worker.

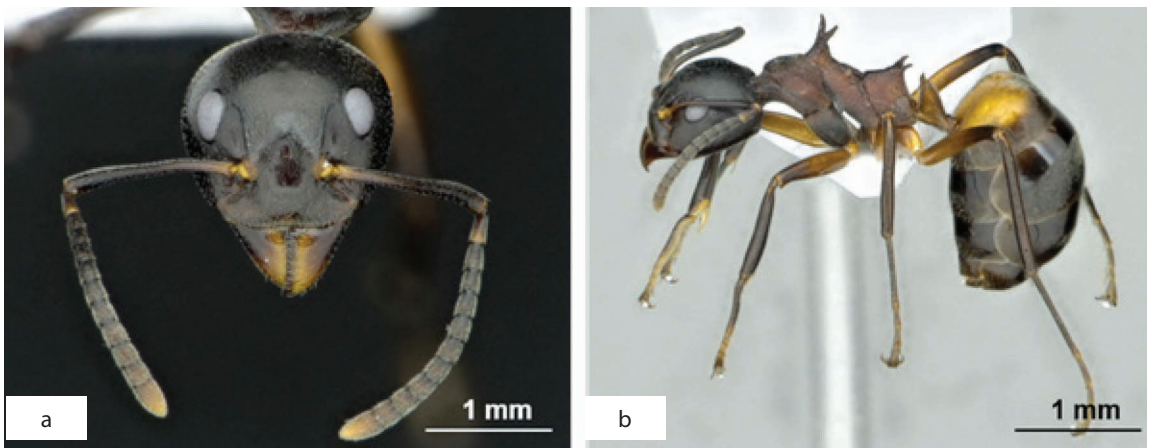


**Figure 7.** *Dolichoderus cf. affinis*, Z02.HymFrm108.rn. Worker.

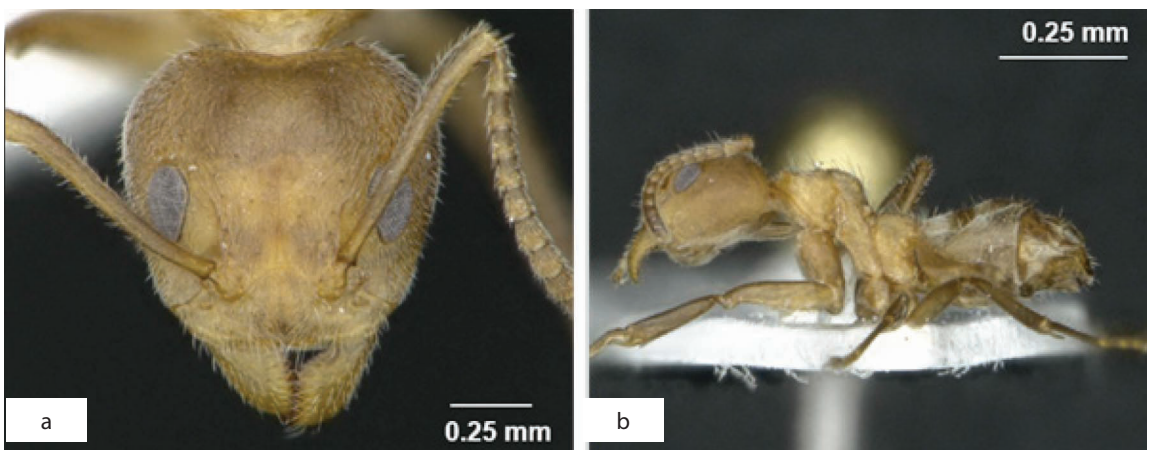




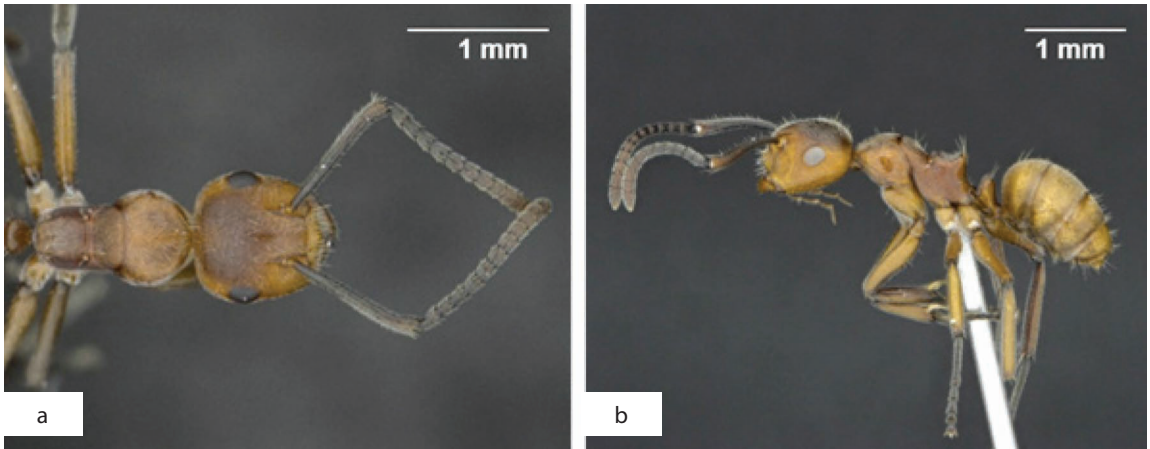
**Figure 8.** *Dolichoderus cf. cuspidatus*, Z02.HymFrm151.rn. Worker.



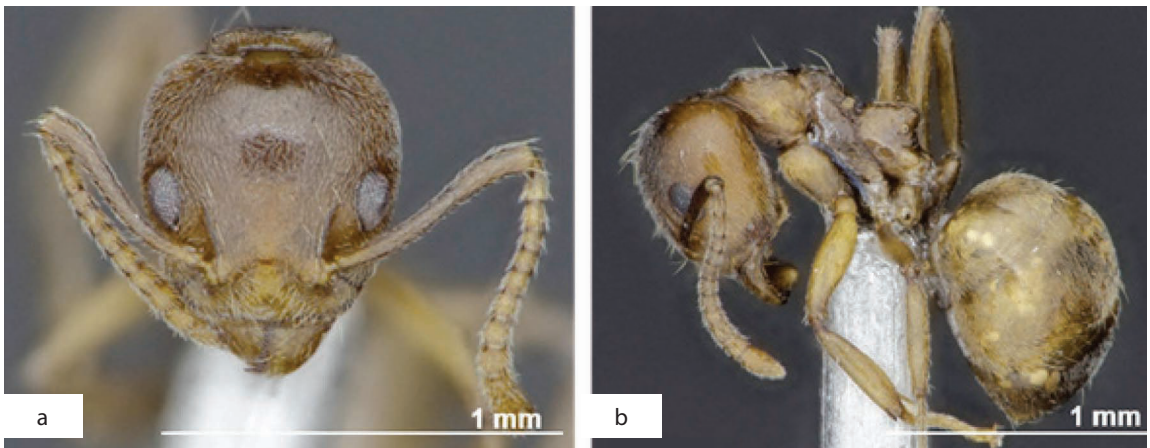
**Figure 9.** *Dolichoderus cuspidatus*, Z02.HymFrm045.rn. Worker.



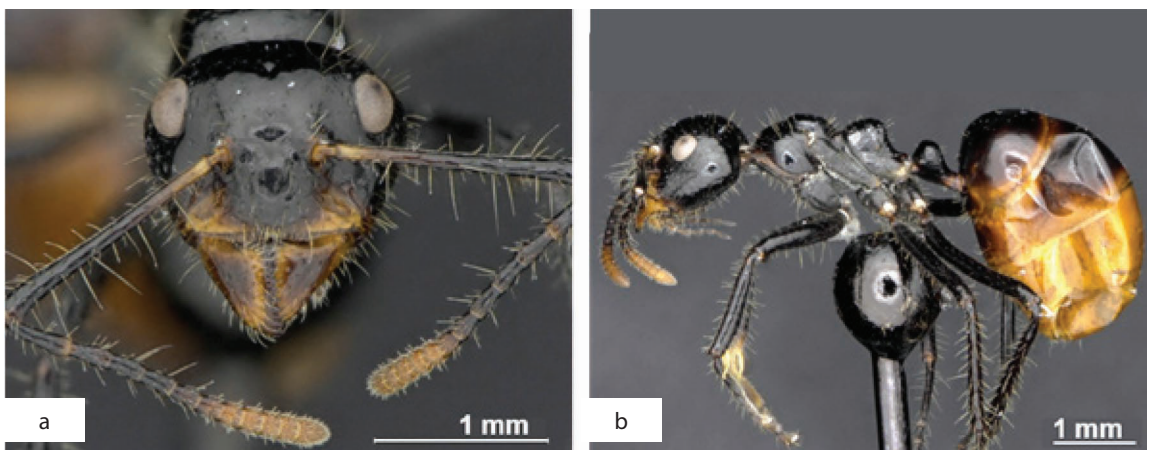
**Figure 10.** *Dolichoderus gibbus*, Z02.HymFrm291.rn. Worker.



**Figure 11.** *Dolichoderus* sp.01, Z02.HymFrm284.rn. Worker.

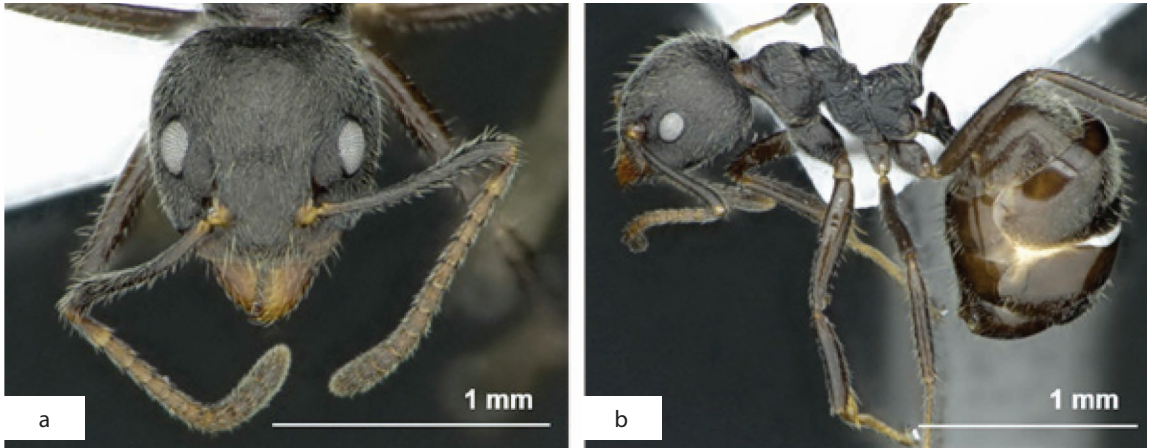


**Figure 12.** *Dolichoderus* sp.06, Z02.HymFrm094.rn. Worker.

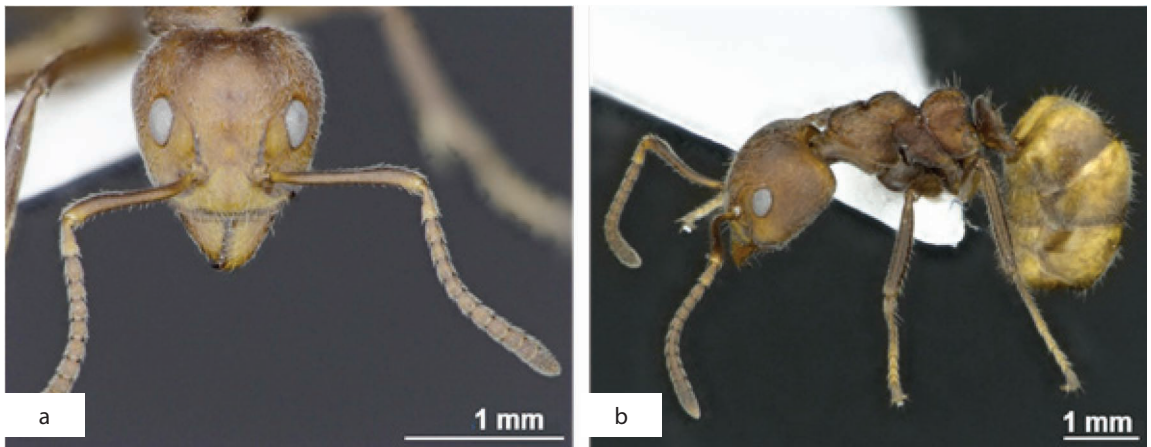


**Figure 13.** *Dolichoderus sulcaticeps*, Z02.HymFrm293.rn. Worker

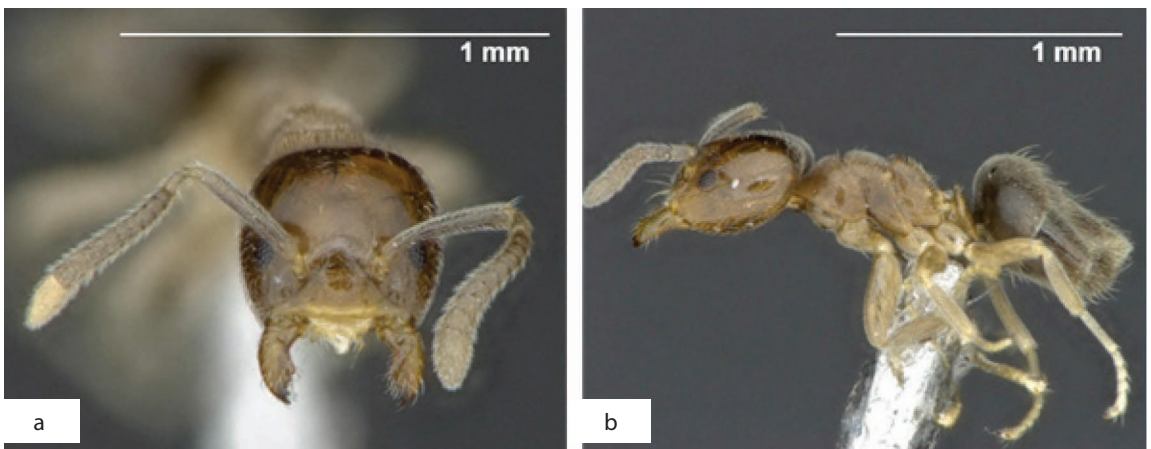




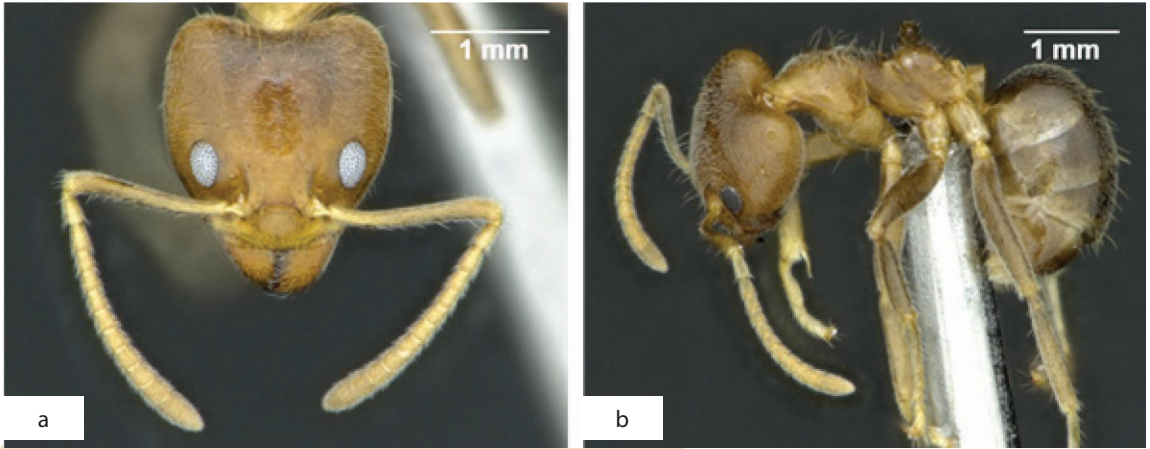
**Figure 14.** *Dolichoderus thoracicus*, Z02.HymFrm009.rn. Worker.



**Figure 15.** *Dolichoderus thoracicus* complex, Z02.HymFrm020.rn. Worker.



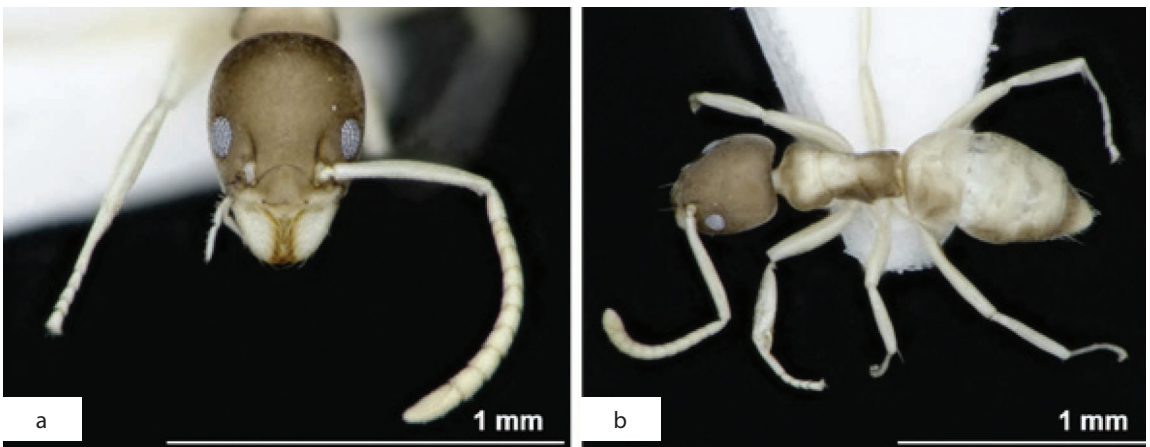
**Figure 16.** *Loweriella* sp.01, Z02.HymFrm216.rn. Worker.



**Figure 17.** *Philidris cordata*, Z02.HymFrm008.rn. Worker.

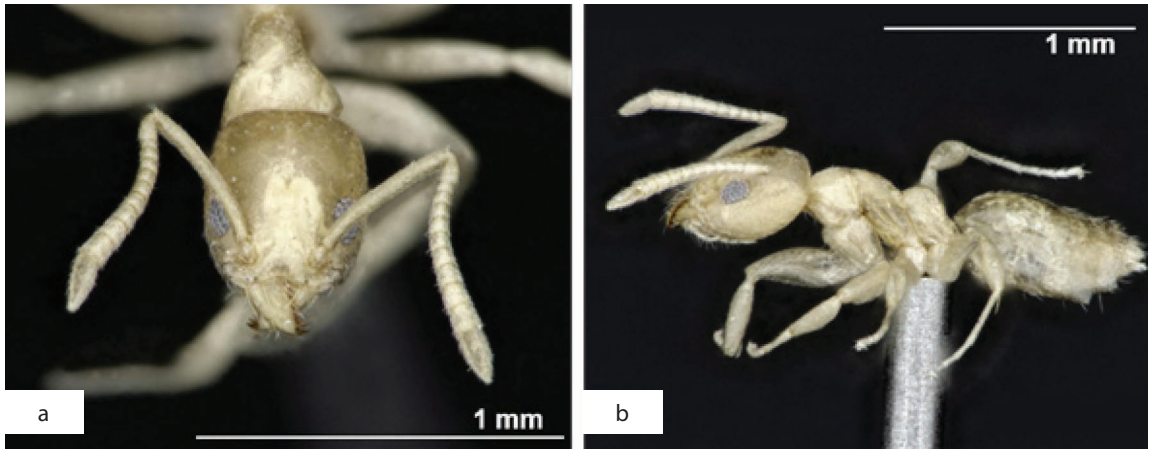


**Figure 18.** *Tapinoma glaucum-andamanensis* group sp.01, Z02.HymFrm035.rn. Worker.

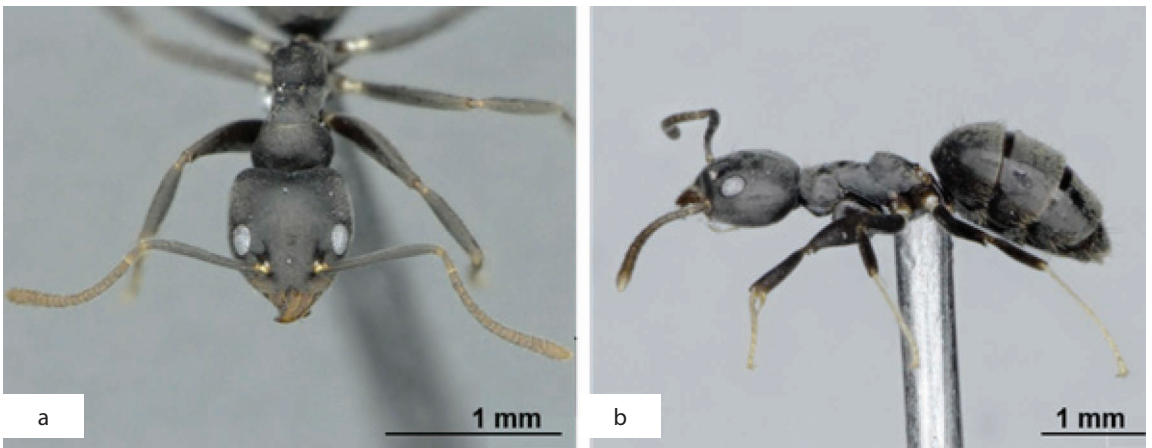


**Figure 19.** *Tapinoma melanocephalum*, Z02.HymFrm014.rn. Worker.

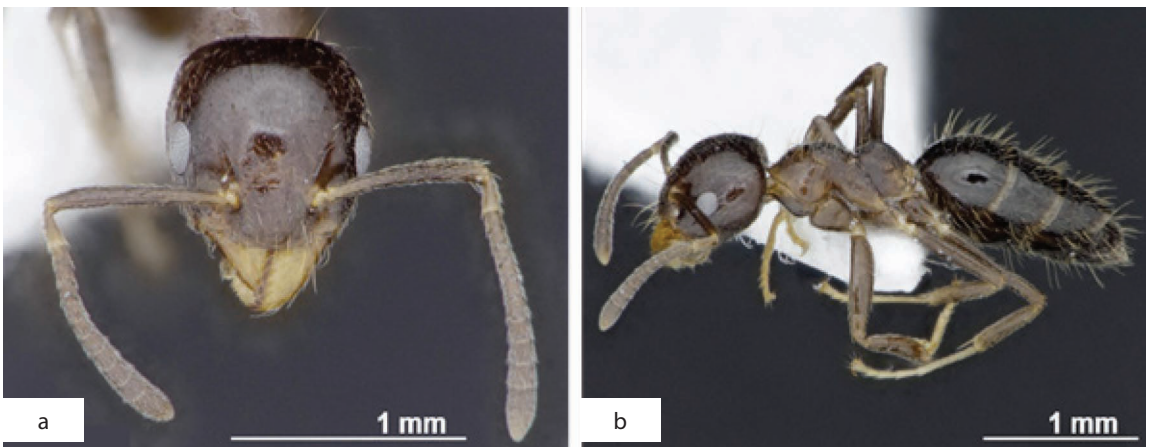




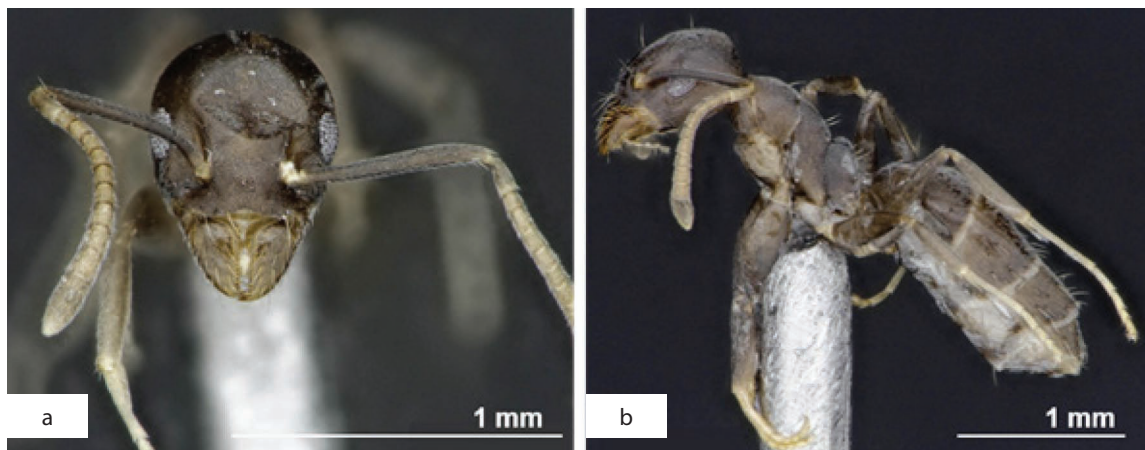
**Figure 20.** *Tapinoma* sp.06, Z02.HymFrm285.rn. Worker.



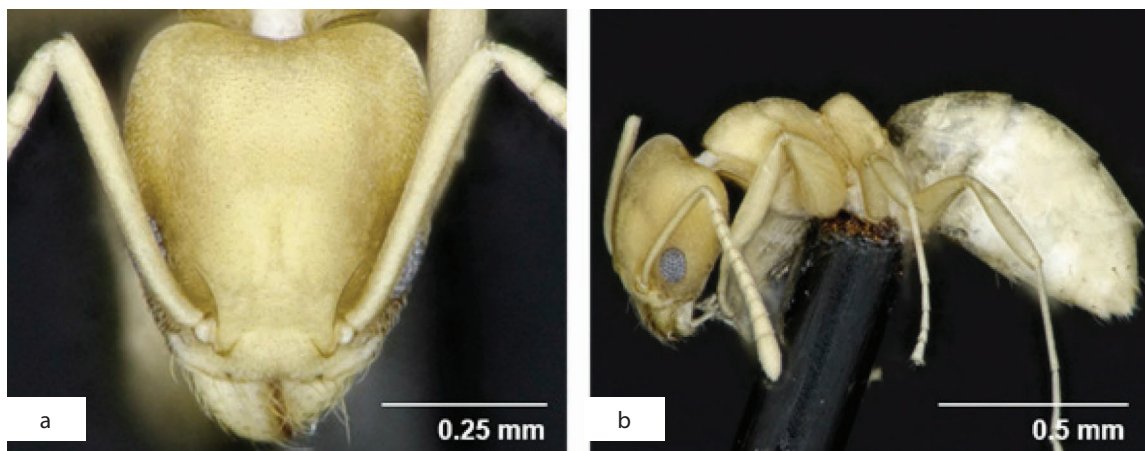
**Figure 21.** *Technomyrmex albipes*, Z02.HymFrm005.rn. Worker.



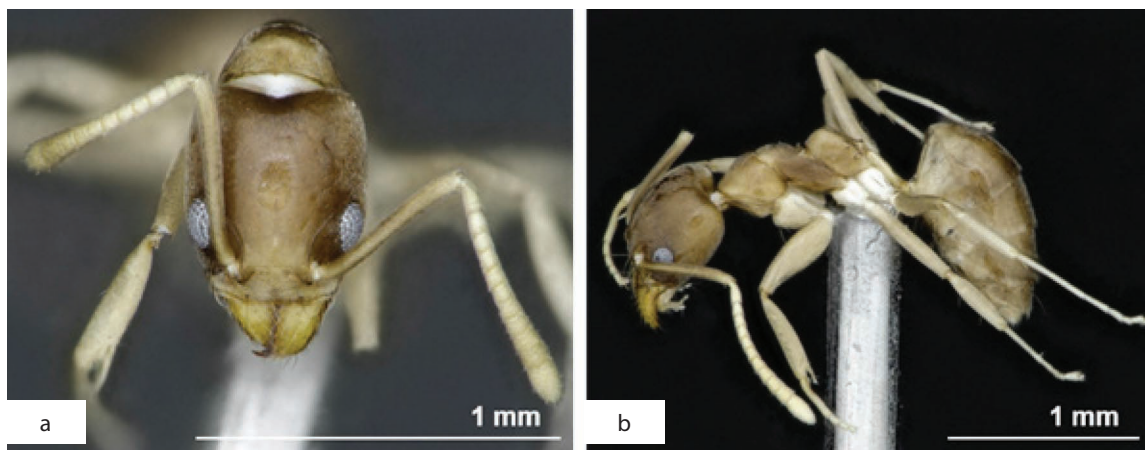
**Figure 22.** *Technomyrmex albipes* cf. *vitiensis* sp.01, Z02.HymFrm033.rn. Worker



**Figure 23.** *Technomyrmex albipes* cf. *vitiensis* sp.02, Z02.HymFrm149.rn. Worker.



**Figure 24.** *Technomyrmex dubius*, Z02.HymFrm097.rn. Worker.

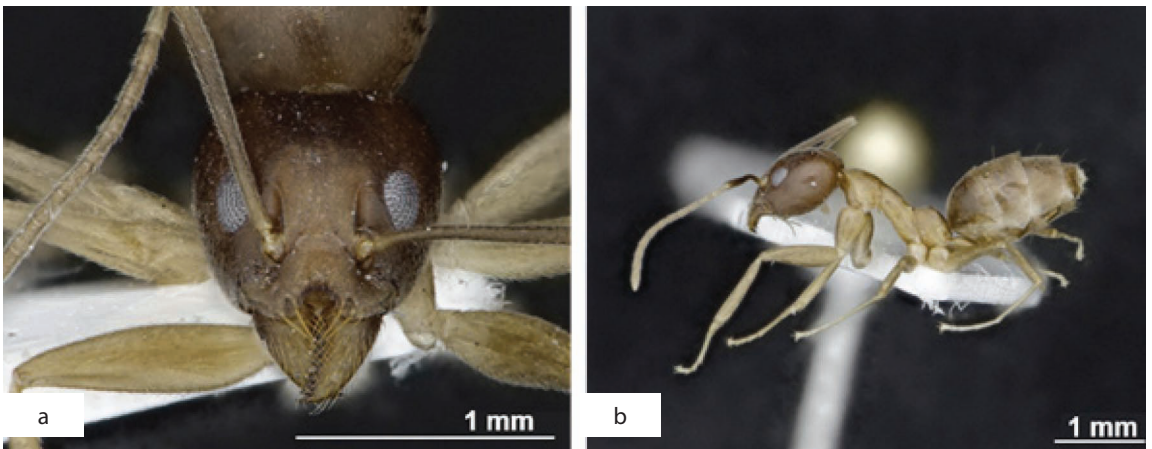


**Figure 25.** *Technomyrmex elatior*, Z02.HymFrm003.rn. Worker.

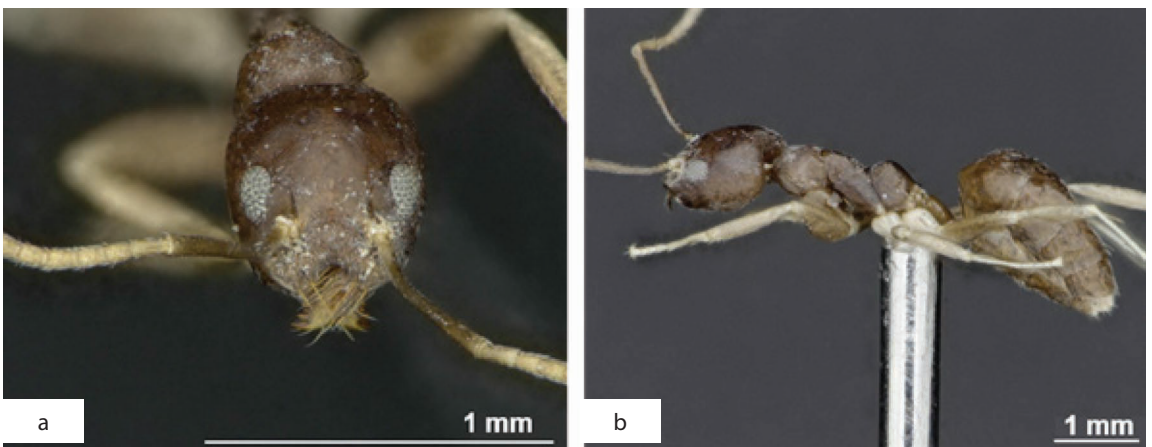




**Figure 26.** *Technomyrmex grandis*, Z02.HymFrm199.rn. Worker.

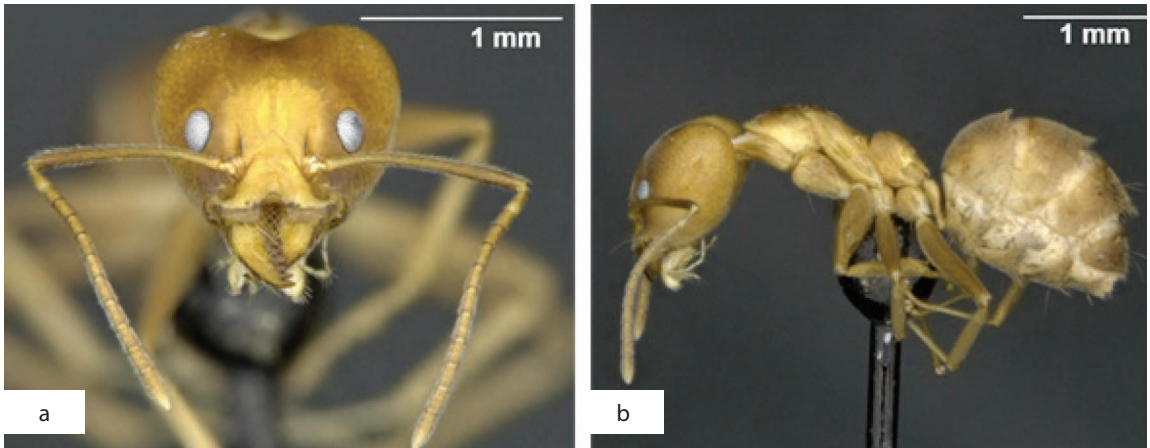


**Figure 27.** *Technomyrmex horni* cf. *schimmeri*, B01.HymFrm266.jw. Worker.

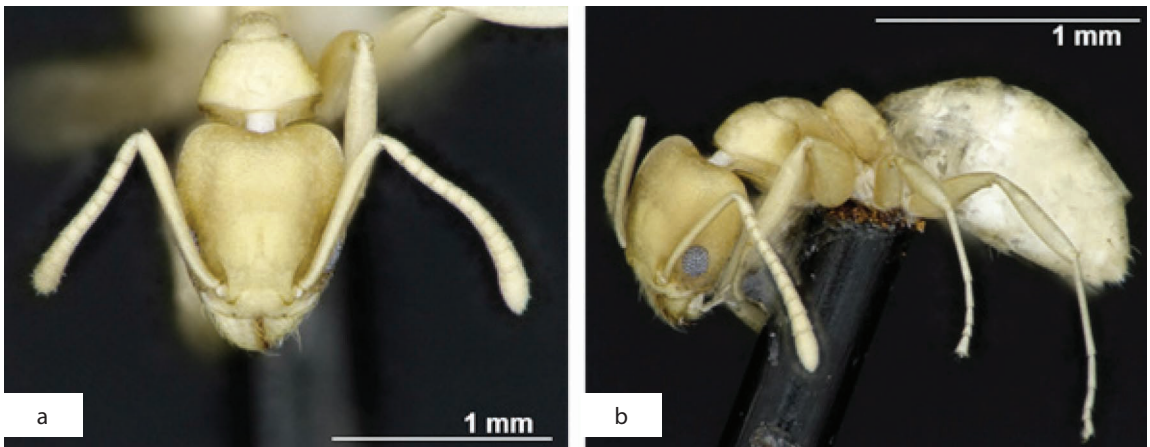


**Figure 28.** *Technomyrmex kraepelini*, B01.HymFrm265.jw. Worker.





**Figure 29.** *Technomyrmex lisae*, Z02.HymFrm336.rn. Worker.



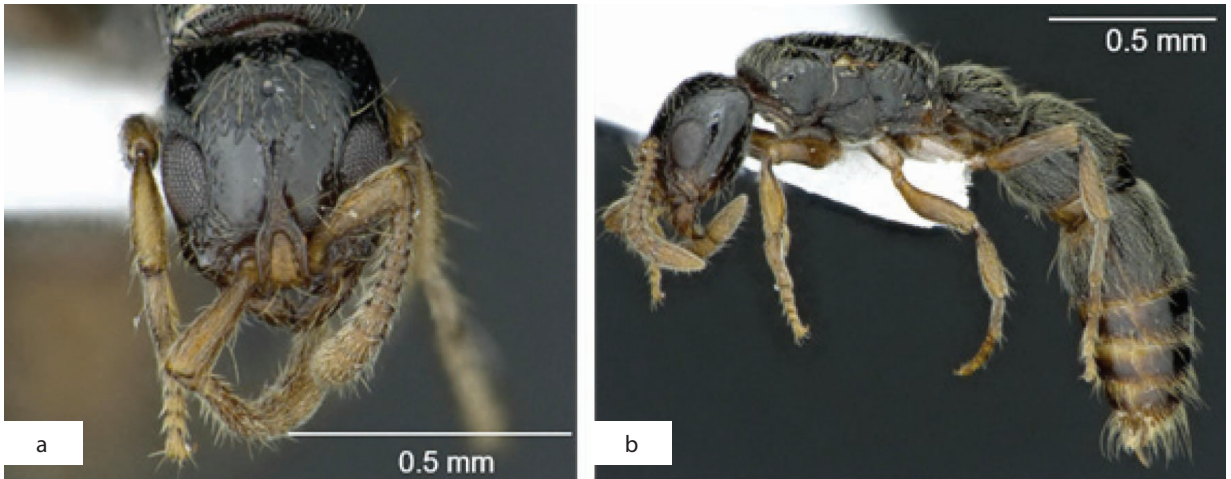
**Figure 30.** *Technomyrmex textor*, Z02.HymFrm502.jd. Worker.



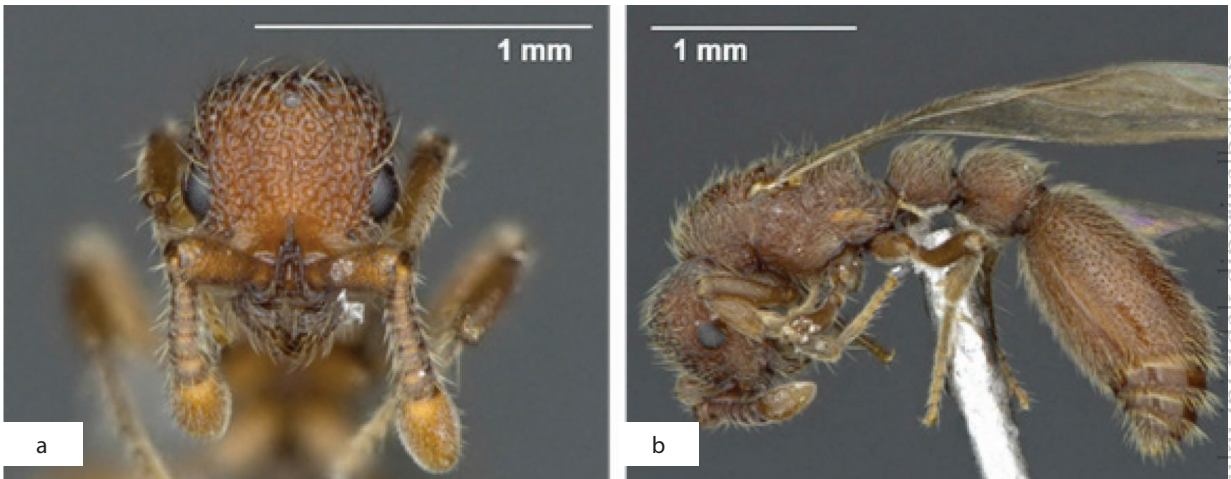
Photo: Gary Alpert (2014)

**Figure 31.** *Technomyrmex wheeleri*, Z02.HymFrm503.jd. Worker.

### 3. Dorylinae

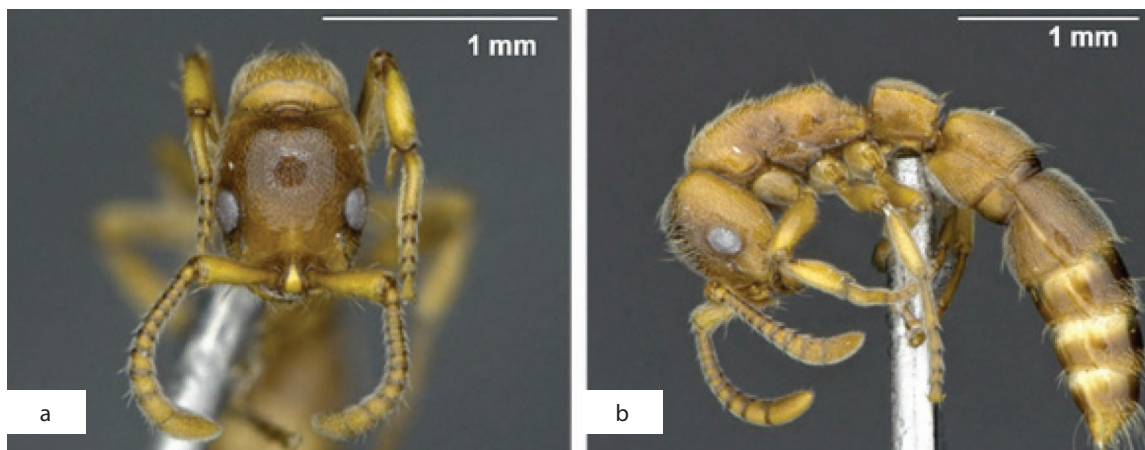


**Figure 32.** *Cerapachys* sp.01, Z02.HymFrm034.rn. Dealate queen.



**Figure 33.** *Cerapachys* sp.03, Z02.HymFrm331.rn. Alate queen.





**Figure 34.** *Ooceraea* sp.01, Z02.HymFrm265.rn. Worker.



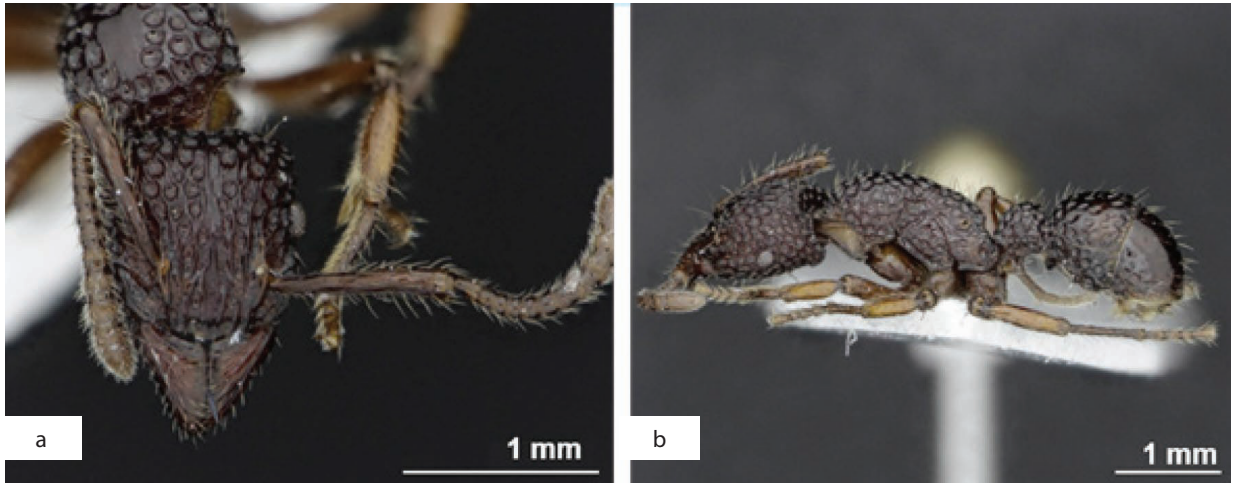
**Figure 35.** *Aenictus inflatus*, Z02.HymFrm146.rn. Worker.



**Figure 36.** *Aenictus* cf. *glabrinotum*, Z02.HymFrm109.rn. Worker.

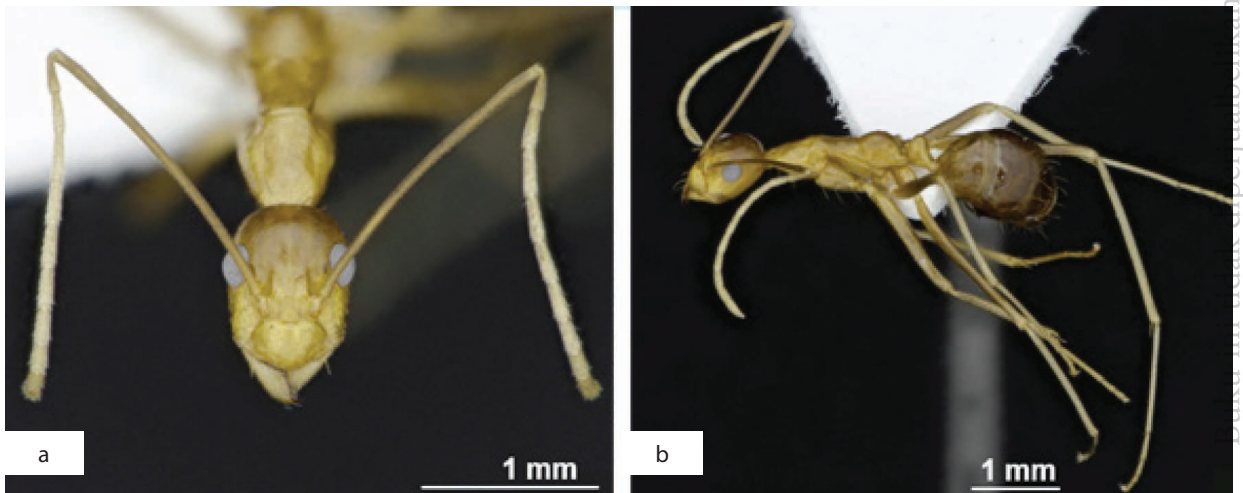


## 4. Ectatomminae

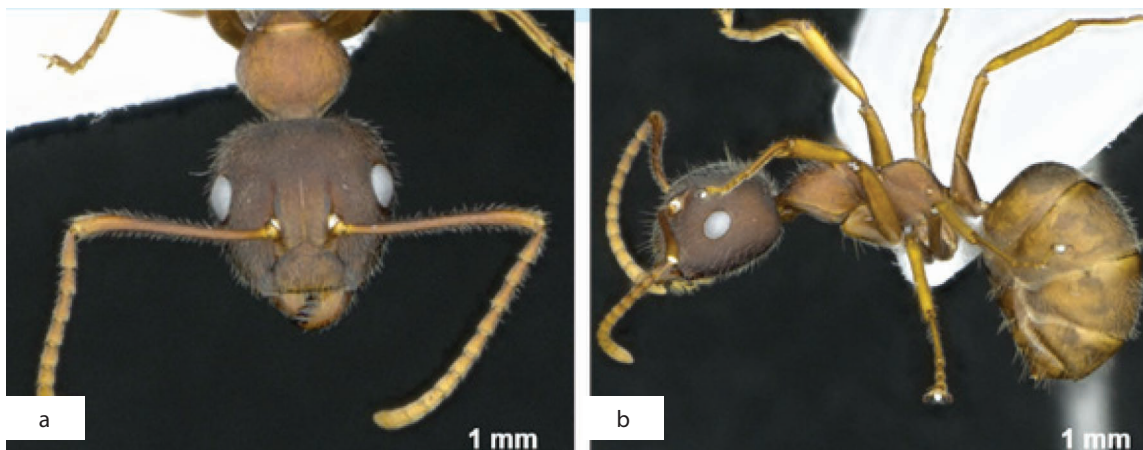


**Figure 37.** *Rhytidoponera* sp.01, B01.HymFrm221.jw. Worker.

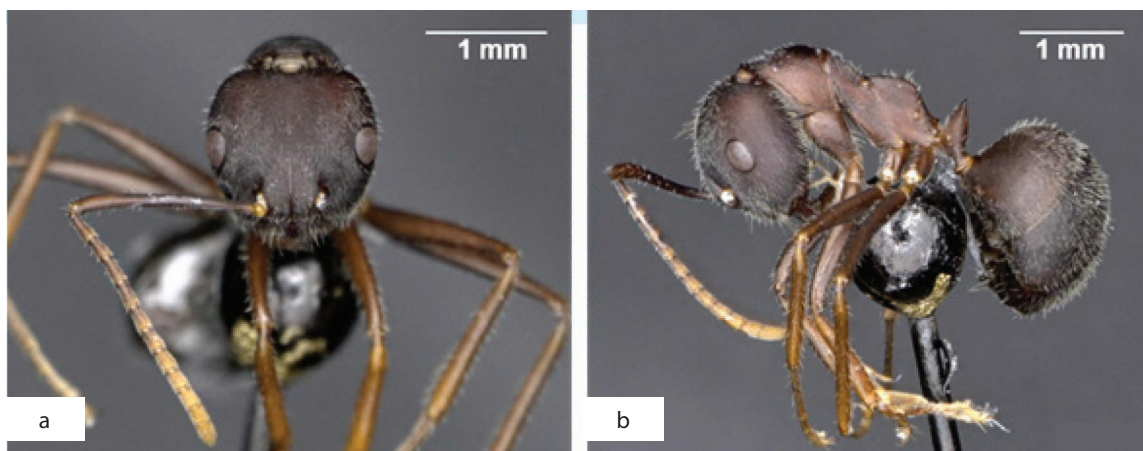
## 5. Formicinae



**Figure 38.** *Anoplolepis gracilipes*, Z02.HymFrm056.rn. Worker.



**Figure 39.** *Camponotus (Karavaievia) dolichoderoides*, Z02.HymFrm050.rn. Worker.

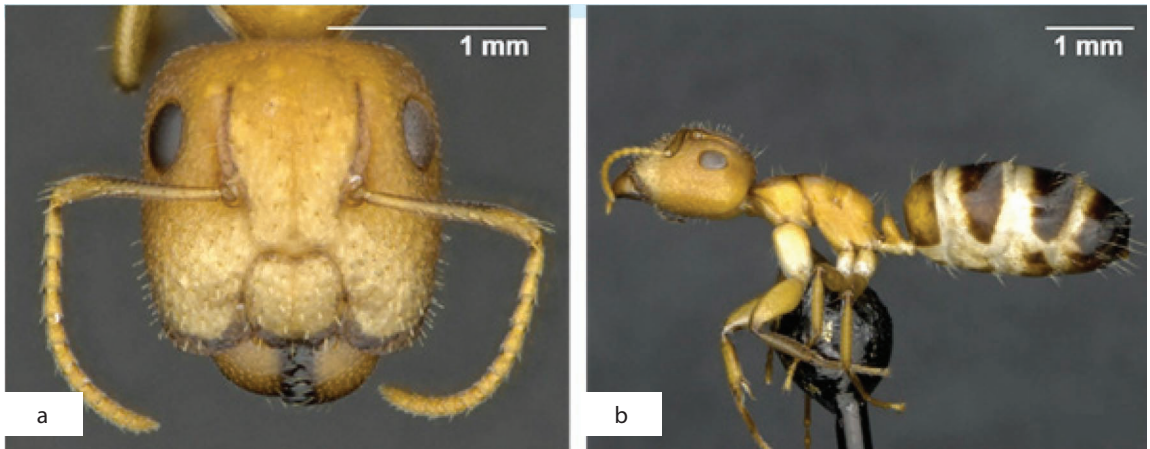


**Figure 40.** *Camponotus (Karavaievia) gombaki*, Z02.HymFrm188.rn. Worker.



**Figure 41.** *Camponotus (Myrmamblys) sp.27* of SKY, Z02.HymFrm270.rn. Worker.

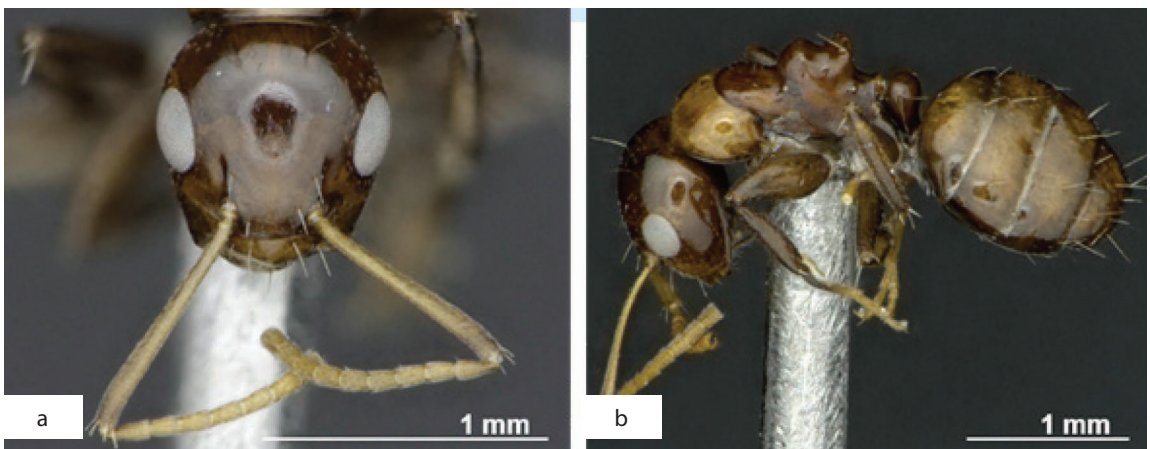




**Figure 42.** *Camponotus (Myrmamblys)* sp.40 of SKY, Z02.HymFrm178.rn. Worker.

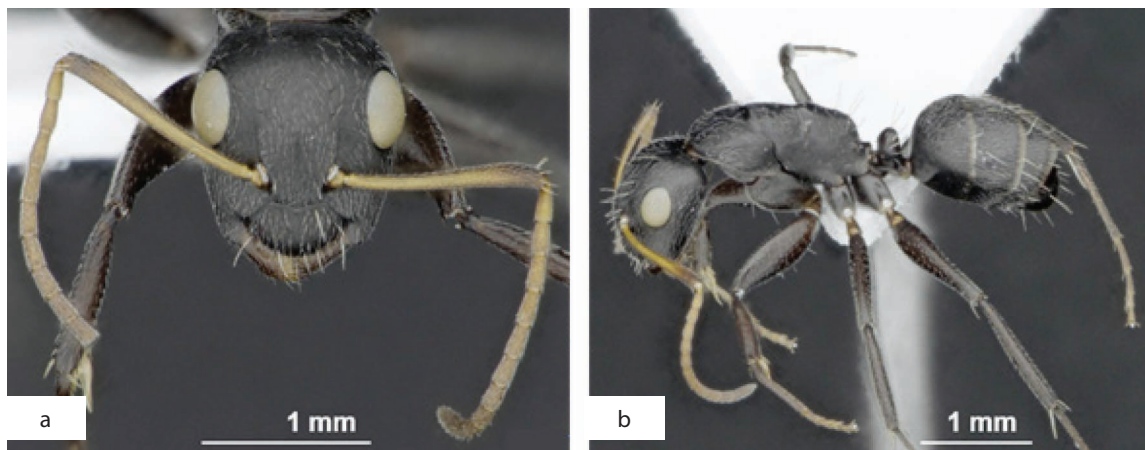


**Figure 43.** *Camponotus (Myrmamblys)* sp.100 of SKY, Z02.HymFrm099.rn. Worker.



**Figure 44.** *Camponotus (Myrmamblys)* sp.101, Z02.HymFrm215.rn. Worker.

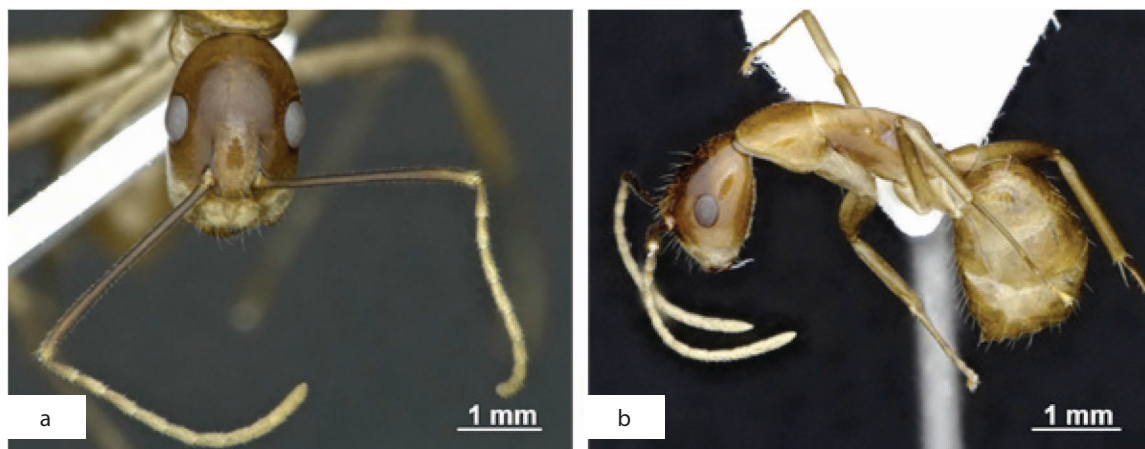




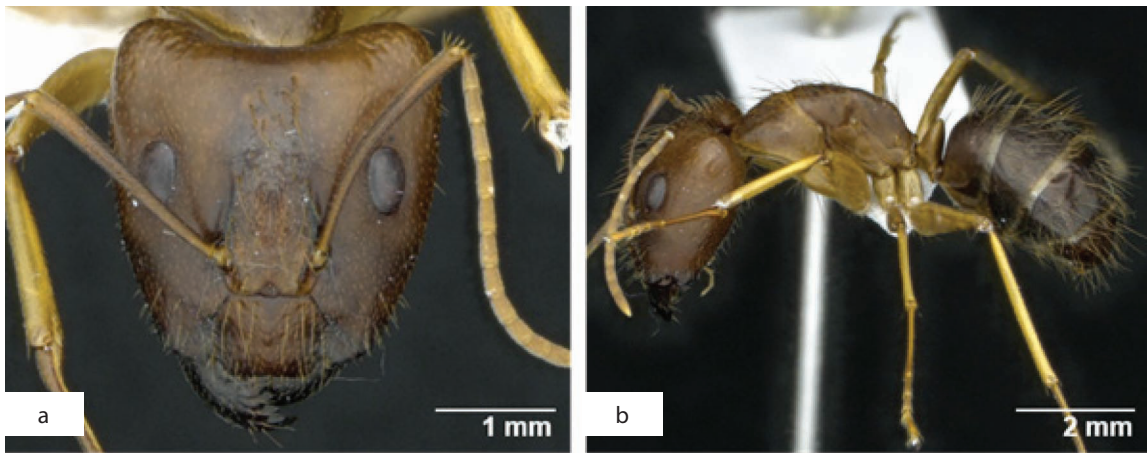
**Figure 45.** *Camponotus (Myrmamblys) bedoti*, Z02.HymFrm179.rn. Worker.



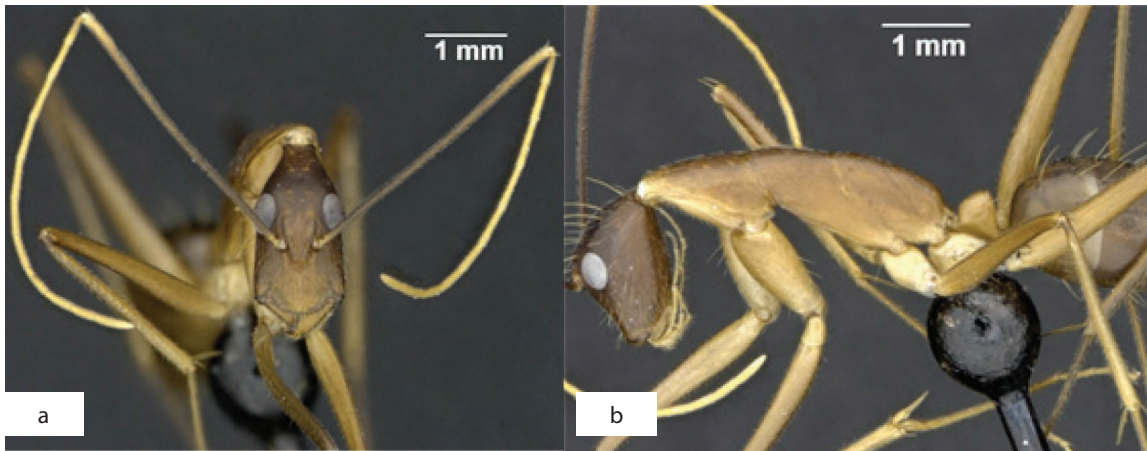
**Figure 46.** *Camponotus (Tanaemyrmex) sp.72* of SKY, Z02.HymFrm049.rn. Worker.



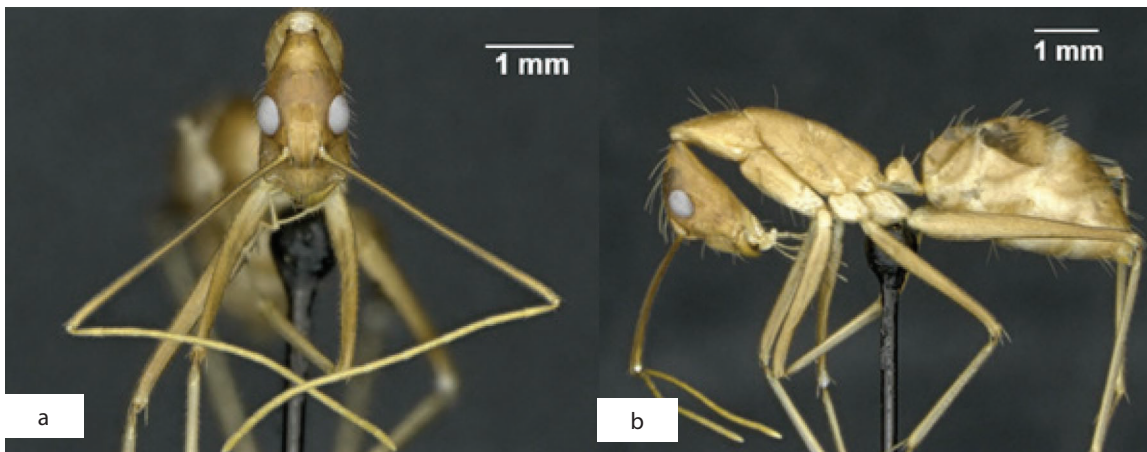
**Figure 47.** *Camponotus (Tanaemyrmex) sp.129* of SKY, Z02.HymFrm040.rn. Minor worker.



**Figure 48.** *Camponotus (Tanaemyrmex)* sp.129 of SKY, Z02.HymFrm040.rn. Major worker.



**Figure 49.** *Camponotus (Tanaemyrmex)* sp.01, Z02.HymFrm335.rn. Worker.

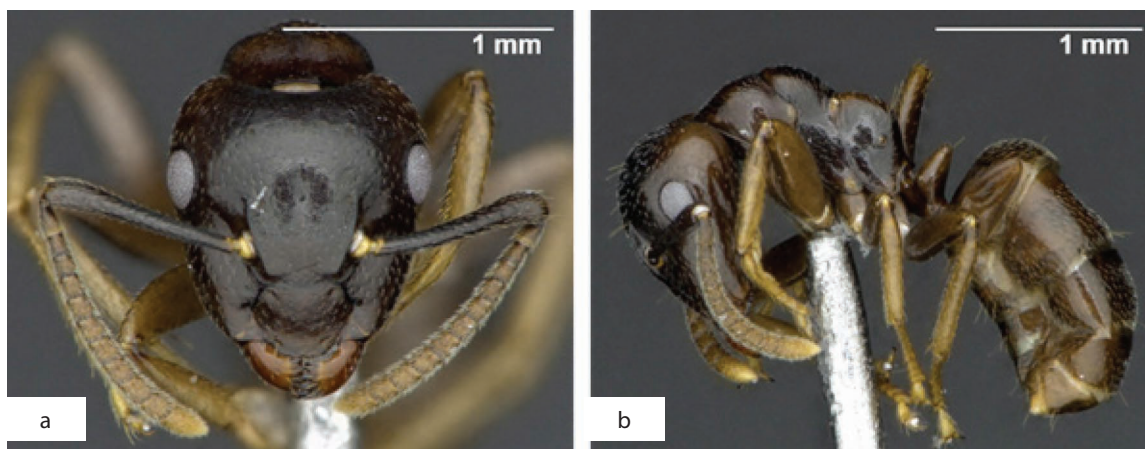


**Figure 50.** *Camponotus (Tanaemyrmex)* sp.02, Z02.HymFrm403.rn. Worker.





**Figure 51.** *Camponotus* cf. *carin*, Z02.HymFrm505.jd. Worker.



**Figure 52.** *Camponotus* cf. *korthalsiae*, Z02.HymFrm290.rn. Worker.

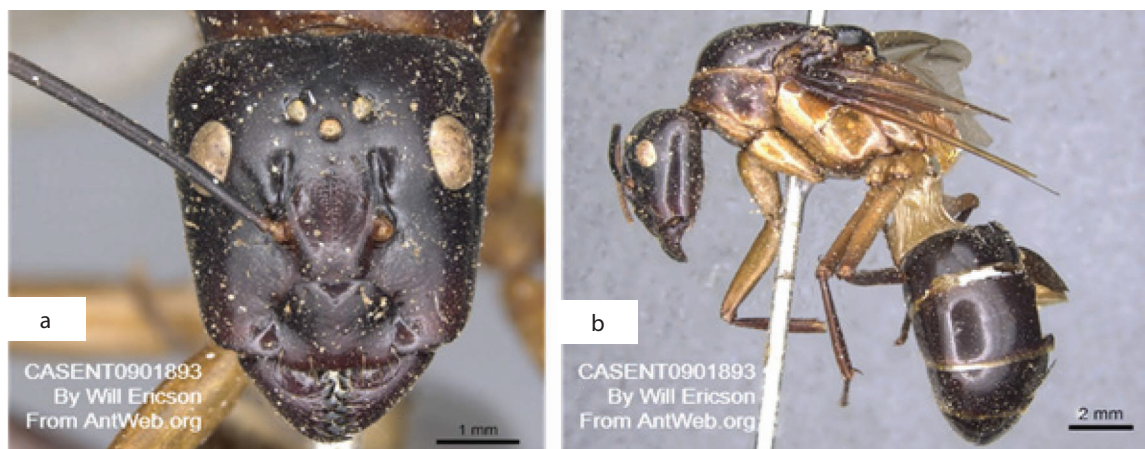
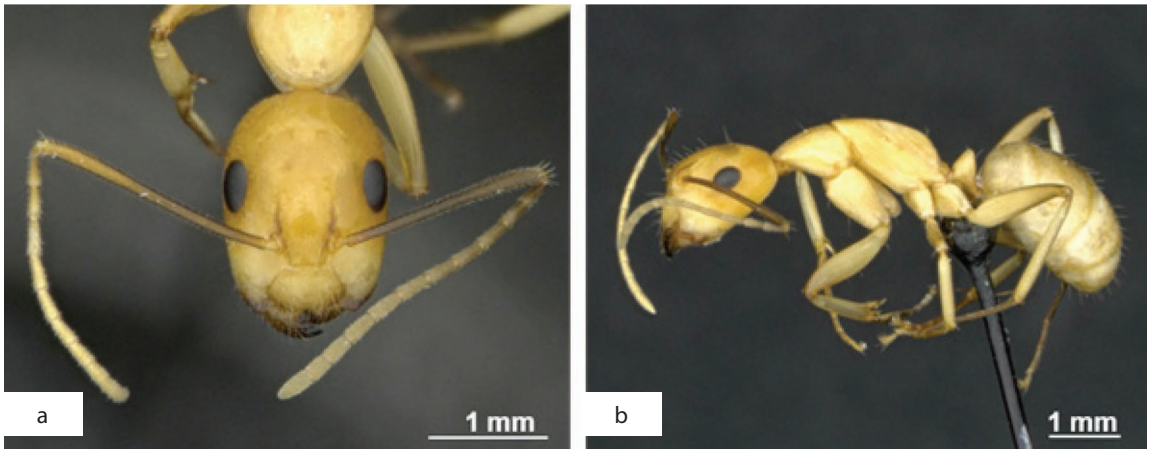


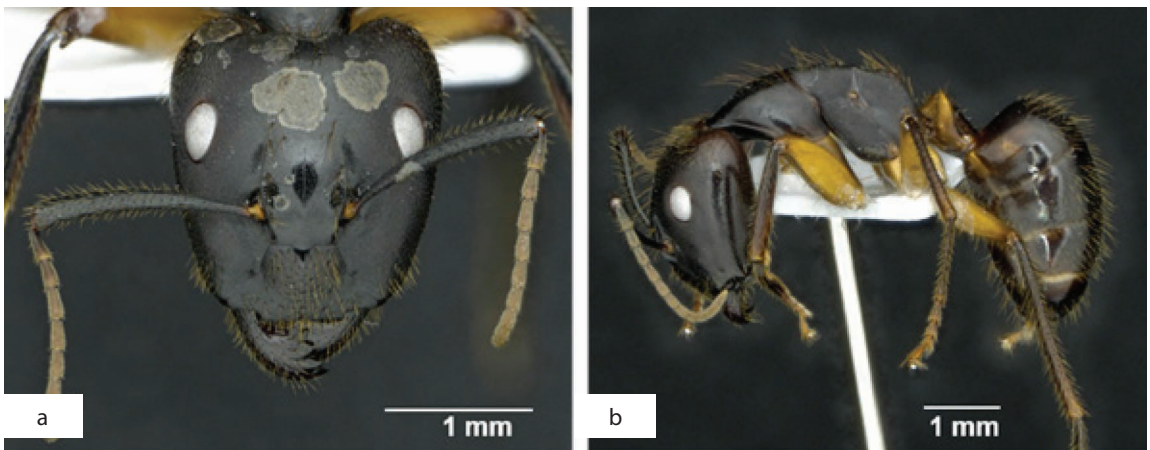
Photo: Will Ericson (2012)

**Figure 53.** *Camponotus festinus*, Z02.HymFrm504.jd. Alate queen.

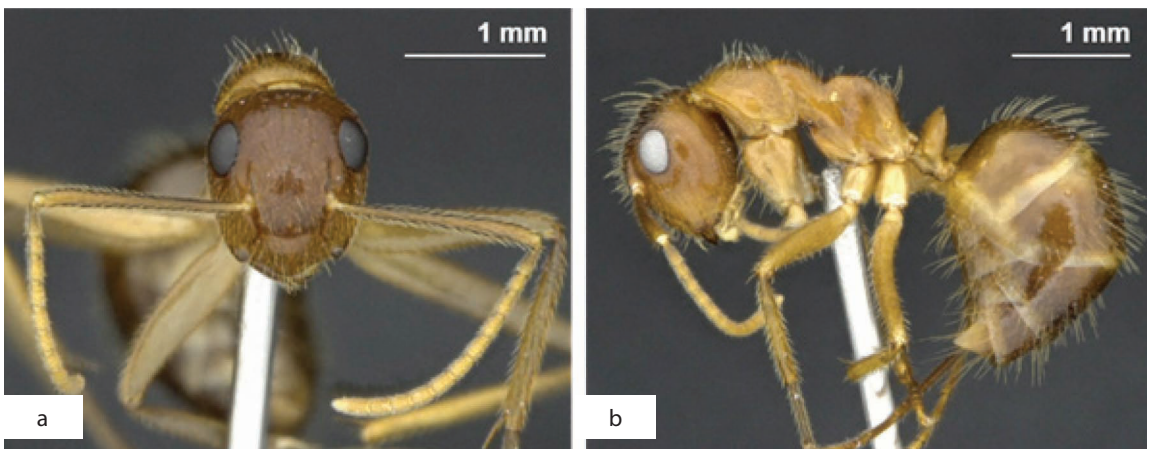




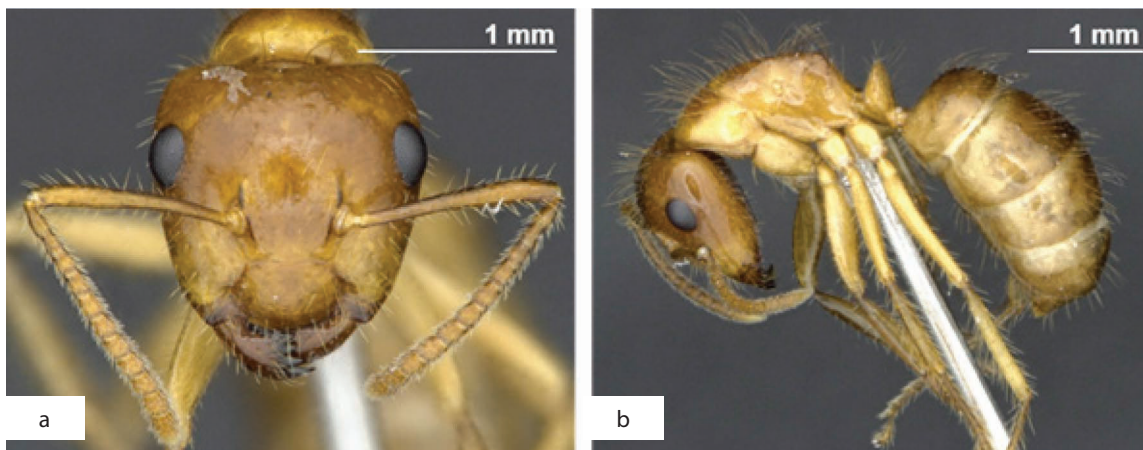
**Figure 54.** *Camponotus* sp.05, Z02.HymFrm180.rn. Worker.



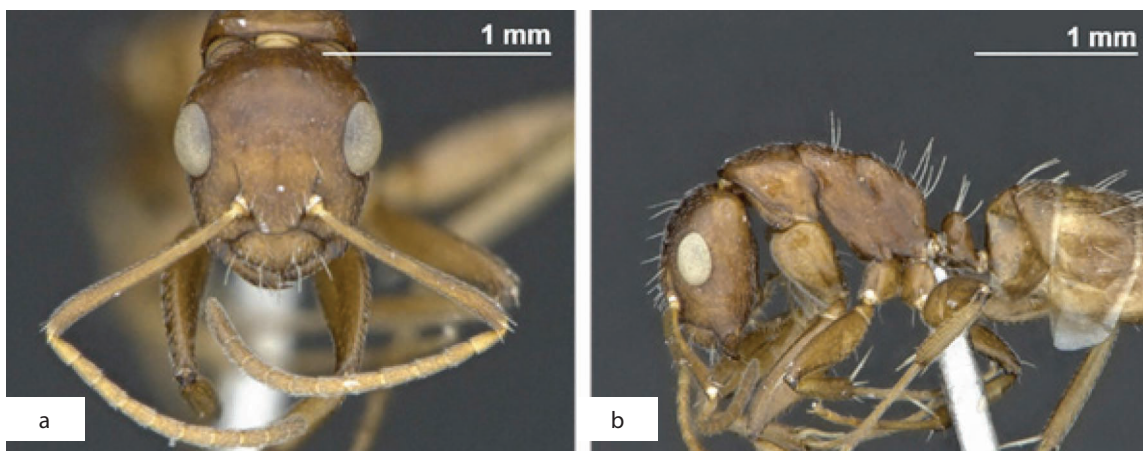
**Figure 55.** *Camponotus* sp.09, Z02.HymFrm075.rn. Worker.



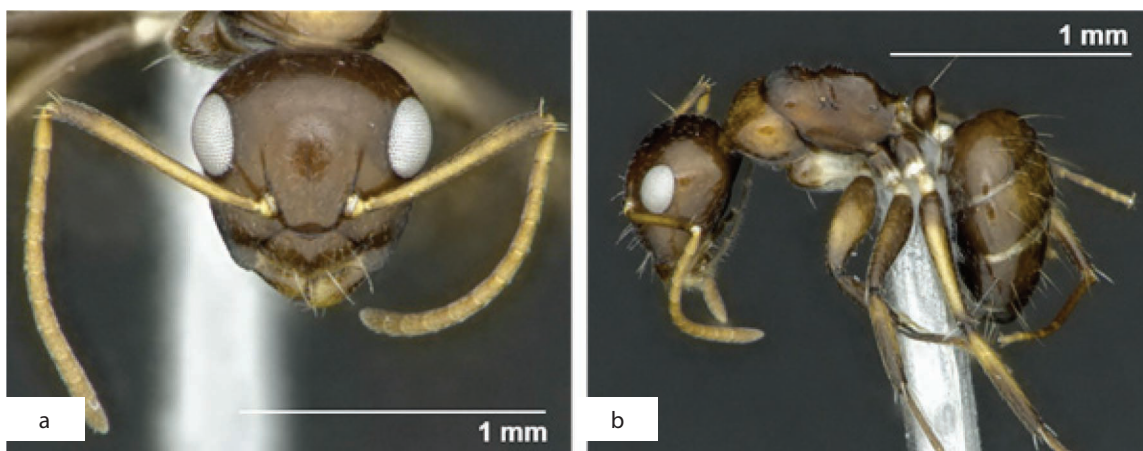
**Figure 56.** *Camponotus* sp.15, Z02.HymFrm177.rn. Worker.



**Figure 57.** *Camponotus* sp.21, Z02.HymFrm192.rn. Worker.

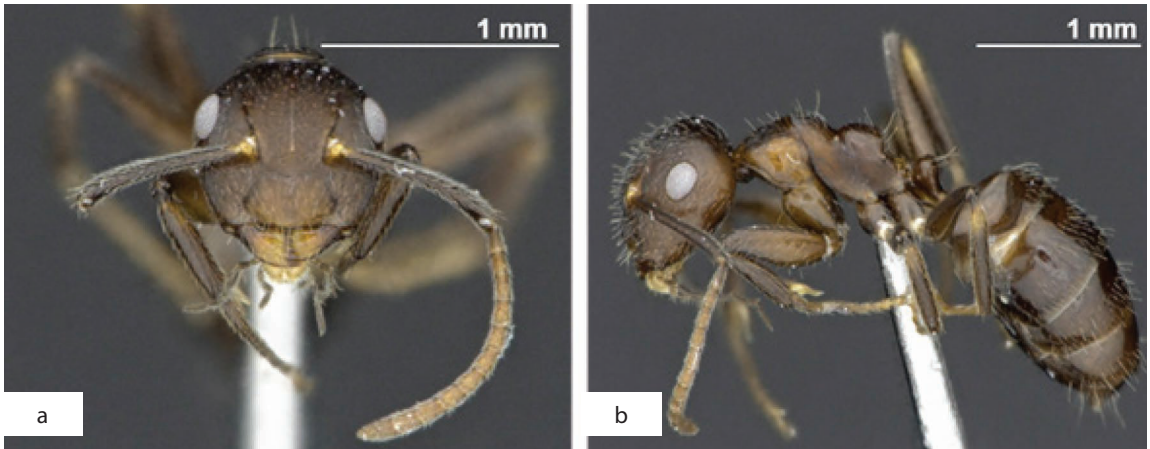


**Figure 58.** *Camponotus* sp.24, Z02.HymFrm212.rn. Worker.

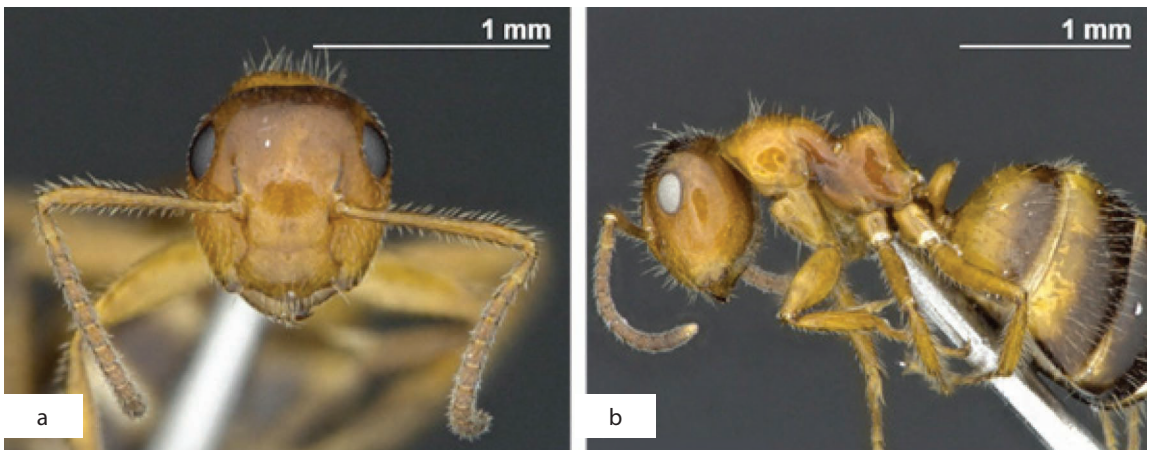


**Figure 59.** *Camponotus* sp.26, Z02.HymFrm010.rn. Worker.





**Figure 60.** *Camponotus* sp.28, Z02.HymFrm337.rn. Worker.

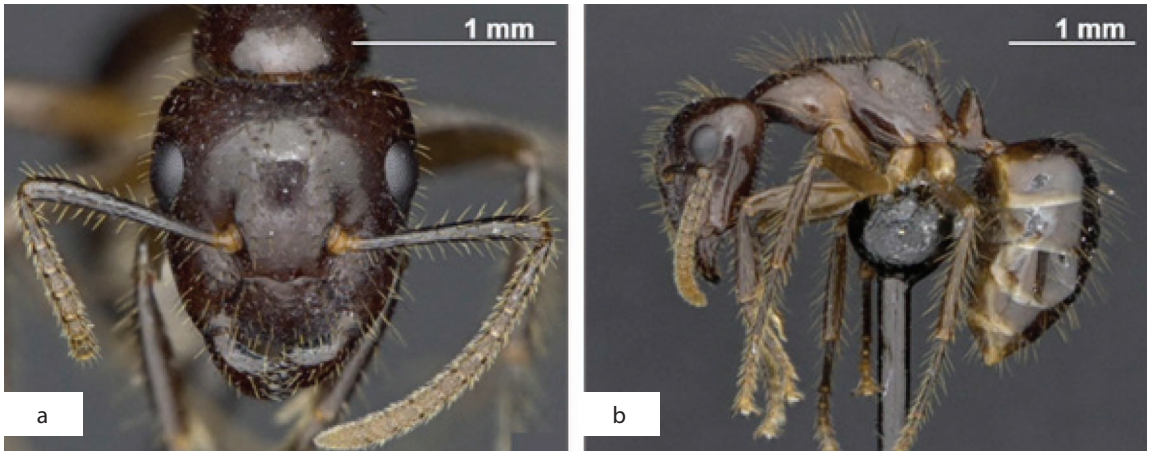


**Figure 61.** *Camponotus* sp.29, Z02.HymFrm417.rn. Worker.

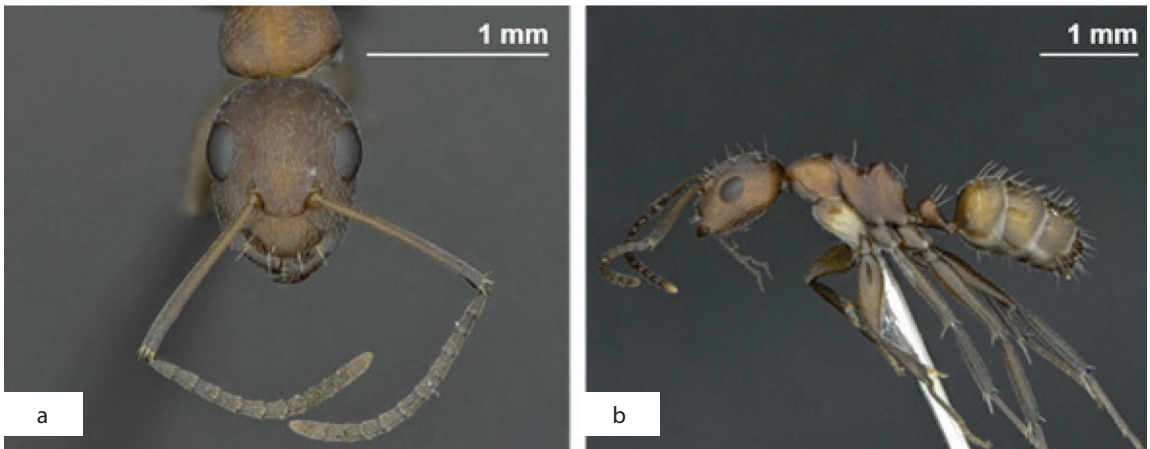


**Figure 62.** *Camponotus* sp.42 of SKY, Z02.HymFrm059.rn. Worker.

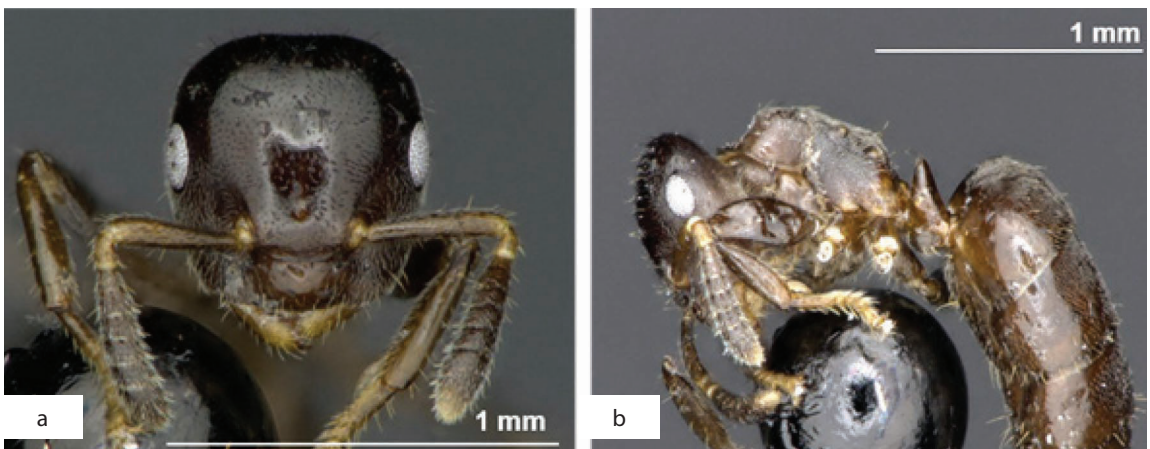




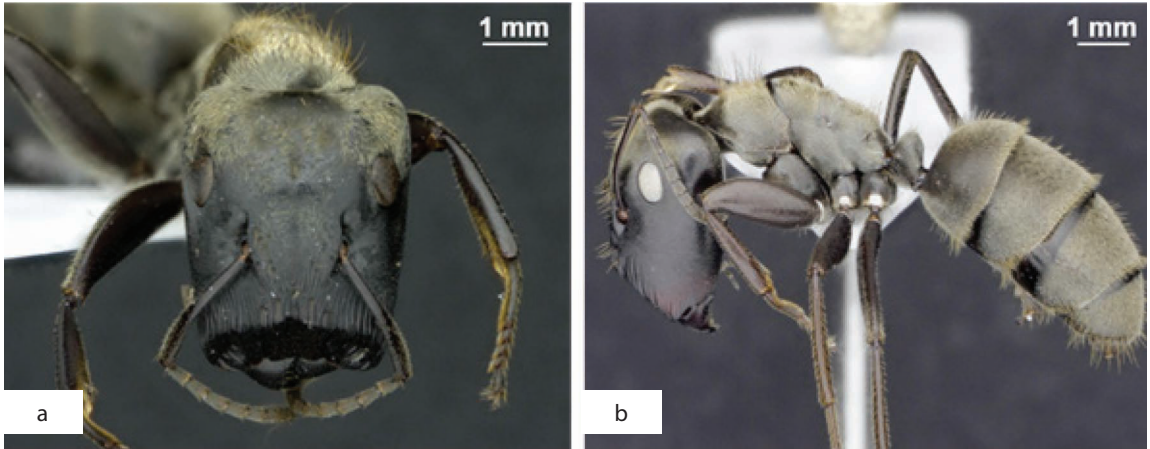
**Figure 63.** *Camponotus* sp.93 of SKY, Z02.HymFrm182.rn. Worker.



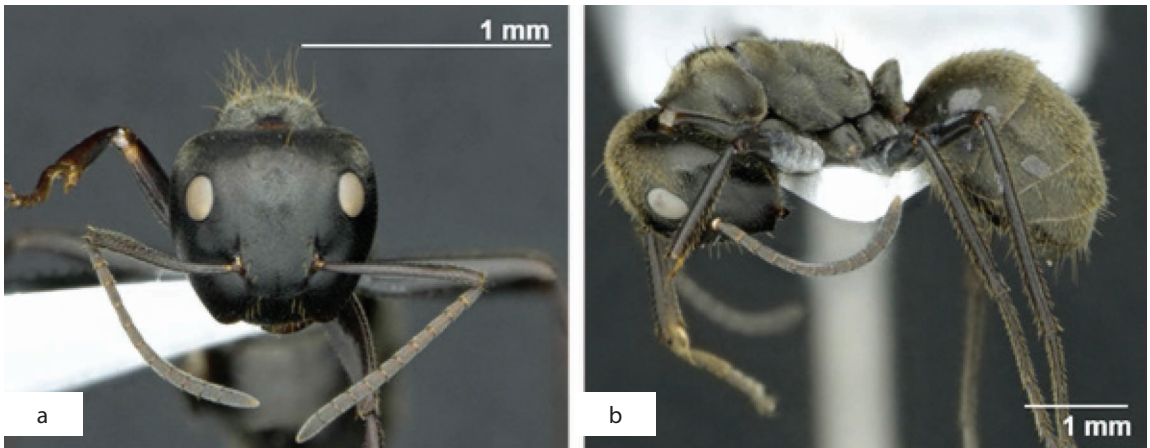
**Figure 64.** *Camponotus* sp.103, Z02.HymFrm415.rn. Worker.



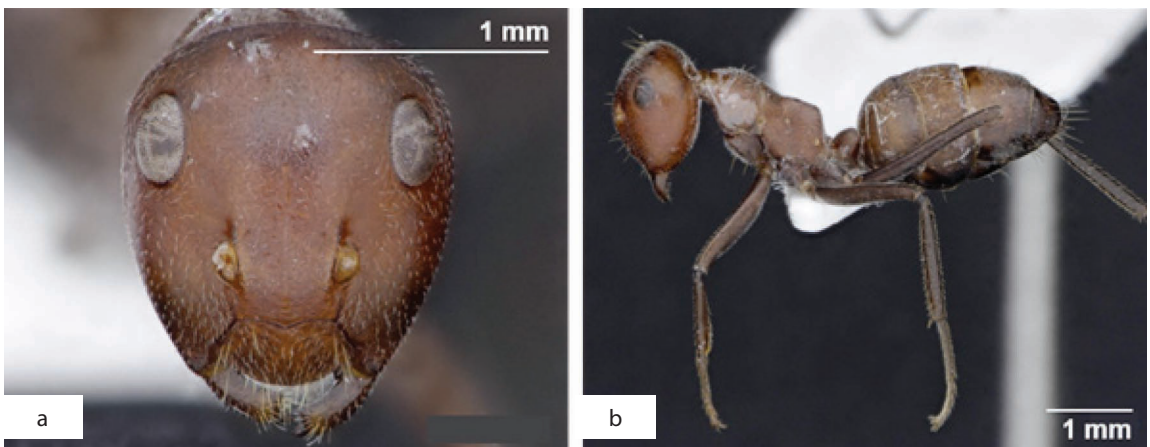
**Figure 65.** *Cladomyrma* cf. *nudidorsalis*, Z02.HymFrm218.rn. Worker.



**Figure 66.** *Colobopsis leonardi* group sp.01, Z02.HymFrm032.rn. Major worker.

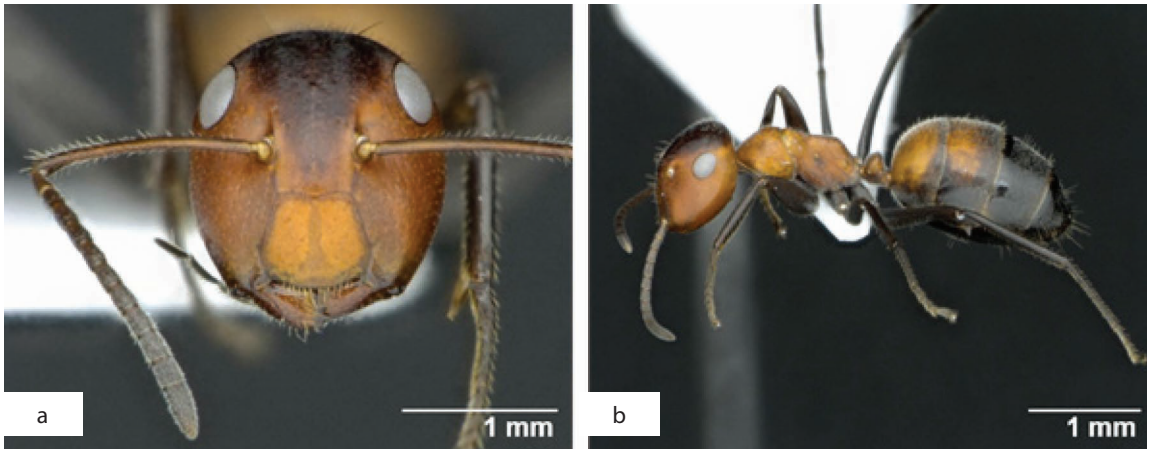


**Figure 67.** *Colobopsis leonardi* group sp.01, Z02.HymFrm032.rn. Minor worker.

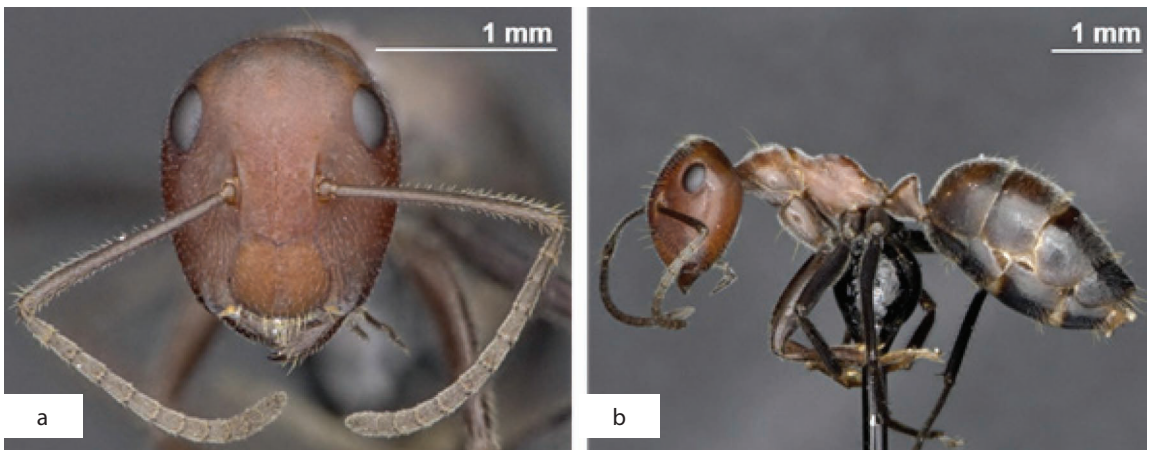


**Figure 68.** *Colobopsis saundersi* group sp.01, Z02.HymFrm155.rn. Worker.





**Figure 69.** *Colobopsis saundersi* group sp.02, Z02.HymFrm048.rn. Worker.

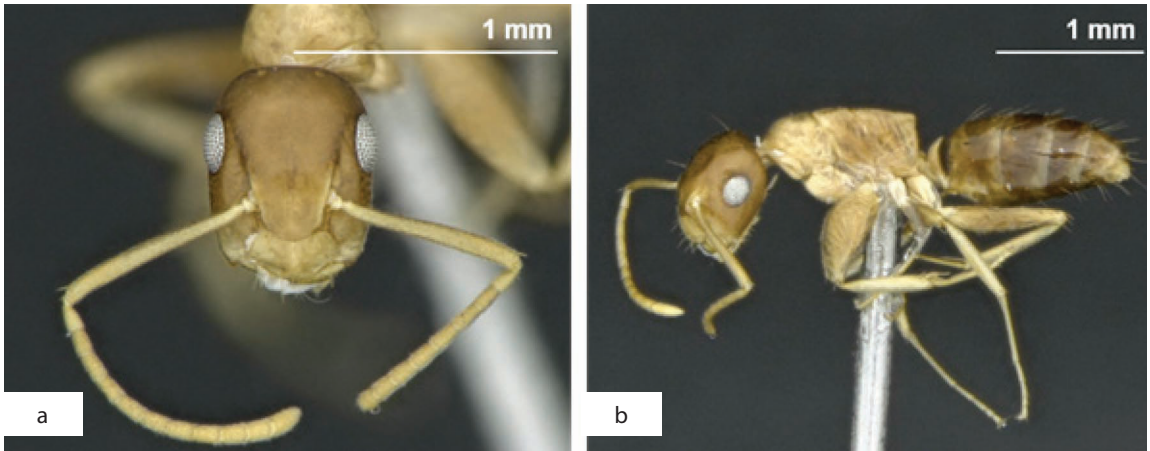


**Figure 70.** *Colobopsis saundersi* group sp.03, Z02.HymFrm219.rn. Worker.

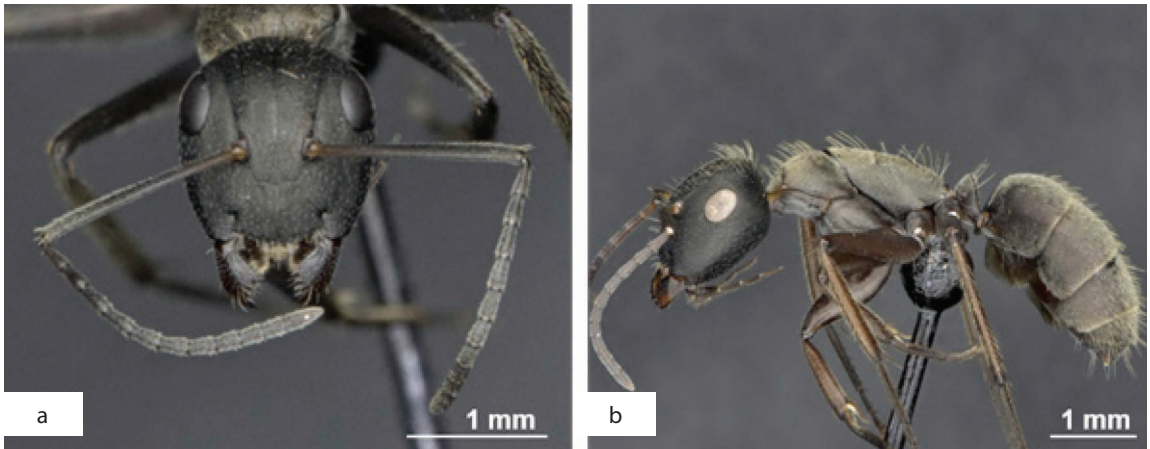


**Figure 71.** *Colobopsis saundersi* group sp.04, Z02.HymFrm090.rn. Worker.

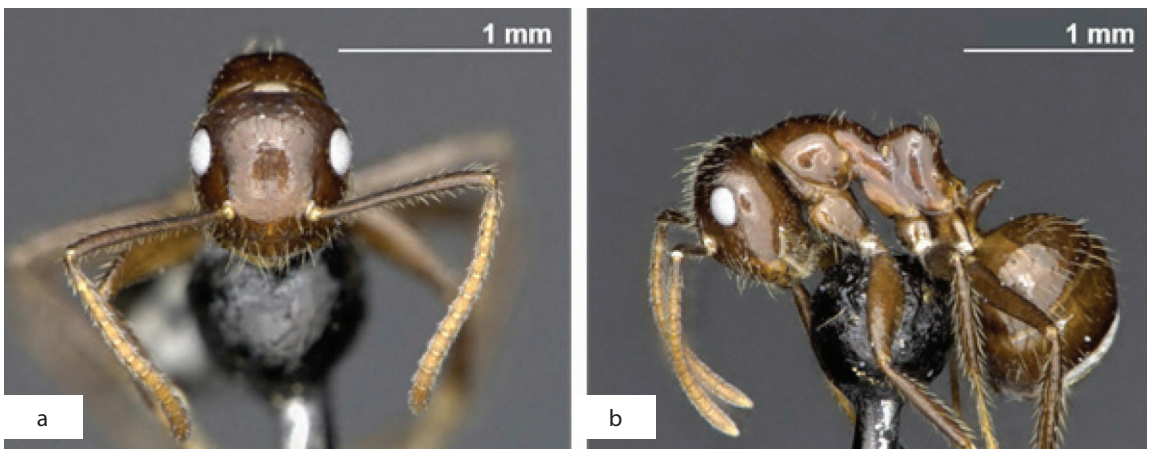




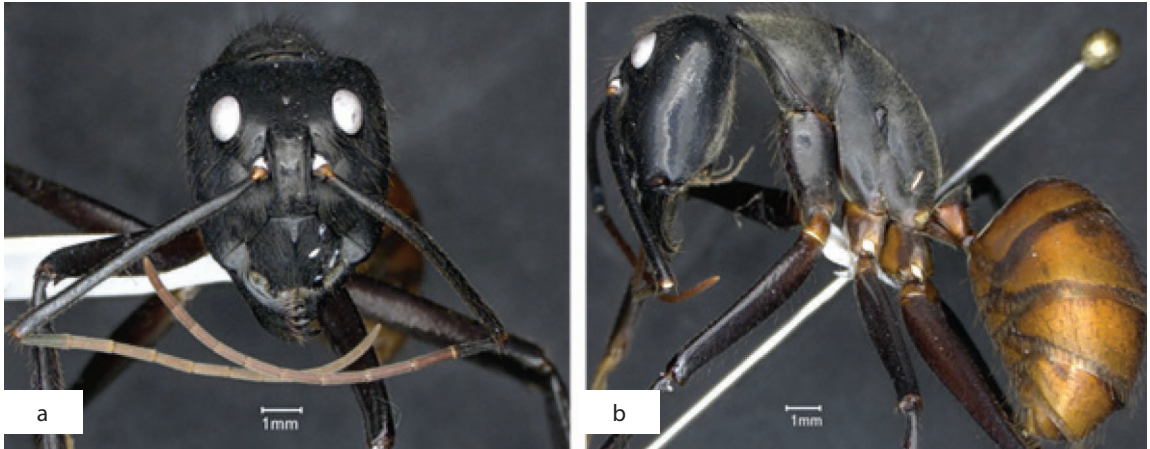
**Figure 72.** *Colobopsis* sp. (Camponotus sp.28 of SKY), Z02.HymFrm186.rn. Worker.



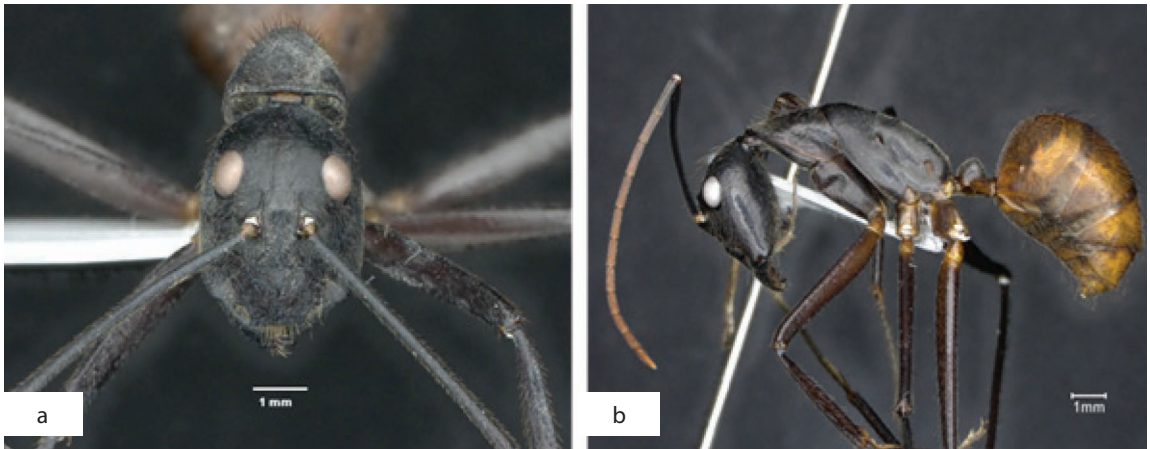
**Figure 73.** *Colobopsis* sp. (Camponotus sp.65 of SKY), Z02.HymFrm195.rn. Worker.



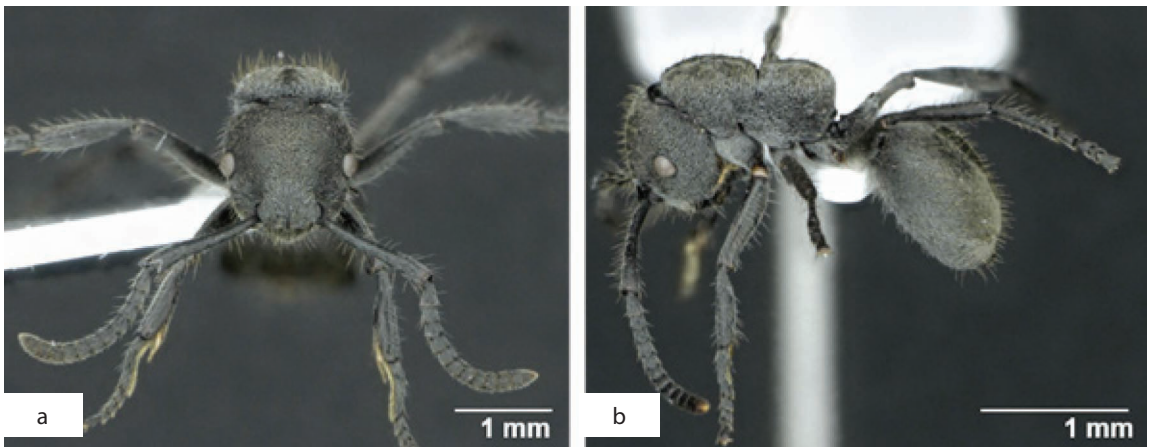
**Figure 74.** *Colobopsis vitrea praeurufa*, Z02.HymFrm187.rn. Worker.



**Figure 75.** *Dinomyrmex gigas*, Z02.HymFrm063.rn. Major worker.

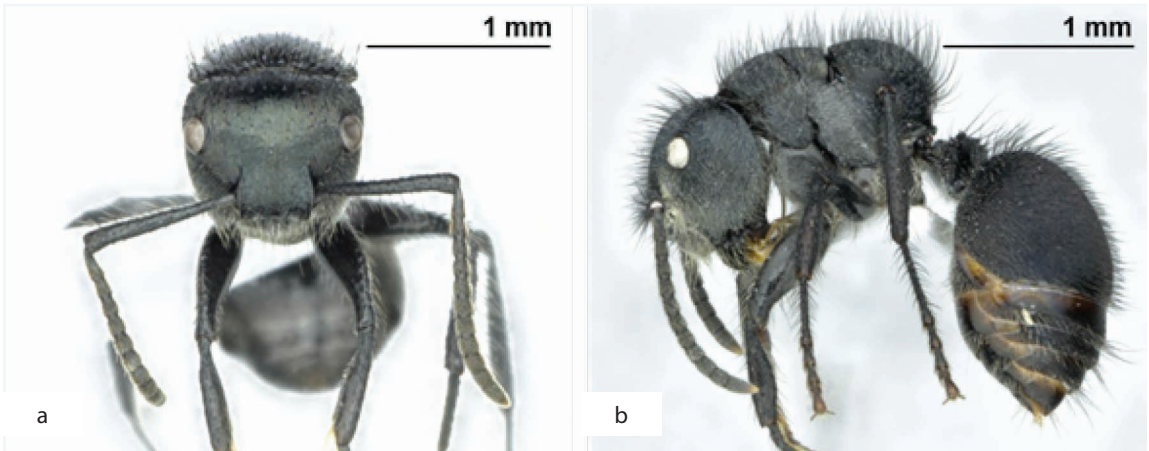


**Figure 76.** *Dinomyrmex gigas*, Z02.HymFrm063.rn. Minor worker.

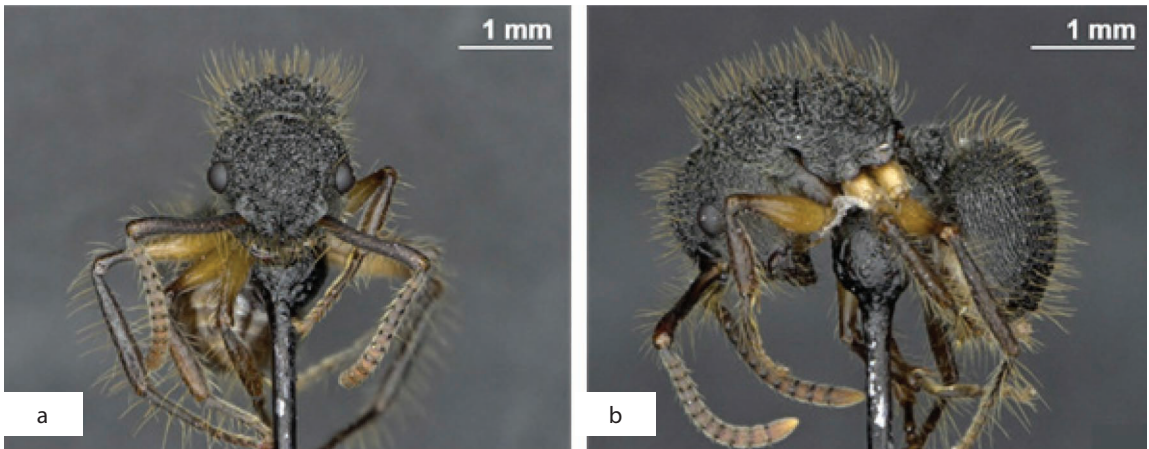


**Figure 77.** *Echinopla lineata*, Z02.HymFrm143.rn. Worker.





**Figure 78.** *Echinopla striata*, Z02.HymFrm013.rn. Worker.



**Figure 79.** *Echinopla tritschleri*, Z02.HymFrm334.rn. Worker.

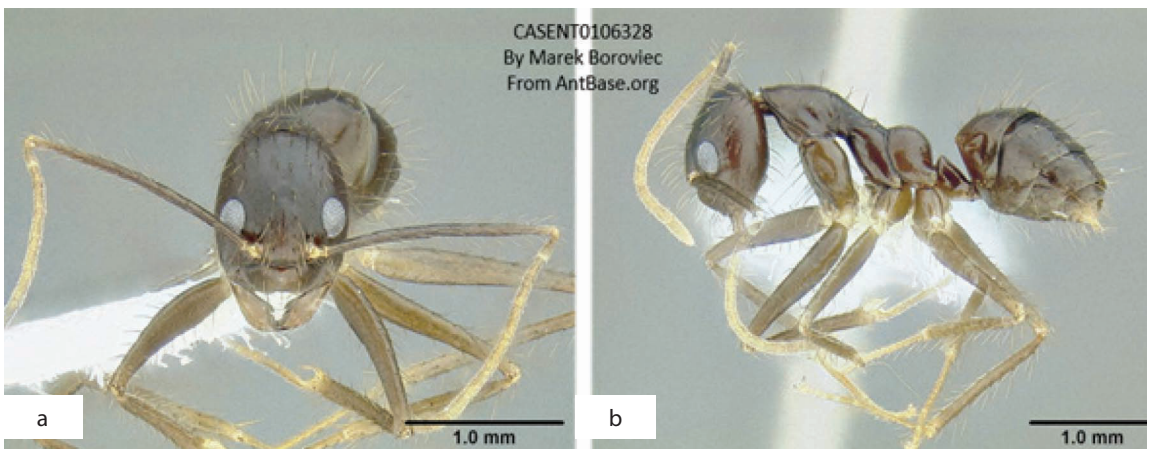
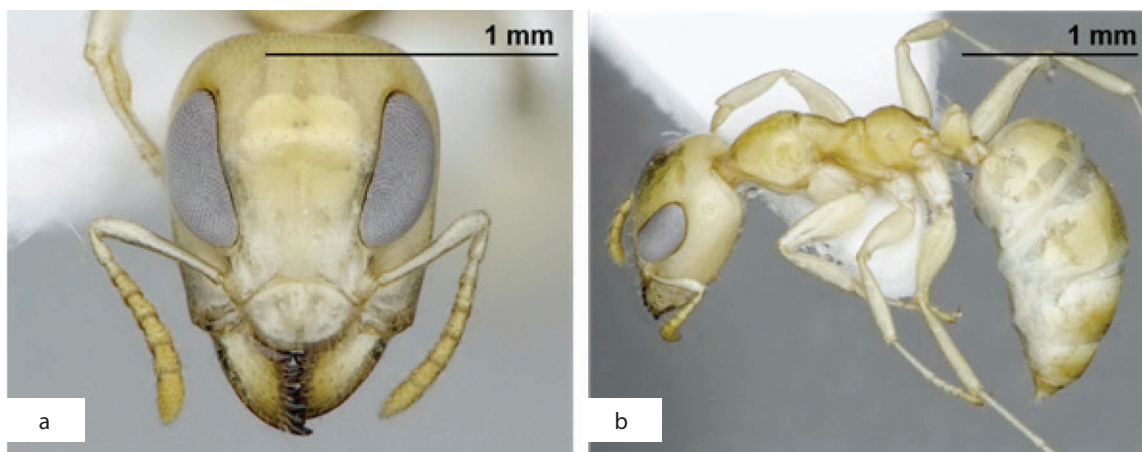


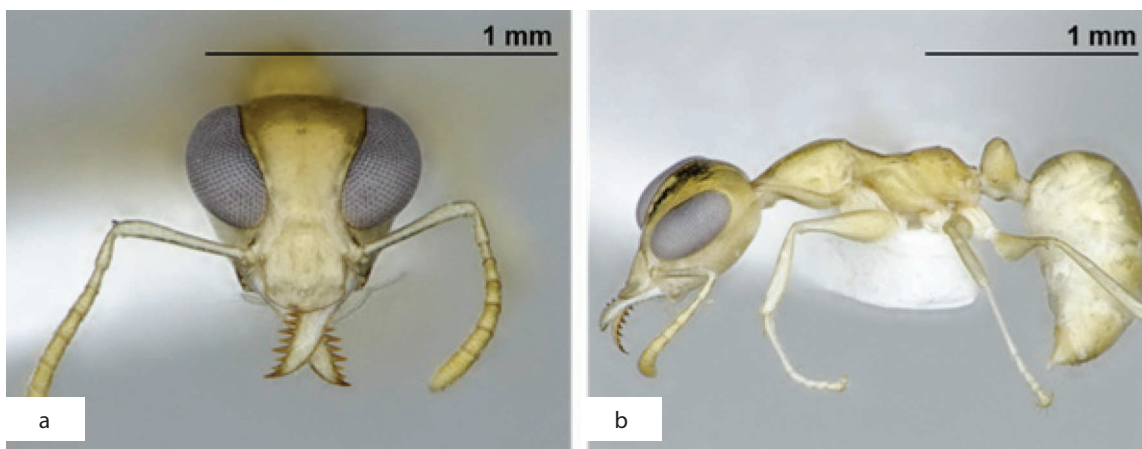
Photo: Marek Borowiec (2015)

**Figure 80.** *Euprenolepis procera*, B01.HymFrm213.jw. Worker.





**Figure 81.** *Gesomyrmex kalshoveni*, Z02.HymFrm101.rn. Major worker.



**Figure 82.** *Gesomyrmex kalshoveni*, Z02.HymFrm101.rn. Minor worker.

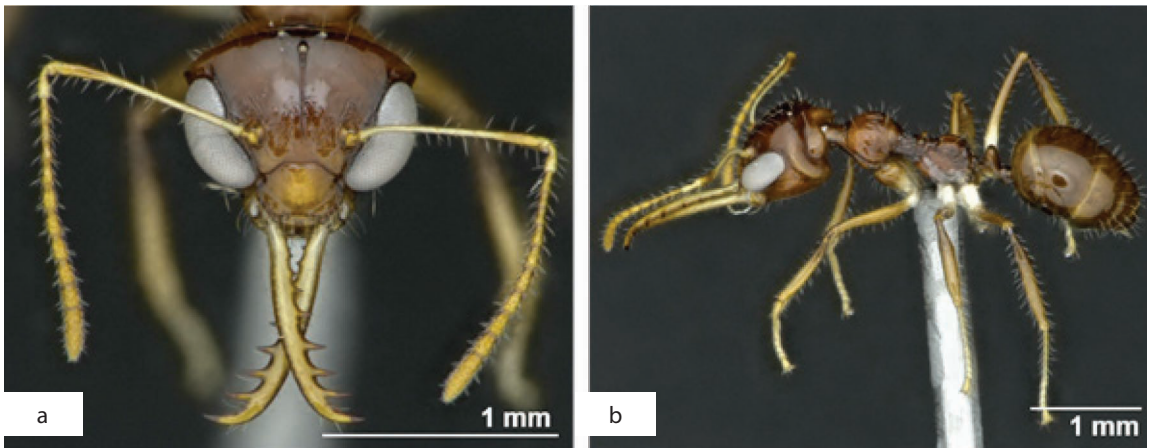


**Figure 83.** *Lepisiota* sp.01, Z02.HymFrm210.rn. Major worker.



Photo: Will Ericson (2013)

**Figure 84.** *Myrmoteras estrudae*, B01.HymFrm210.jw. Worker.



**Figure 85.** *Myrmoteras* sp.01, Z02.HymFrm046.rn. Worker.



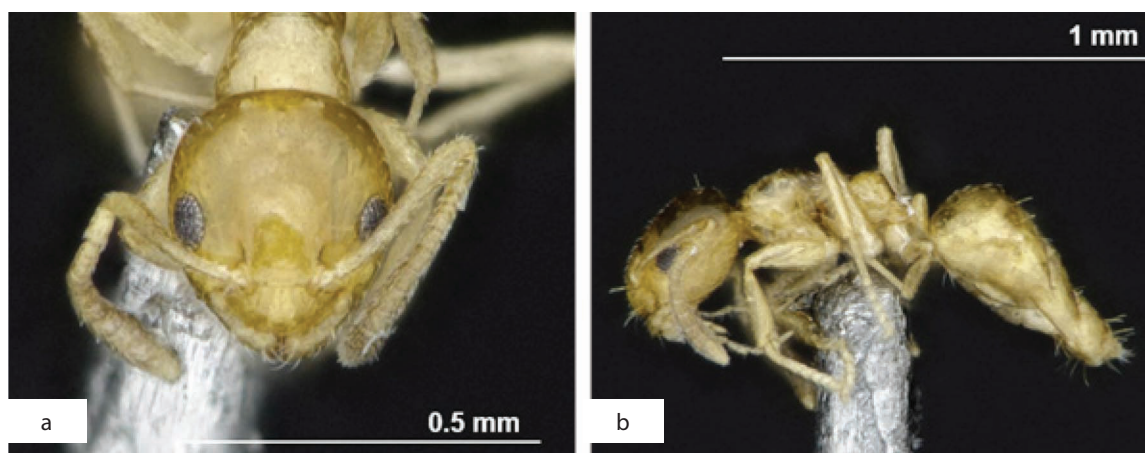
Photo: April Nobile (2008)

**Figure 86.** *Nylanderia bourbonica*, B01.HymFrm304.jw. Worker.





**Figure 87.** *Nylanderia* cf. *kraepelini*, B01.HymFrm241.jw. Worker.



**Figure 88.** *Nylanderia kraepelini*, Z02.HymFrm115.rn. Worker.

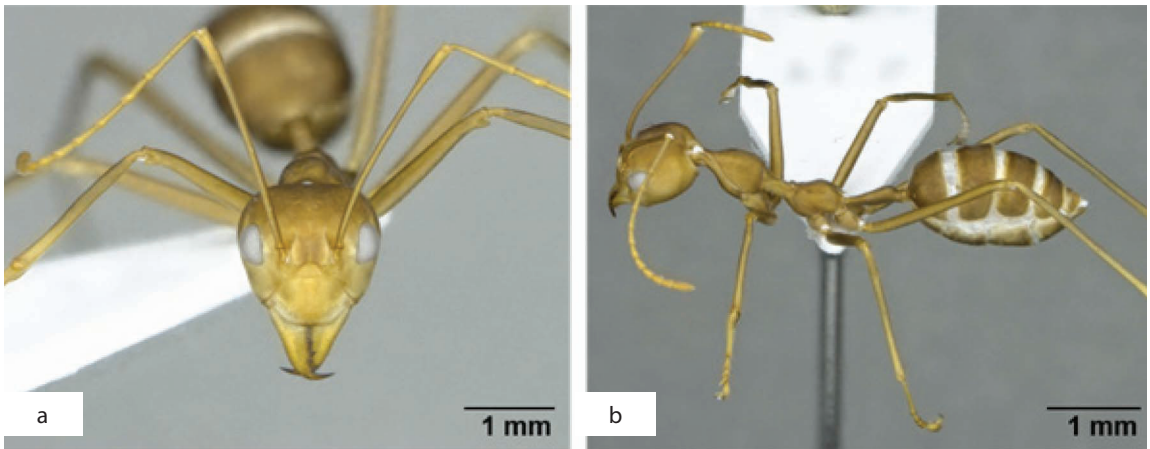


**Figure 89.** *Nylanderia* cf. *vaga*, Z02.HymFrm207.rn. Worker.

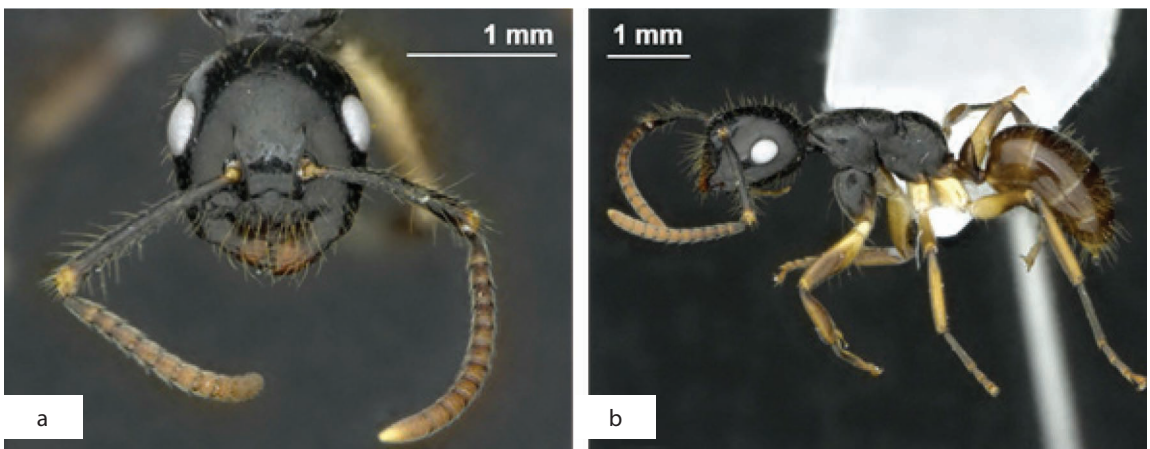




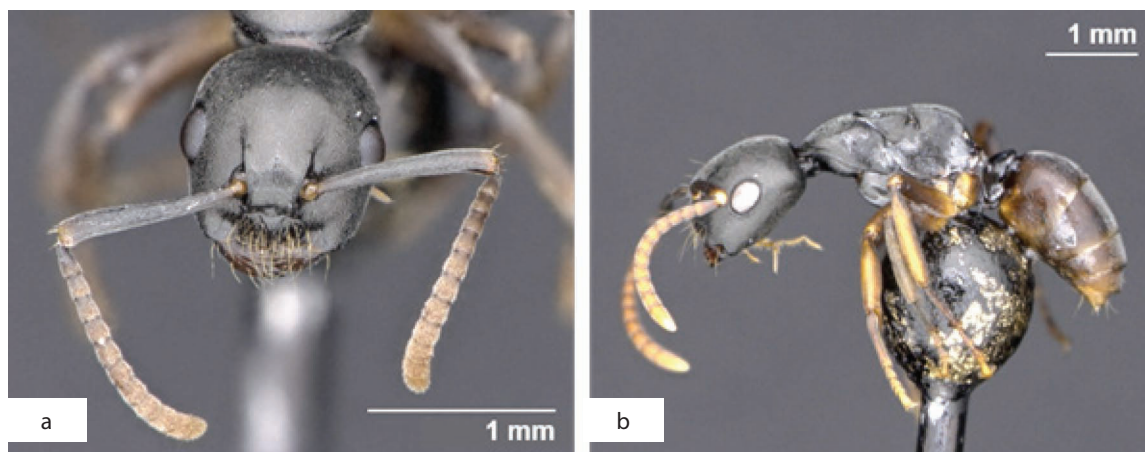
**Figure 90.** *Nylanderia* cf. *vividula*, Z02.HymFrm281.rn. Worker.



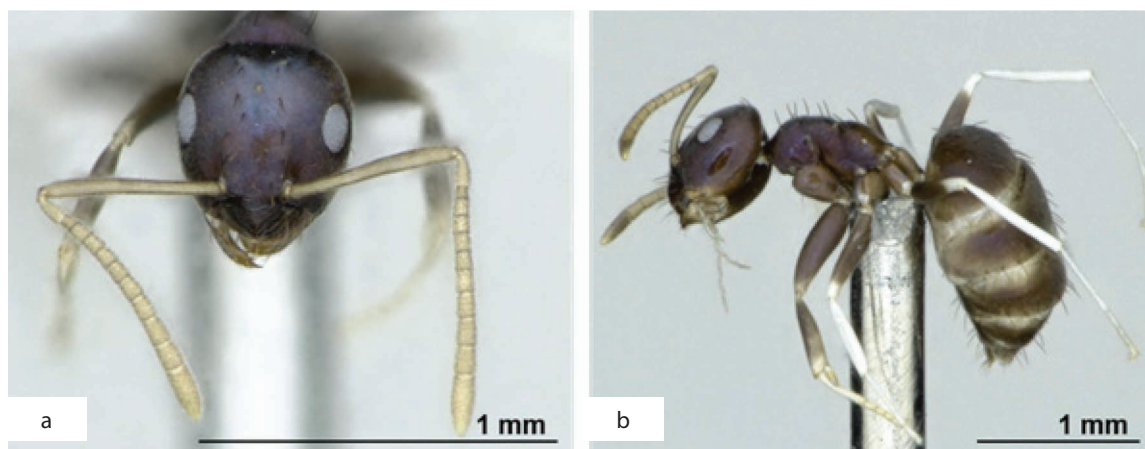
**Figure 91.** *Oecophylla smaragdina*, Z02.HymFrm062.rn. Worker.



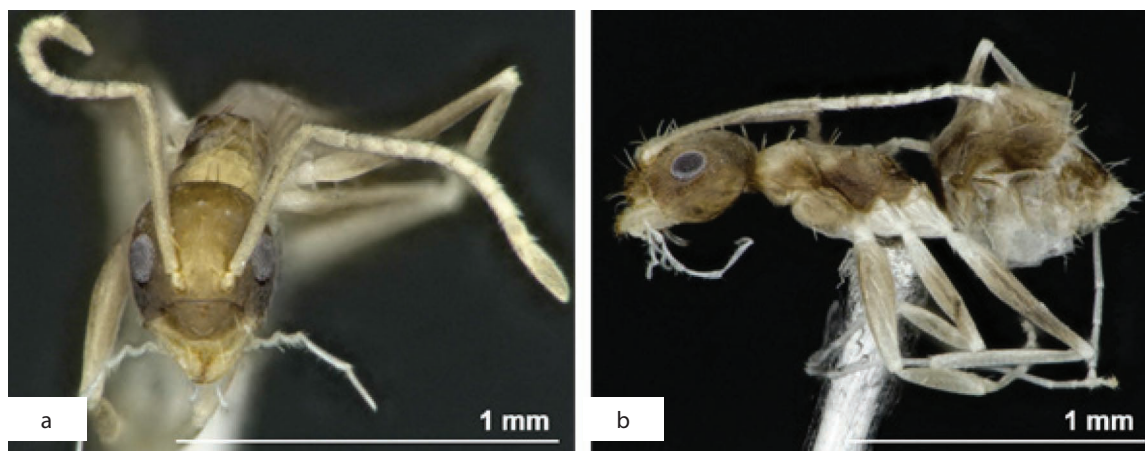
**Figure 92.** *Overbeckia* sp.01, Z02.HymFrm031.rn. Worker.



**Figure 93.** *Overbeckia subclavata*, Z02.HymFrm285.rn. Worker.

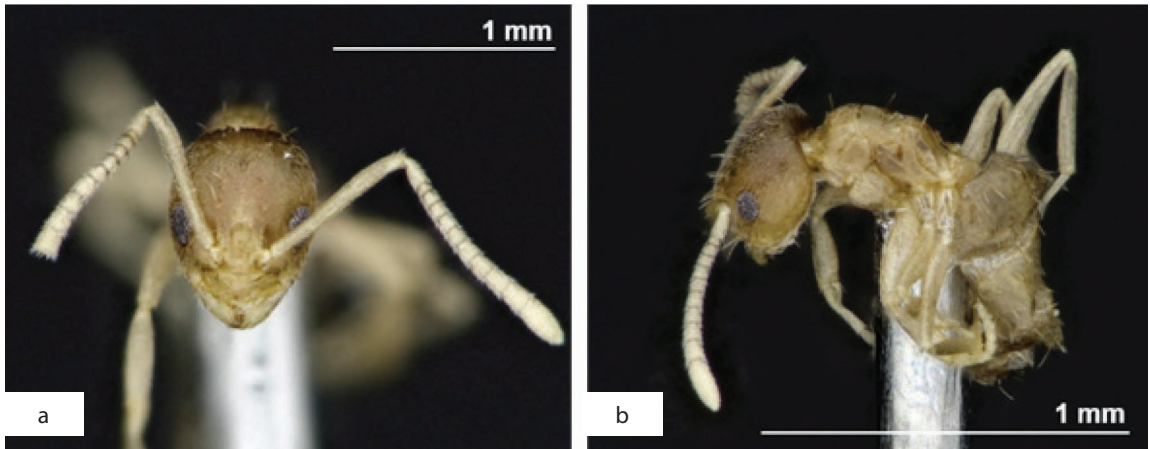


**Figure 94.** *Parapatrechina* cf. *opaca*, Z02.HymFrm068.rn. Worker.

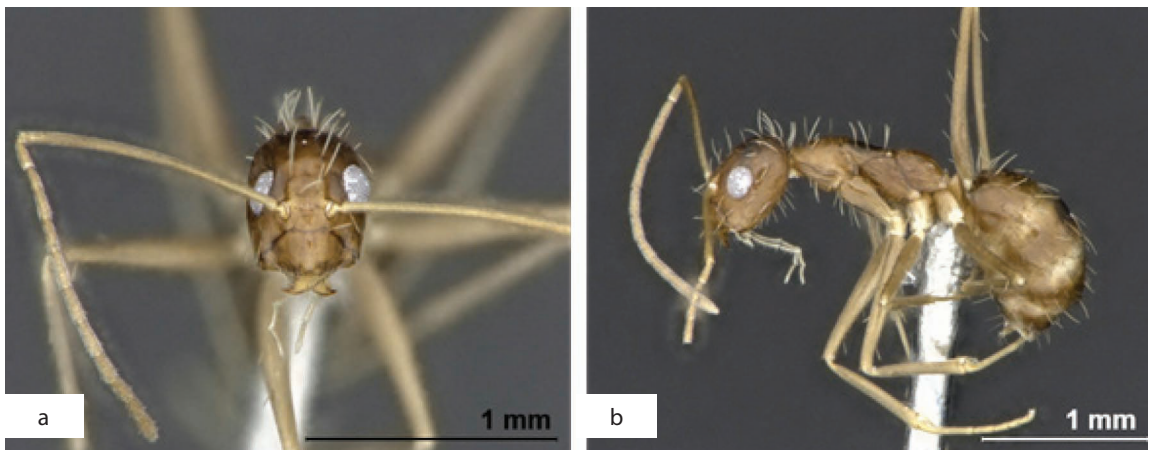


**Figure 95.** *Parapatrechina dichroa*, Z02.HymFrm001.rn. Worker.





**Figure 96.** *Paraparatrechina* sp.01, Z02.HymFrm026.rn. Worker.

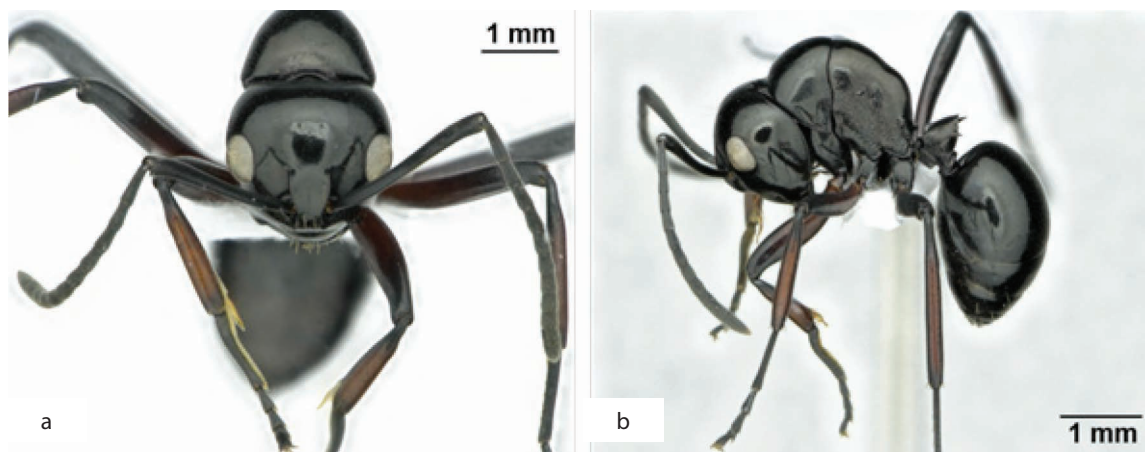


**Figure 97.** *Paratrechina longicornis*, Z02.HymFrm208.rn. Worker.

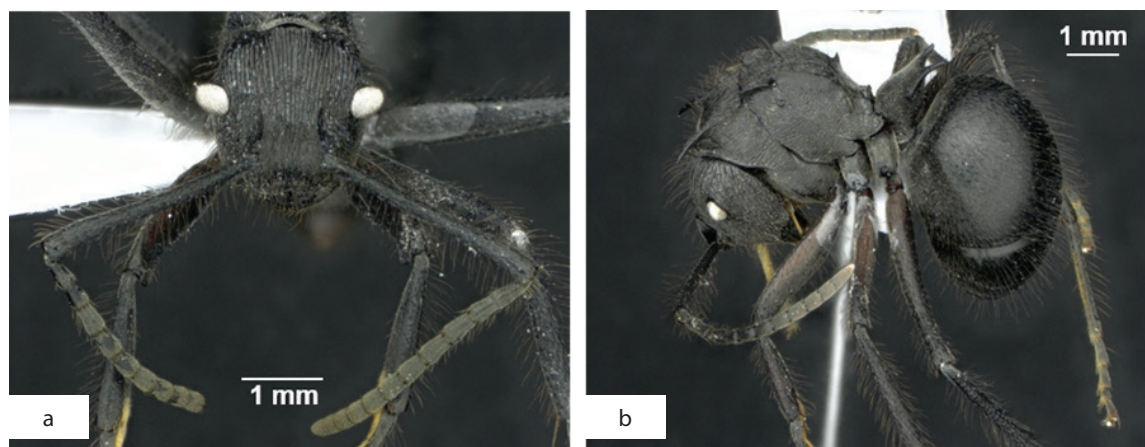


**Figure 98.** *Plagiolepis* sp.02, Z02.HymFrm217.rn. Worker.

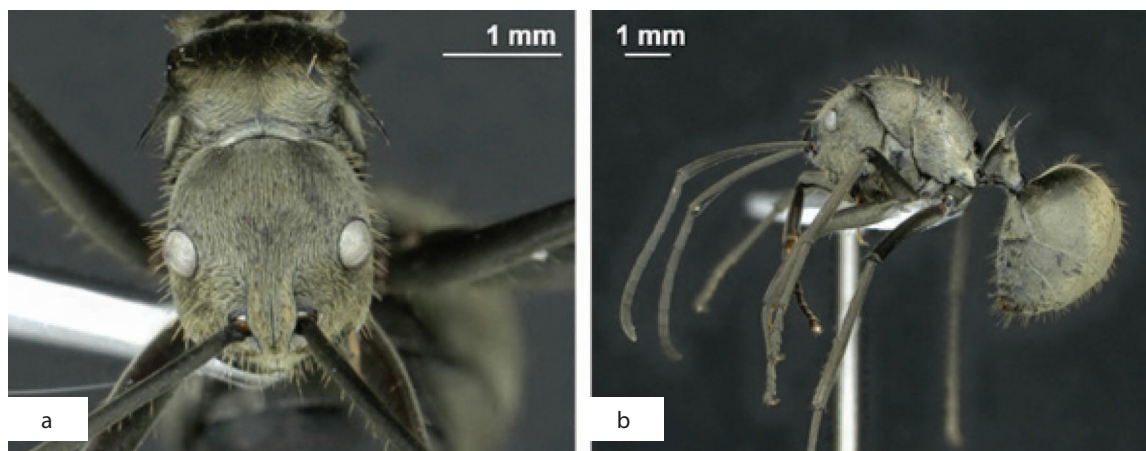




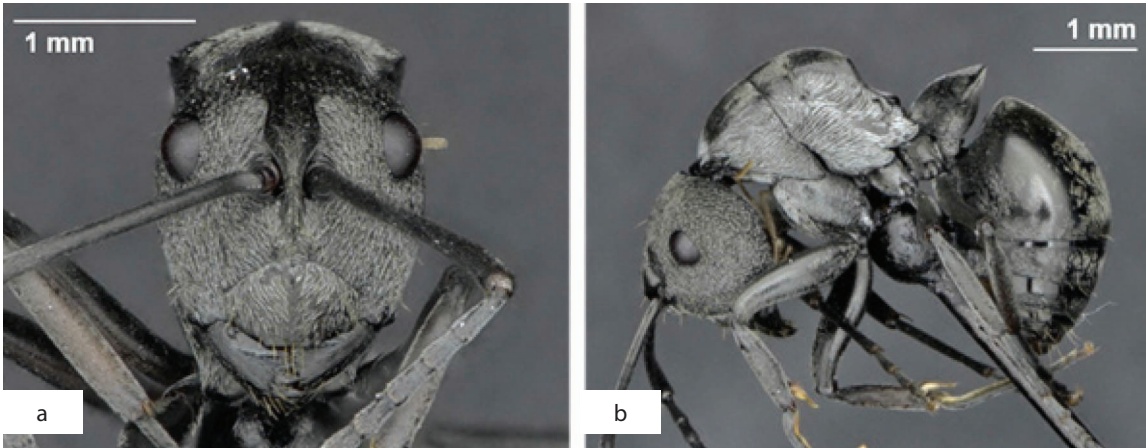
**Figure 99.** *Polyrhachis (Cyrtomyrma) cf. lepida*, Z02.HymFrm064.rn. Worker.



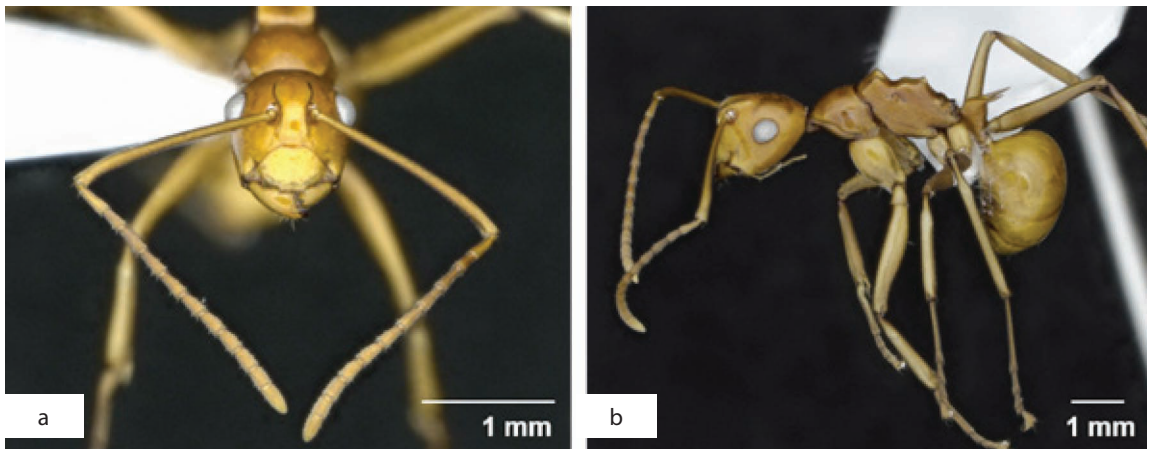
**Figure 100.** *Polyrhachis (Myrma) nigropilosa*, Z02.HymFrm130.rn. Worker.



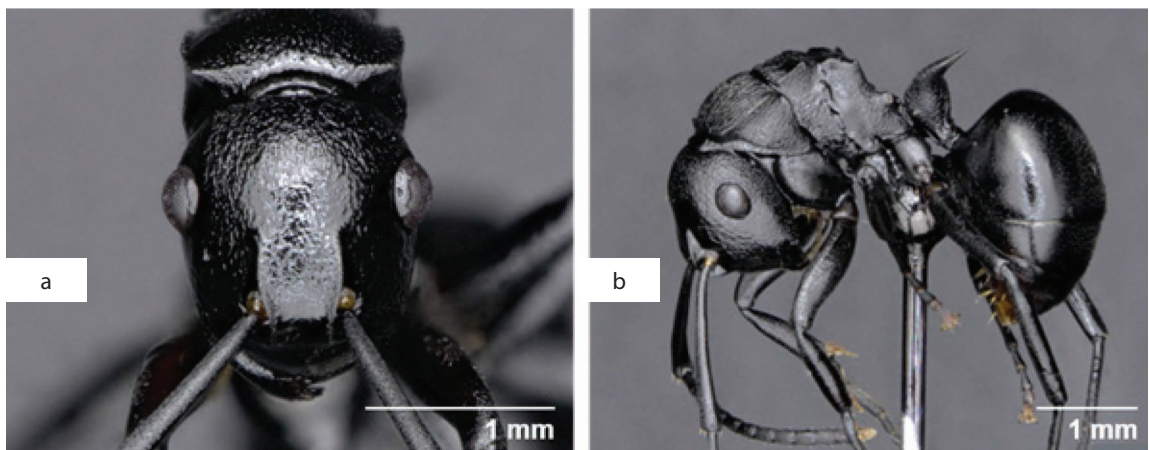
**Figure 101.** *Polyrhachis (Myrma) proxima*, Z02.HymFrm070.rn. Worker.



**Figure 102.** *Polyrhachis (Myrma) cf. inermis*, Z02.HymFrm170.rn. Worker.

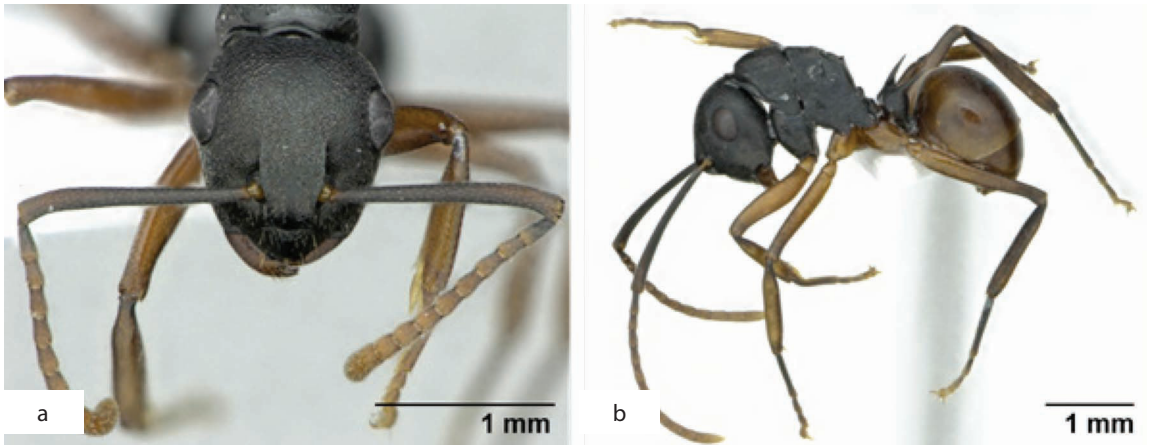


**Figure 103.** *Polyrhachis (Myrmatopa) schang*, Z02.HymFrm025.rn. Worker.

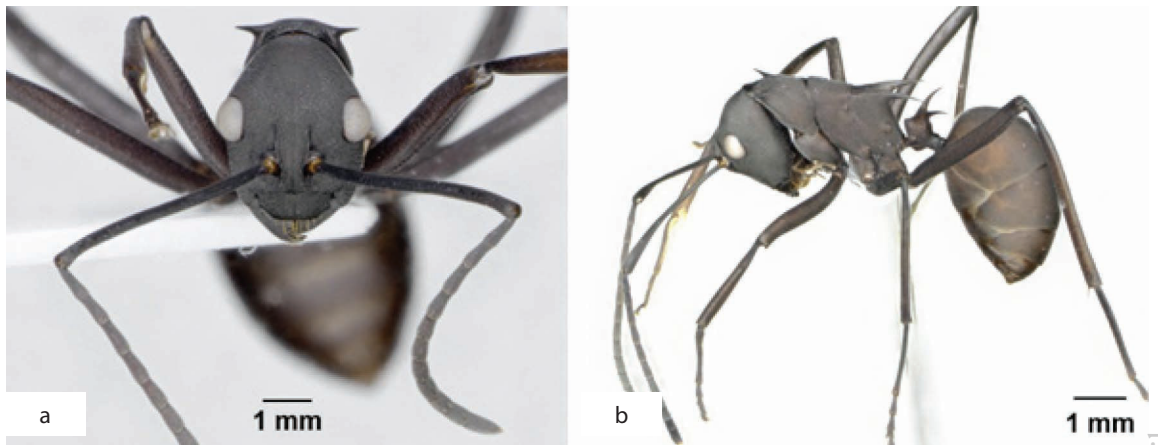


**Figure 104.** *Polyrhachis (Myrmatopa) simillima*, Z02.HymFrm166.rn. Worker.

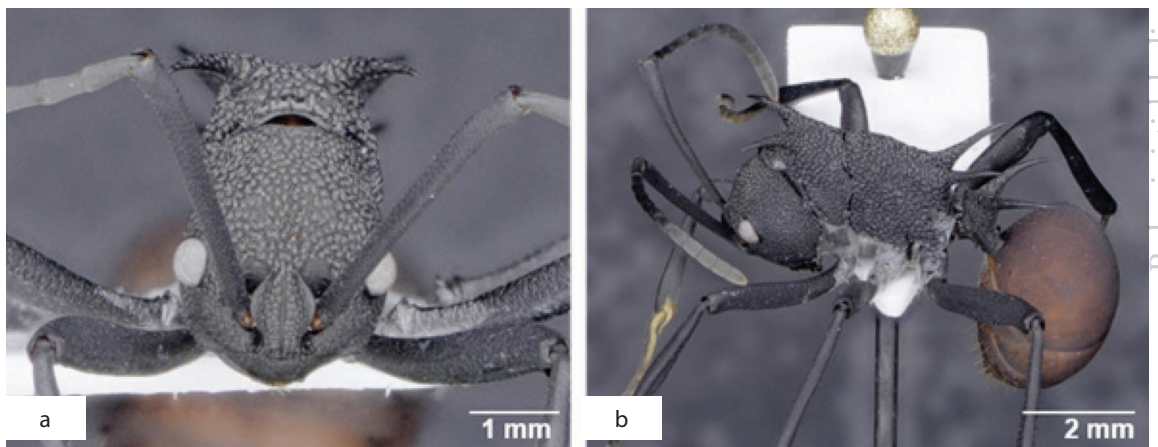




**Figure 105.** *Polyrhachis (Myrmatopa) sp.01*, Z02.HymFrm052.rn. Worker.

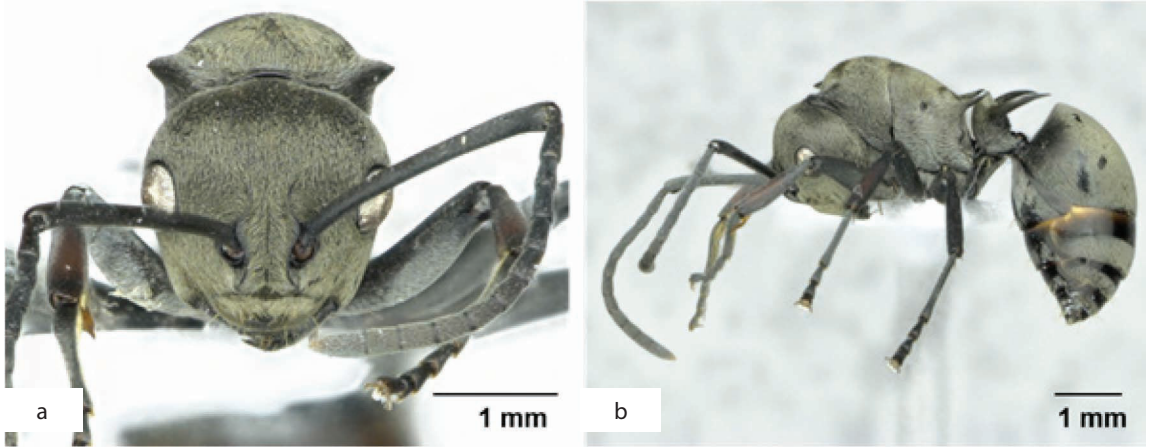


**Figure 106.** *Polyrhachis (Myrmhopla) abdominalis*, Z02.HymFrm069.rn. Worker.

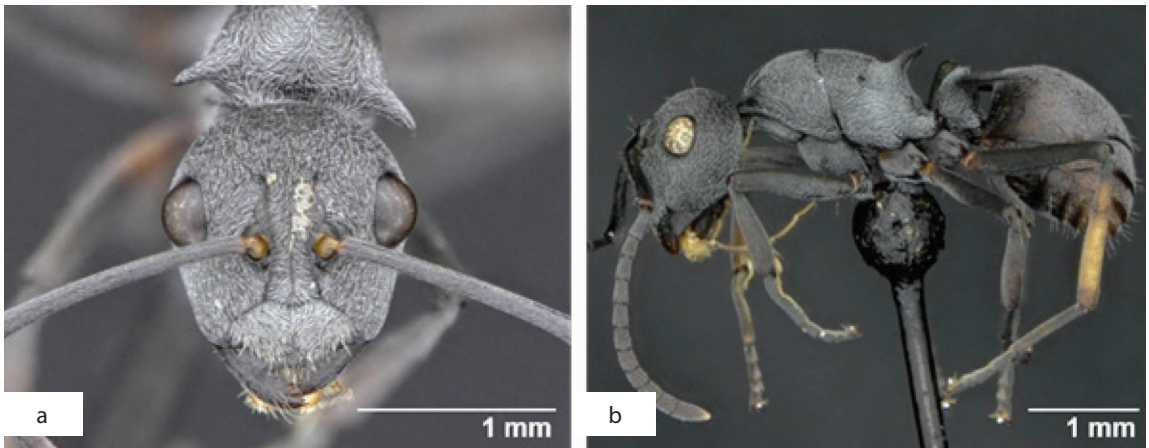


**Figure 107.** *Polyrhachis (Myrmhopla) armata*, Z02.HymFrm011.rn. Worker.

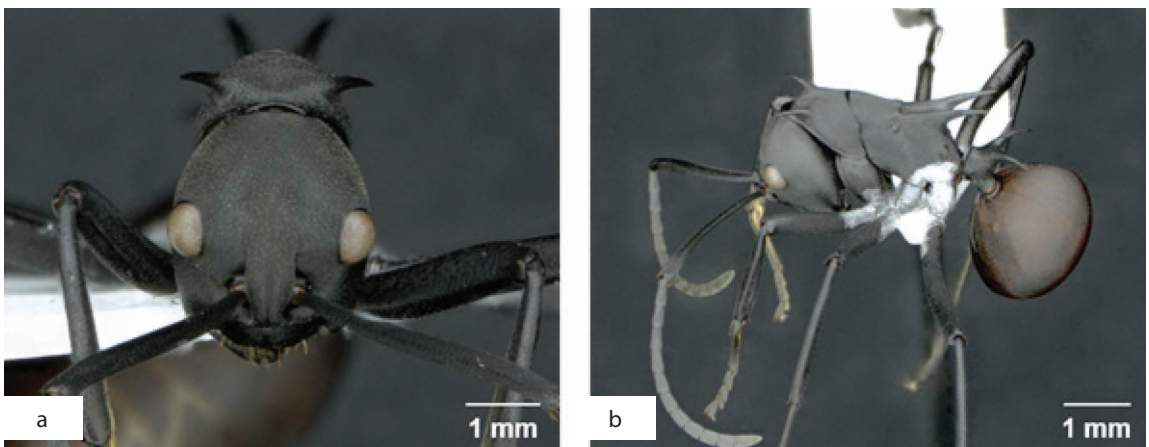




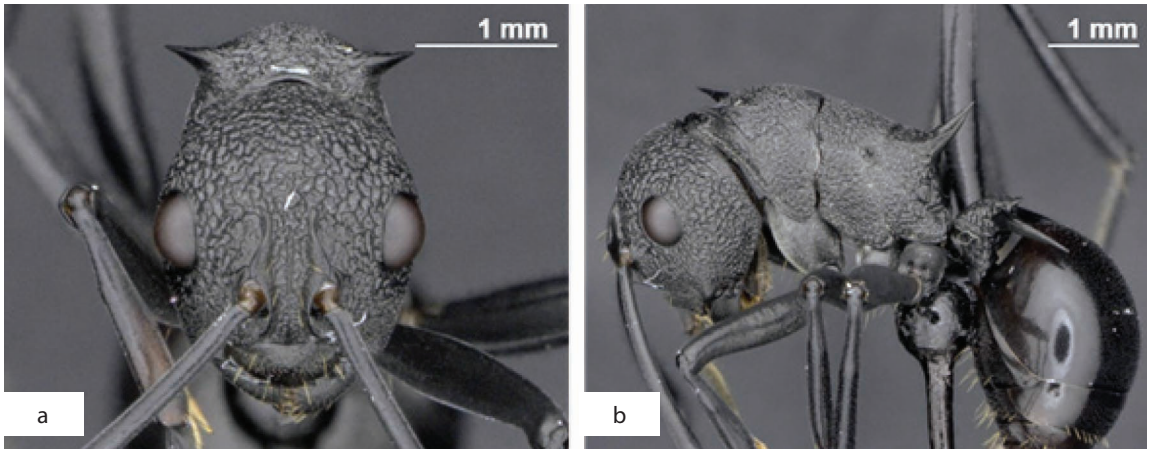
**Figure 108.** *Polyrhachis (Myrmhopla) armata* group sp.01, Z02.HymFrm015.rn. Worker



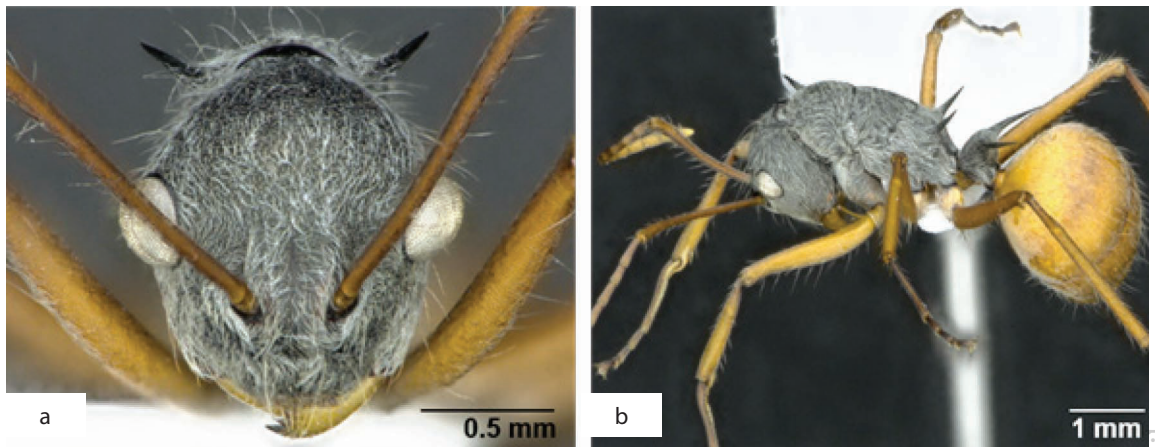
**Figure 109.** *Polyrhachis (Myrmhopla) armata* group sp.02, Z02.HymFrm163.rn. Worker.



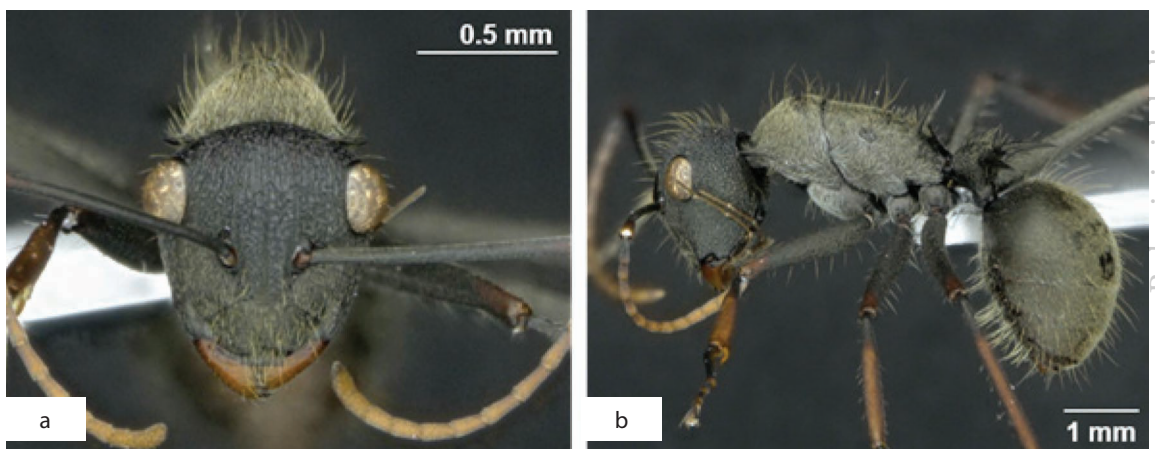
**Figure 110.** *Polyrhachis (Myrmhopla) armata* group sp.03, Z02.HymFrm507.jd. Worker.



**Figure 111.** *Polyrhachis (Myrmhopla) armata* group sp.04, Z02.HymFrm333.rn. Worker.

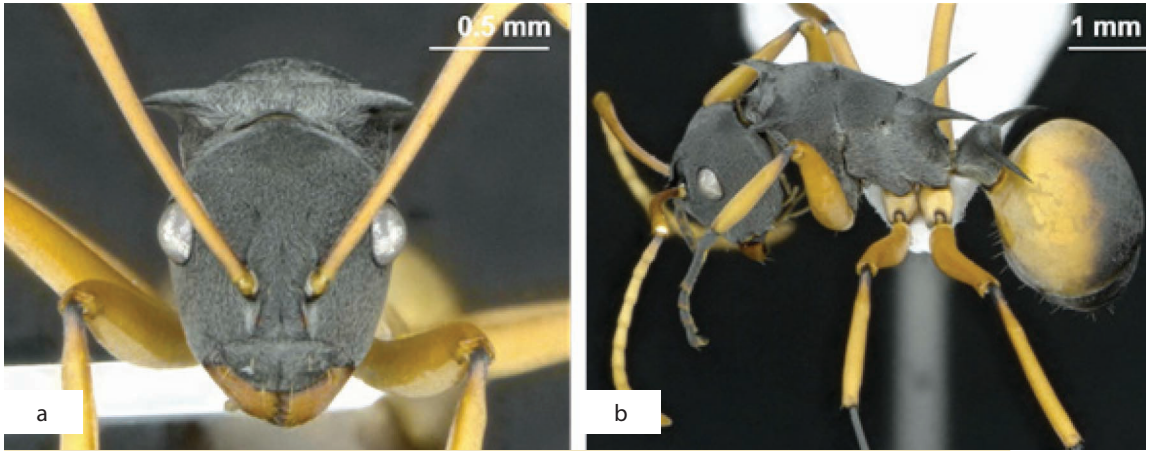


**Figure 112.** *Polyrhachis (Myrmhopla) bicolor* group sp.01, Z02.HymFrm024.rn. Worker.

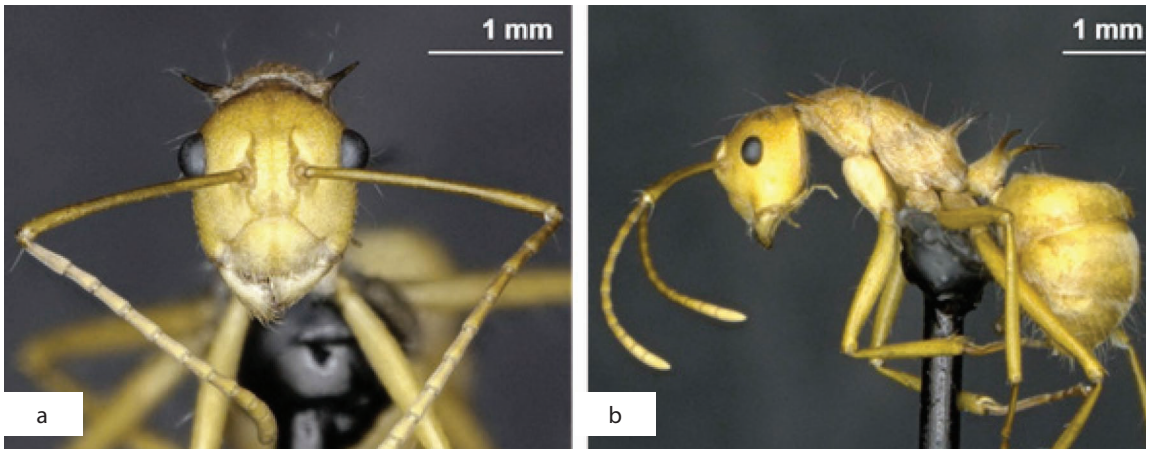


**Figure 113.** *Polyrhachis (Myrmhopla) bicolor* group sp.02, Z02.HymFrm078.rn. Worker.

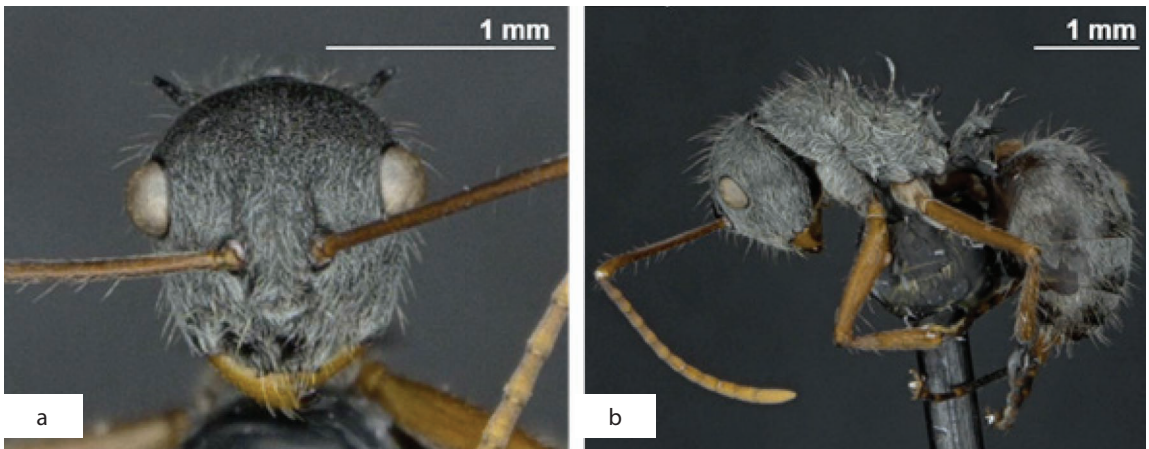




**Figure 114.** *Polyrhachis (Myrmhopla) bicolor* group sp.03, Z02.HymFrm508.jd. Worker.



**Figure 115.** *Polyrhachis (Myrmhopla) bicolor* group sp.04, Z02.HymFrm291.rn. Worker.



**Figure 116.** *Polyrhachis (Myrmhopla) bicolor* group sp.05, Z02.HymFrm221.rn. Worker.





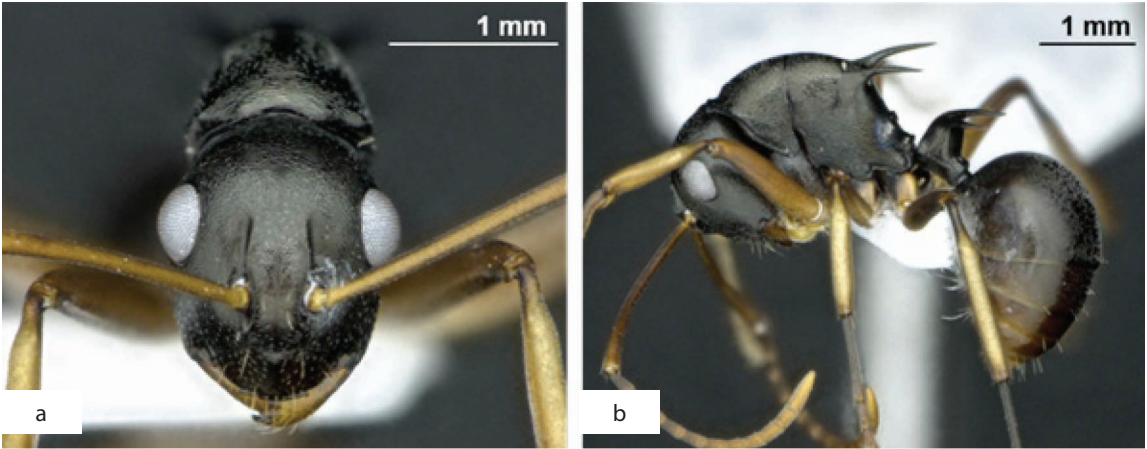
**Figure 117.** *Polyrhachis (Myrmhopla) bicolor* group sp.06, Z02.HymFrm509.jd. Worker.



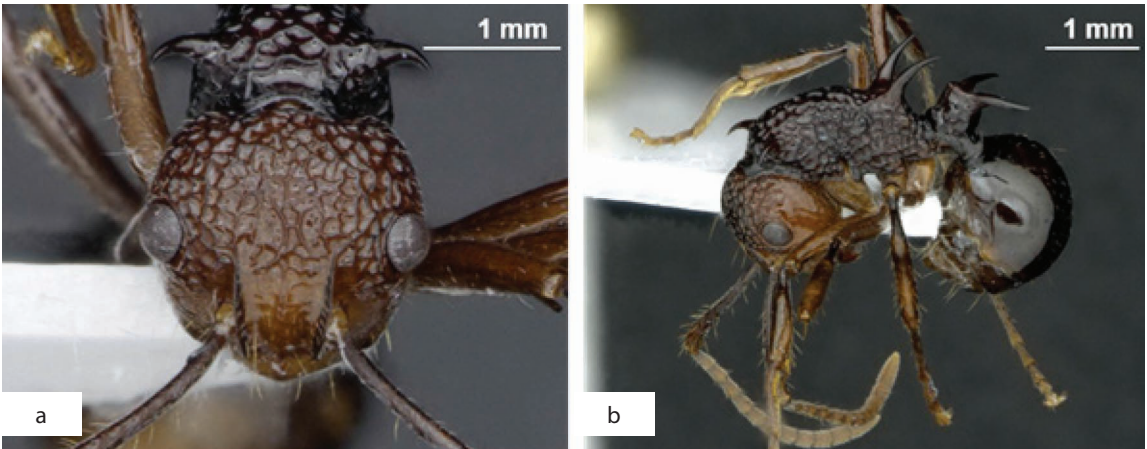
**Figure 118.** *Polyrhachis (Myrmhopla) bicolor* group sp.07, Z02.HymFrm510.jd. Worker.



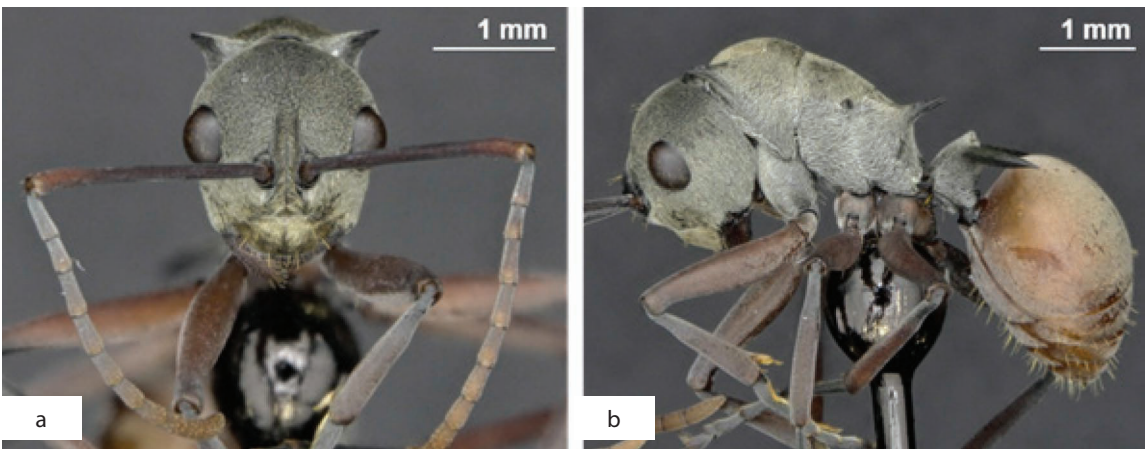
**Figure 119.** *Polyrhachis (Myrmhopla) flavoflagellata* group sp.01, Z02.HymFrm200.rn. Worker.



**Figure 120.** *Polyrhachis (Myrmhopla) mucronata* gr.sp.01, Z02.HymFrm023.rn. Worker.

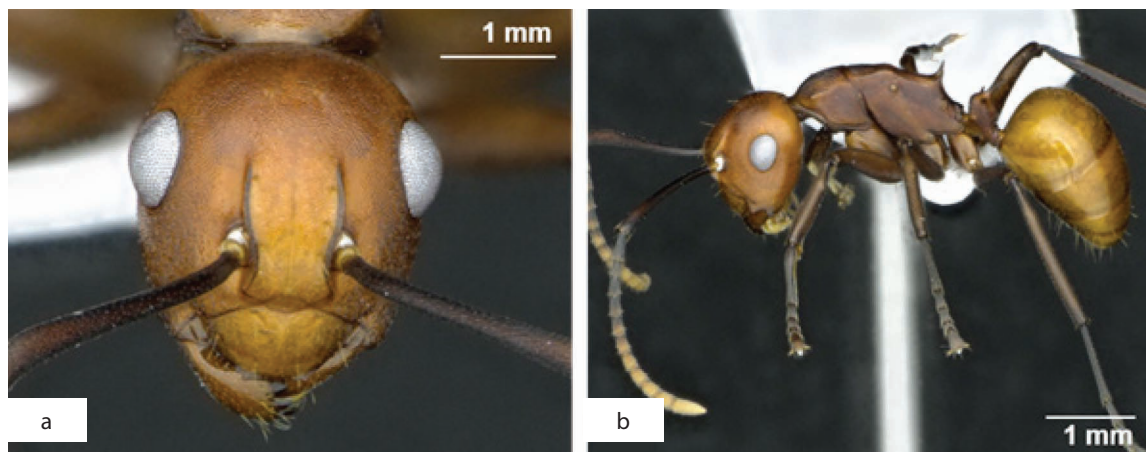


**Figure 121.** *Polyrhachis (Myrmhopla) rufipes*, Z02.HymFrm138.rn. Worker.

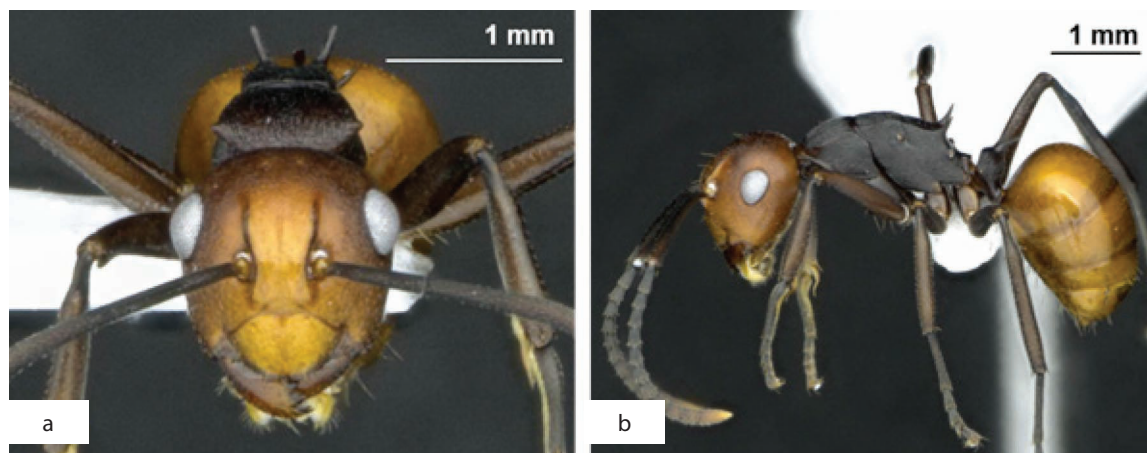


**Figure 122.** *Polyrhachis (Myrmhopla)* sp. near *basirufa*, Z02.HymFrm172.rn. Worker.

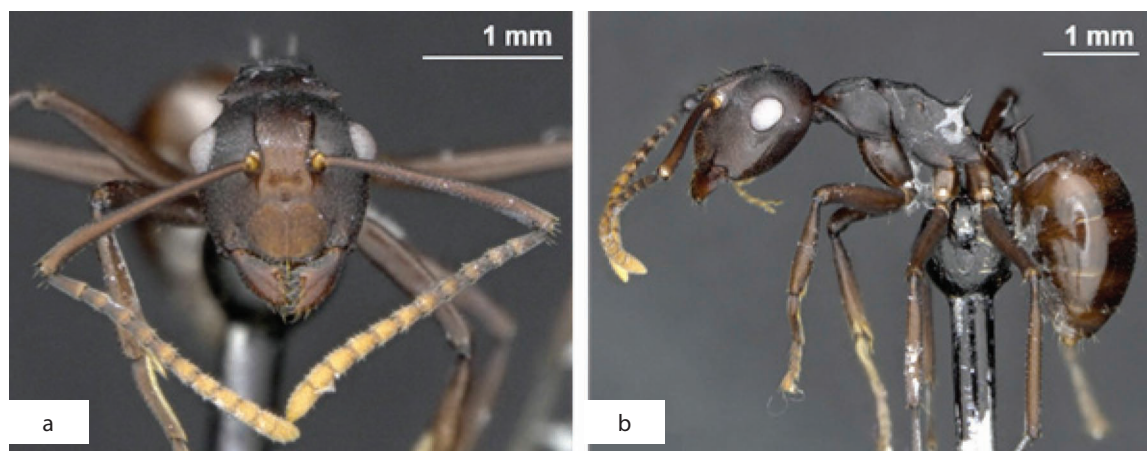




**Figure 123.** *Polyrhachis (Myrmotherinax)* near *thrinax* sp.01, Z02.HymFrm071.rn. Worker.

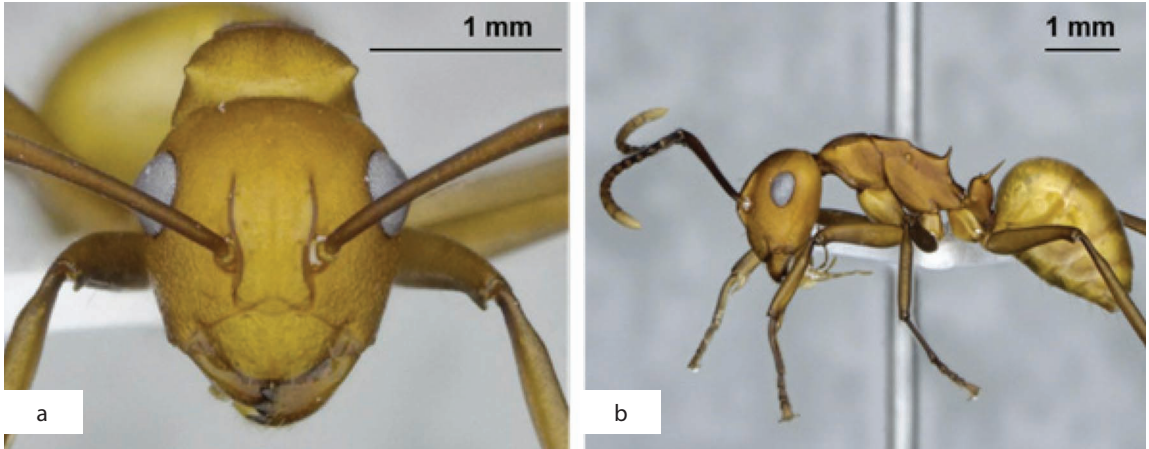


**Figure 124.** *Polyrhachis (Myrmotherinax)* near *thrinax* sp.02, Z02.HymFrm124.rn. Worker.

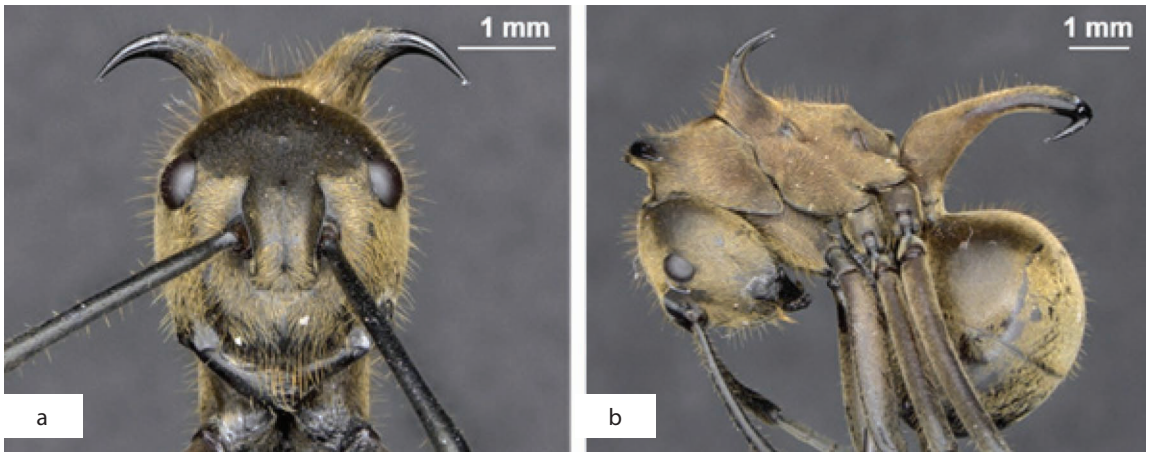


**Figure 125.** *Polyrhachis (Myrmotherinax)* near *thrinax* sp.03, Z02.HymFrm222.rn. Worker.

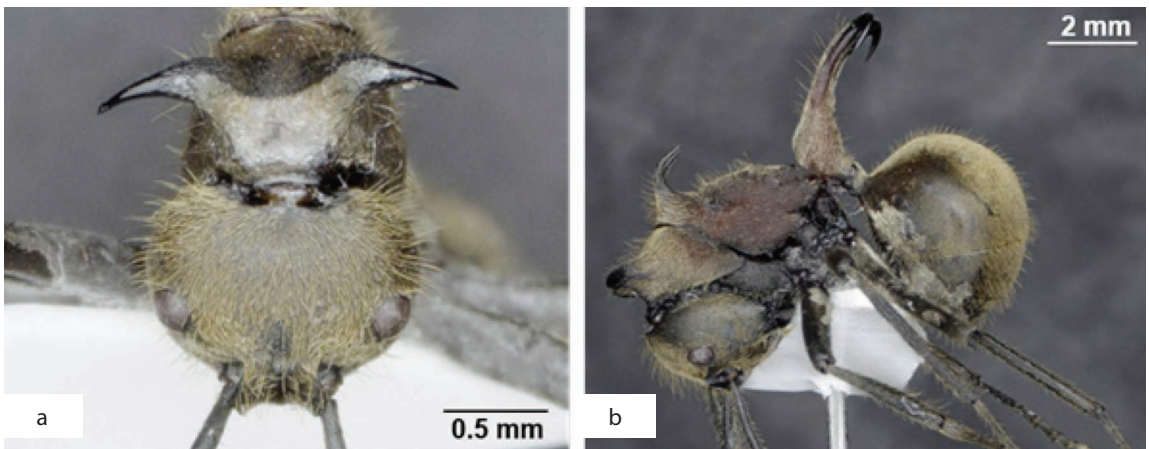




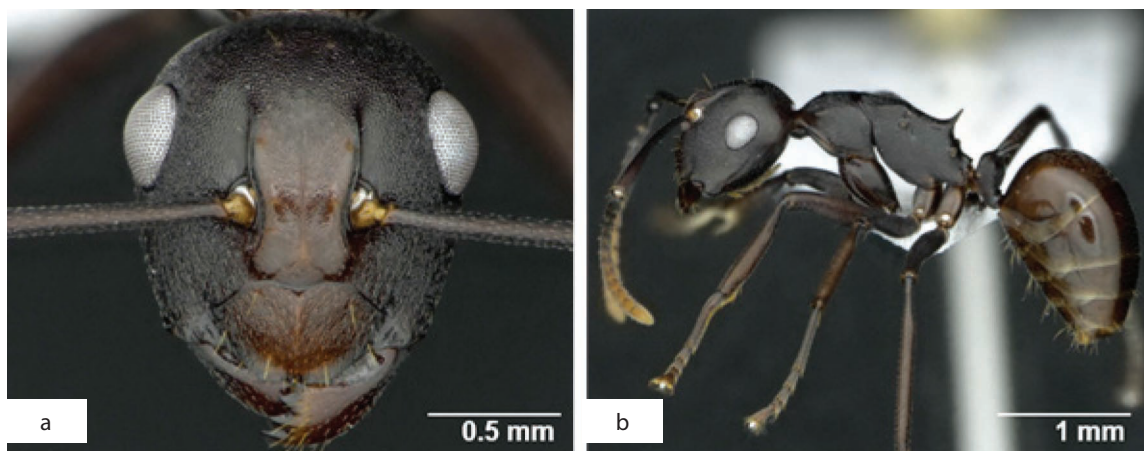
**Figure 126.** *Polyrhachis (Myrmothrinax)* near *thrinax* sp.05, Z02.HymFrm080.rn. Worker.



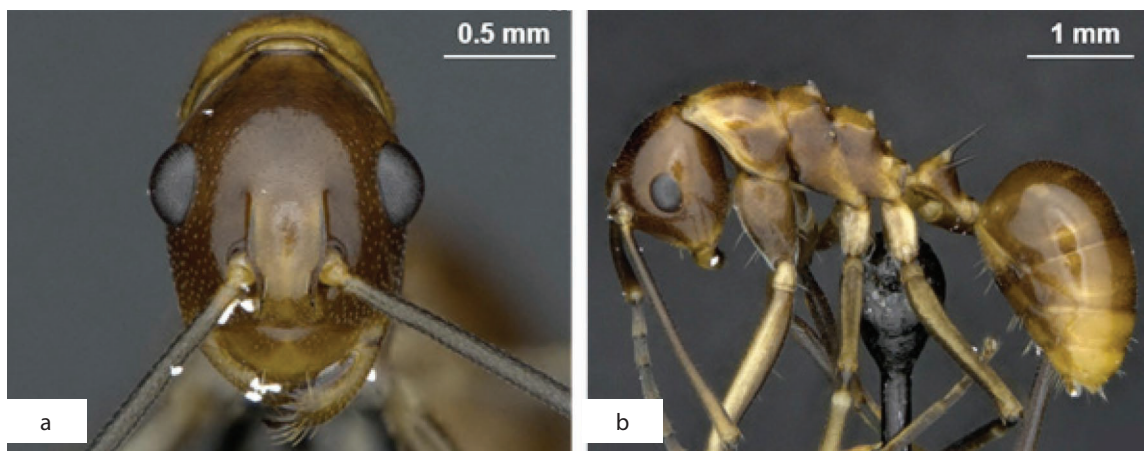
**Figure 127.** *Polyrhachis (Polyrhachis) olybria*, Z02.HymFrm267.rn. Worker.



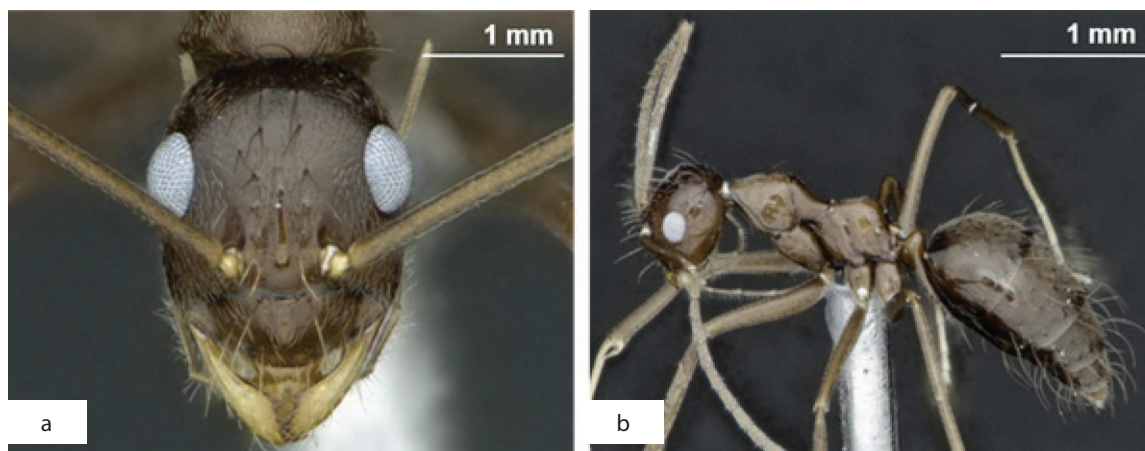
**Figure 128.** *Polyrhachis (Polyrhachis) ypsilon*, Z02.HymFrm184.rn. Worker.



**Figure 129.** *Polyrhachis* sp.101, Z02.HymFrm113.rn. Worker.



**Figure 130.** *Polyrhachis* sp.103, Z02.HymFrm413.rn. Worker.



**Figure 131.** *Prenolepis* sp.01, Z02.HymFrm066.rn. Worker.

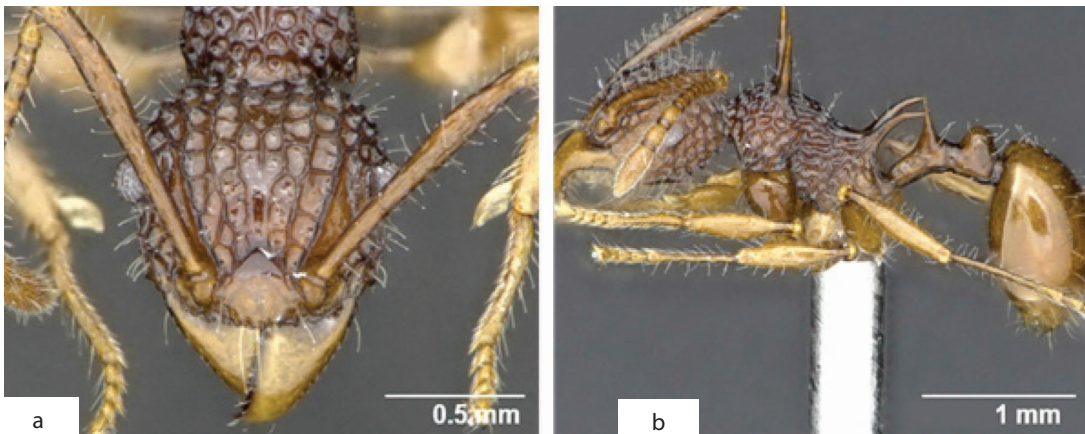




Photo: Jason Williams (2016)

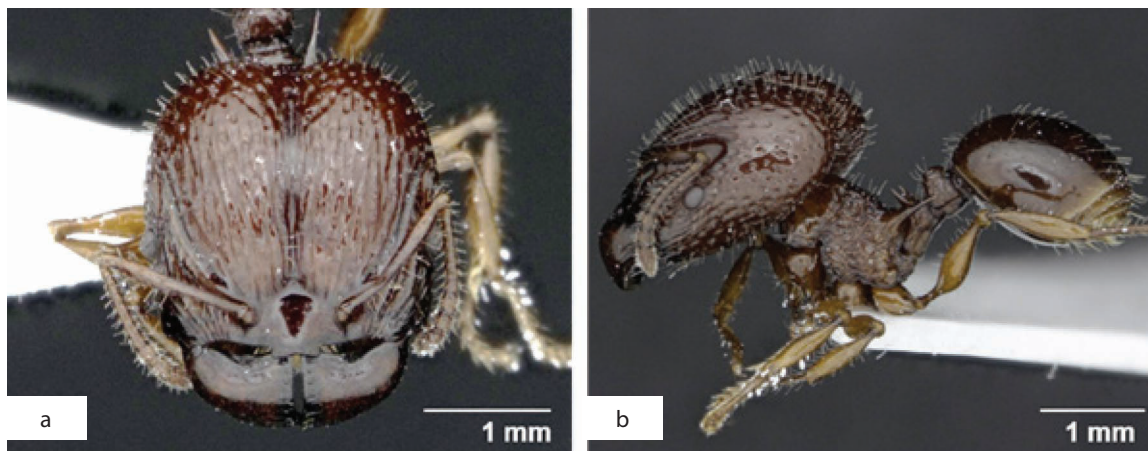
**Figure 132.** *Prenolepis subopaca*, B01.HymFrm286.jw. Worker.

## 6. Myrmicinae



**Figure 133.** *Acanthomyrmex ferox*, B01.HymFrm220.jw. Minor worker.





**Figure 134.** *Acanthomyrmex ferox*, B01.HymFrm220.jw. Major worker.

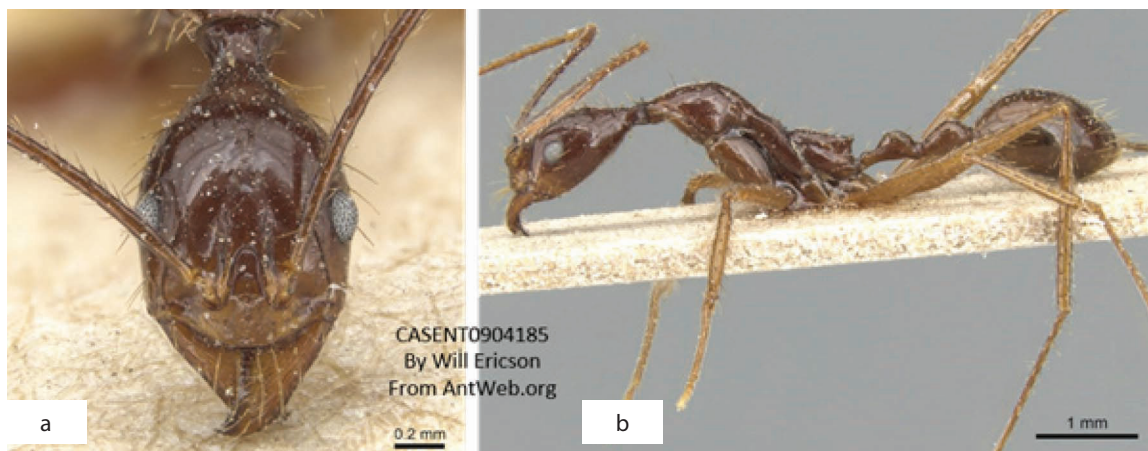
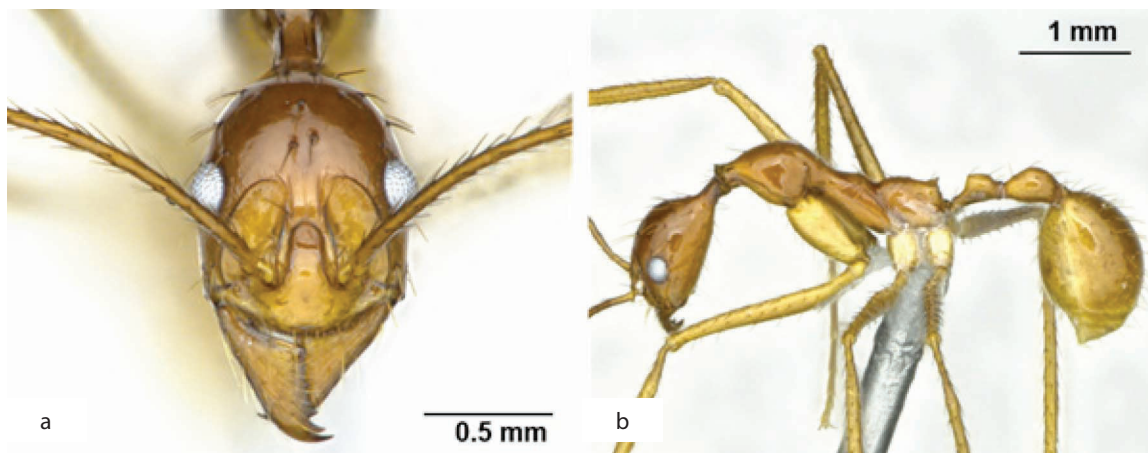
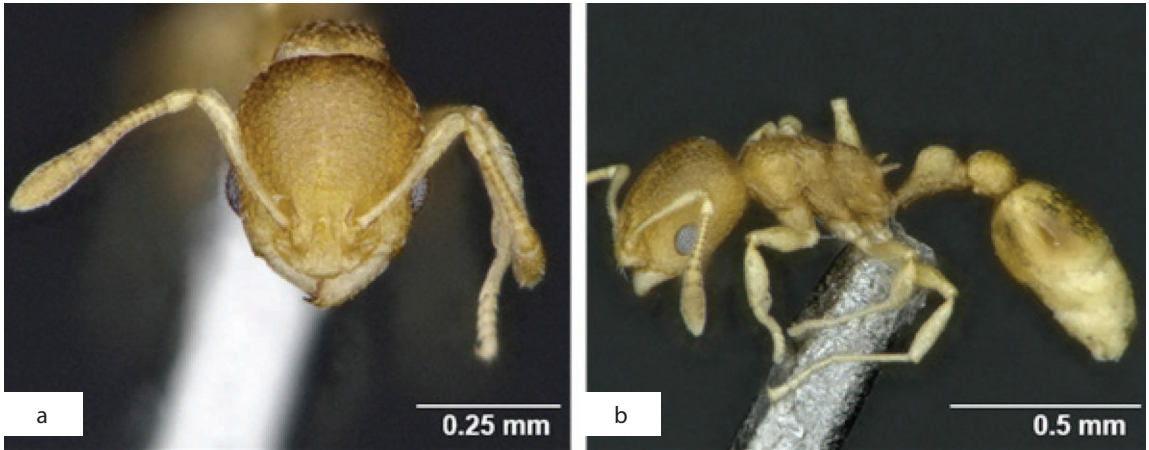


Photo: Will Ericson (2013)

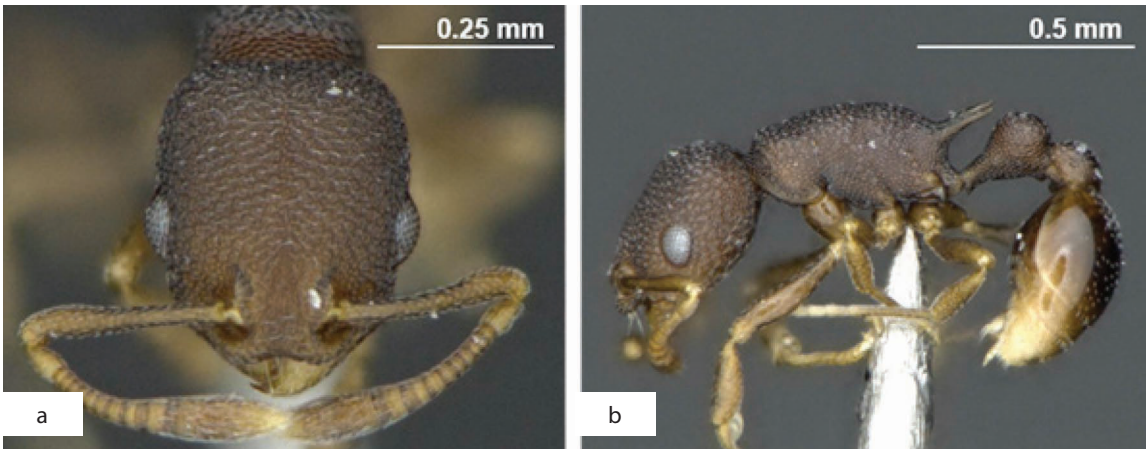
**Figure 135.** *Aphaenogaster feae*, B01.HymFrm211.jw. Worker.



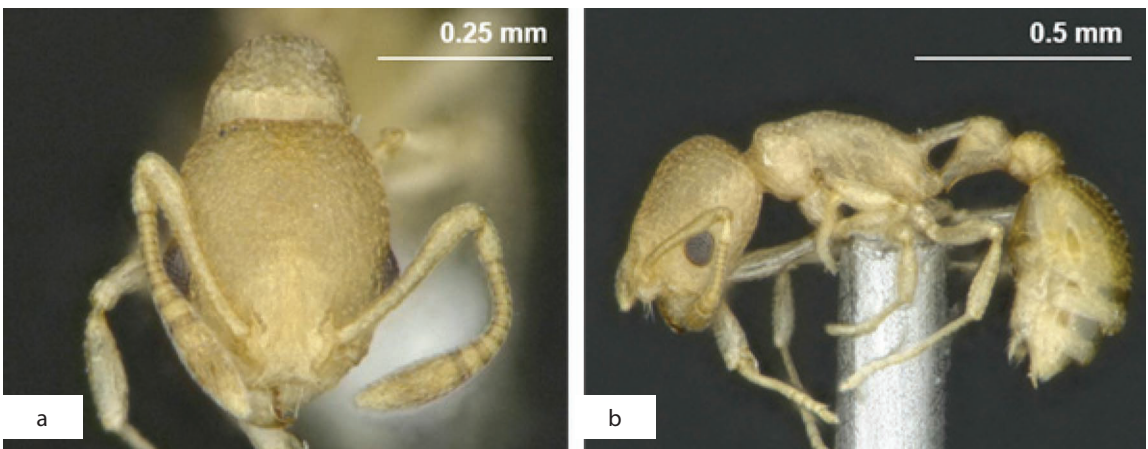
**Figure 136.** *Aphaenogaster* sp.01, Z02.HymFrm161.rn. Worker.



**Figure 137.** *Cardiocondyla wroughtonii*, Z02.HymFrm021.rn. Worker.



**Figure 138.** *Cardiocondyla* sp.01, Z02.HymFrm206.rn. Worker.



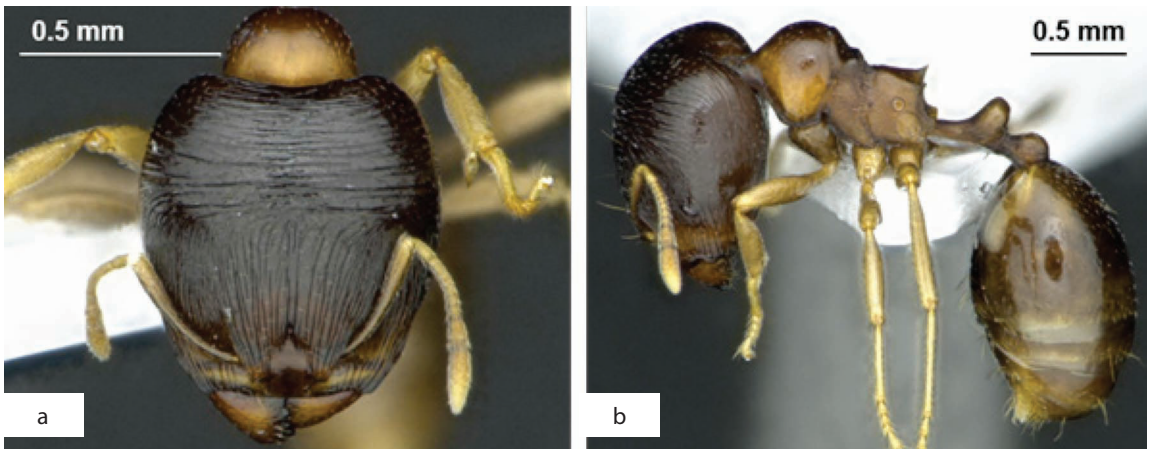
**Figure 139.** *Cardiocondyla* sp.02, B01.HymFrm227.jw. Worker.





Photo: Marek Borowiec (2013)

**Figure 140.** *Carebara pygmea*, Z02.HymFrm141.rn. Minor worker.

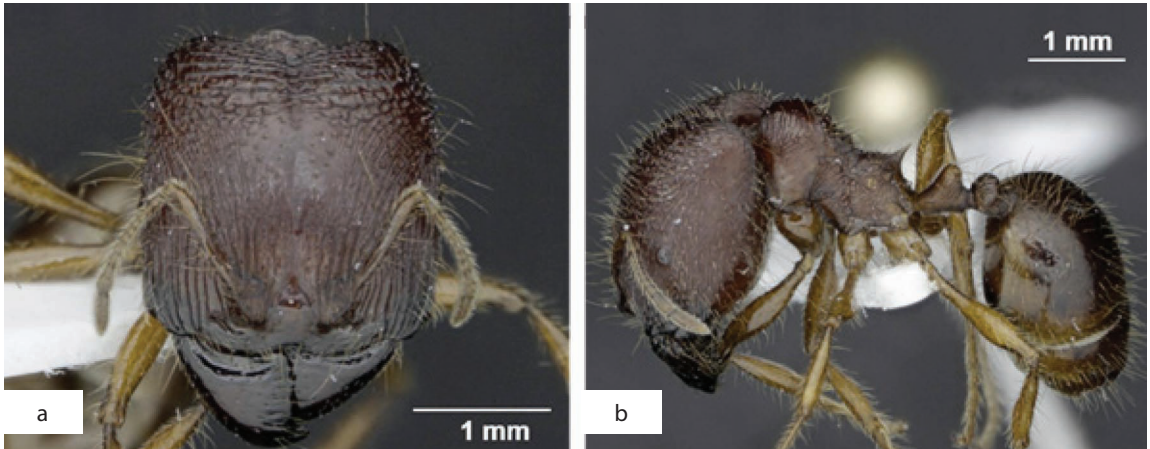


**Figure 141.** *Carebara pygmea*, Z02.HymFrm141.rn. Major worker.



**Figure 142.** *Carebara* sp.01, B01.HymFrm223.jw. Minor worker.

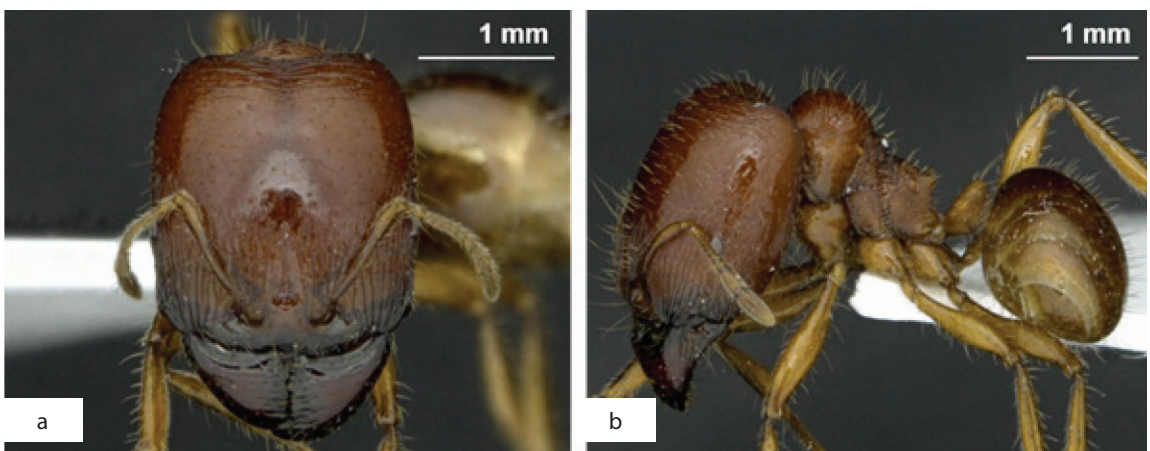




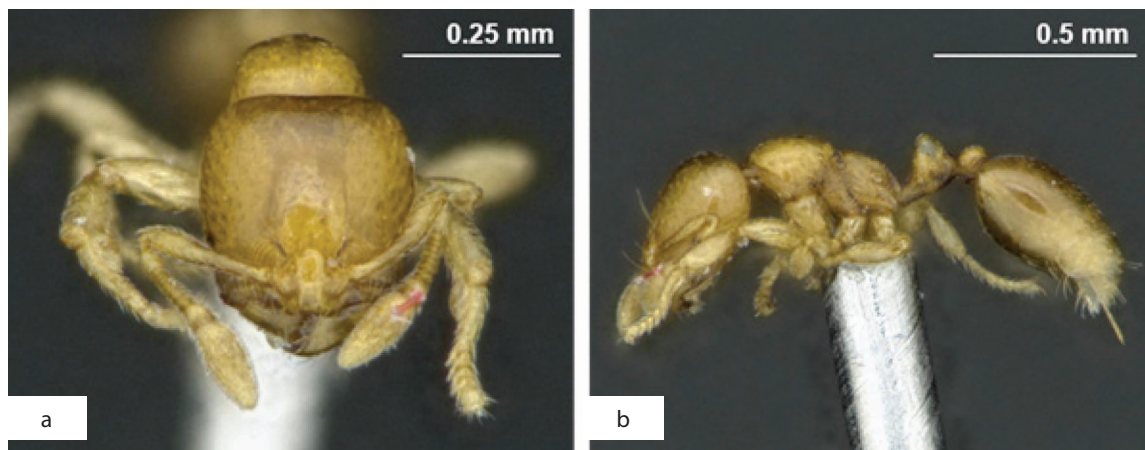
**Figure 143.** *Carebara* sp.01, B01.HymFrm223.jw. Major worker.



**Figure 144.** *Carebara* sp.02, B01.HymFrm224.jw. Minor worker.



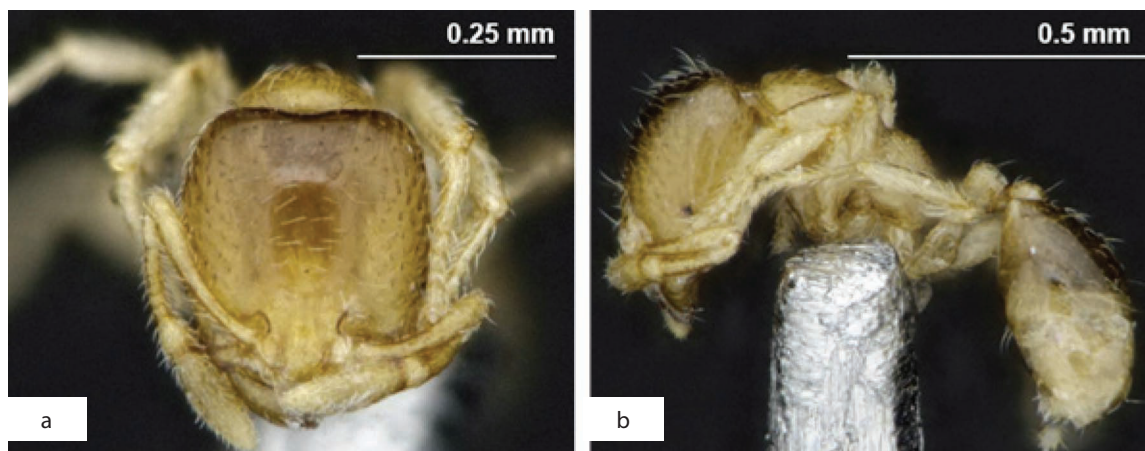
**Figure 145.** *Carebara* sp.02, B01.HymFrm224.jw. Major worker.



**Figure 146.** *Carebara* sp.03, B01.HymFrm225.jw. Minor worker.

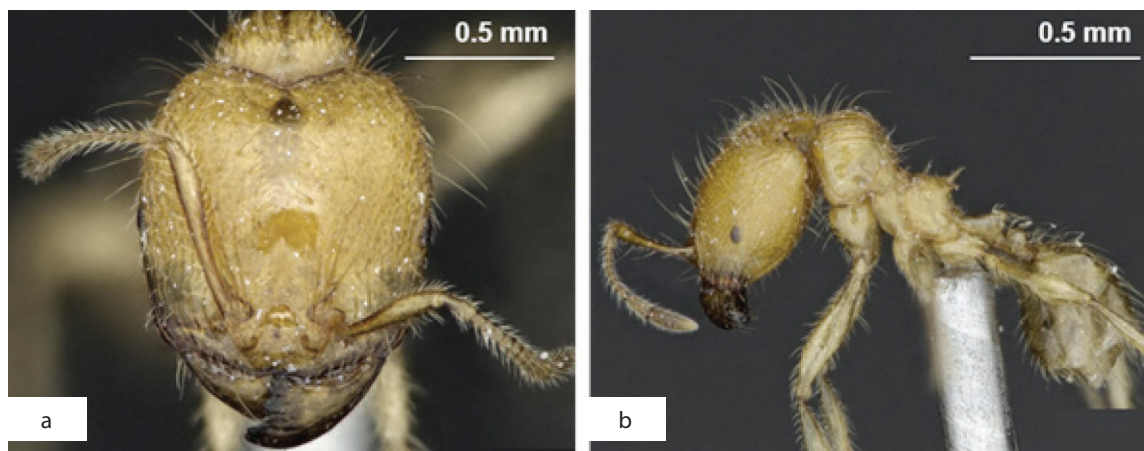


**Figure 147.** *Carebara* sp.04, B01.HymFrm201.jw. Minor worker.

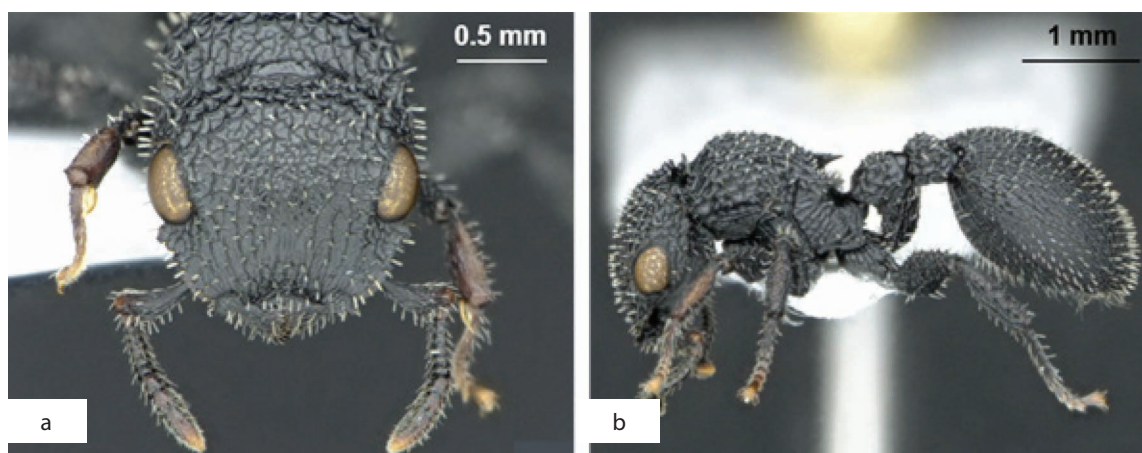


**Figure 148.** *Carebara* sp.61, Z01.HymFrm061.rn. Minor worker.

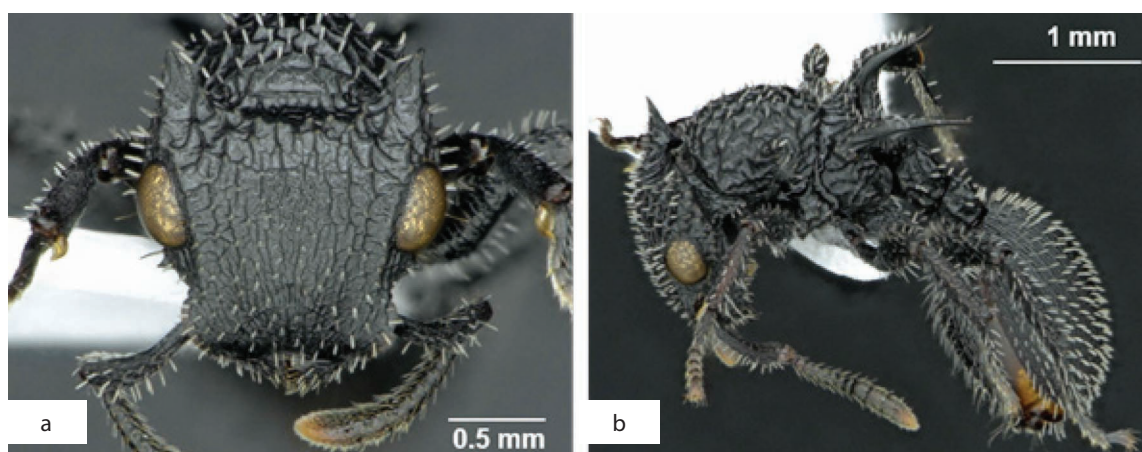




**Figure 149.** *Carebara* sp.104, B01.HymFrm226.jw. Minor worker.

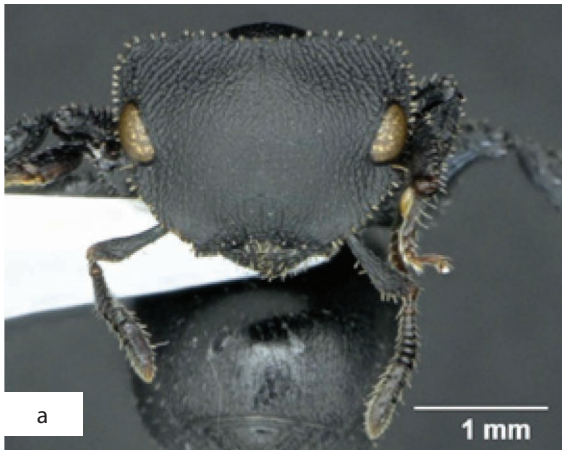


**Figure 150.** *Cataulacus hispidulus*, Z02.HymFrm091.rn. Worker.



**Figure 151.** *Cataulacus horridus*, Z02.HymFrm159.rn. Worker.

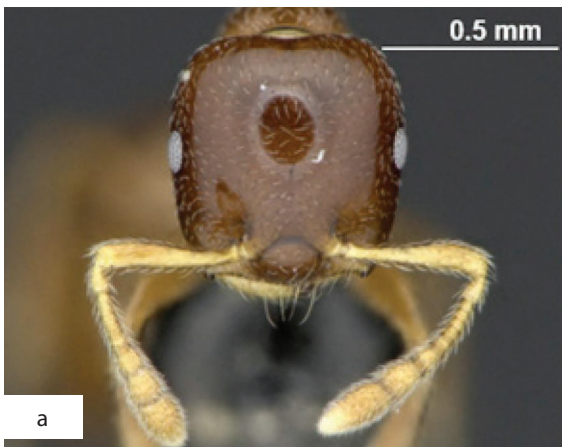




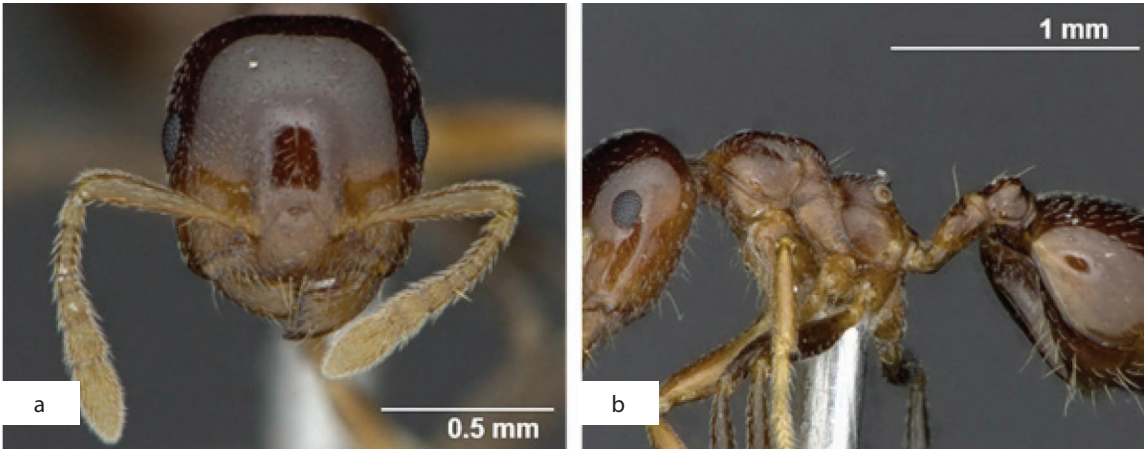
**Figure 152.** *Cataulacus latissimus*, Z02.HymFrm030.rn. Worker.



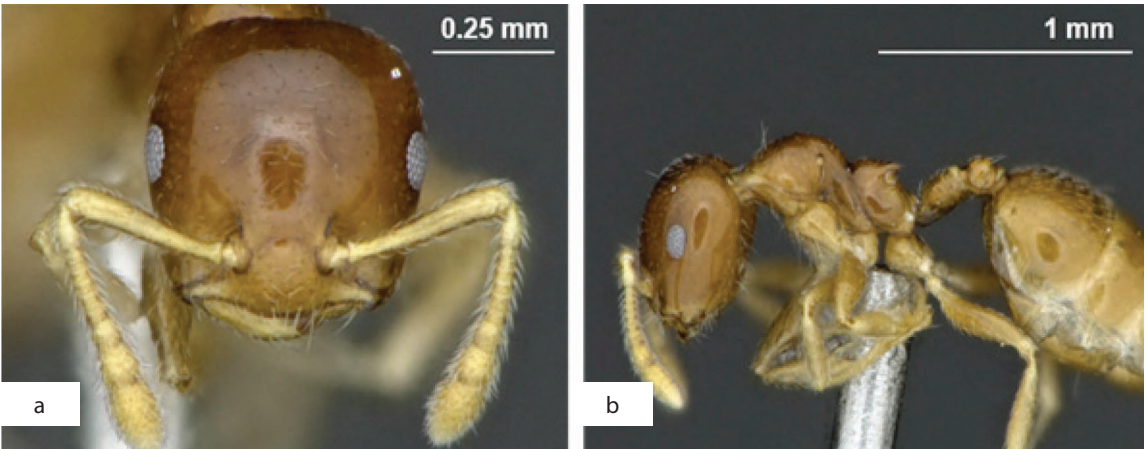
**Figure 153.** *Cataulacus praetextus*, Z02.HymFrm004.rn. Worker.



**Figure 154.** *Crematogaster borneensis* group sp.01, Z02.HymFrm239.rn. Worker.



**Figure 155.** *Crematogaster borneensis* group sp.02, Z02.HymFrm252.rn. Worker.

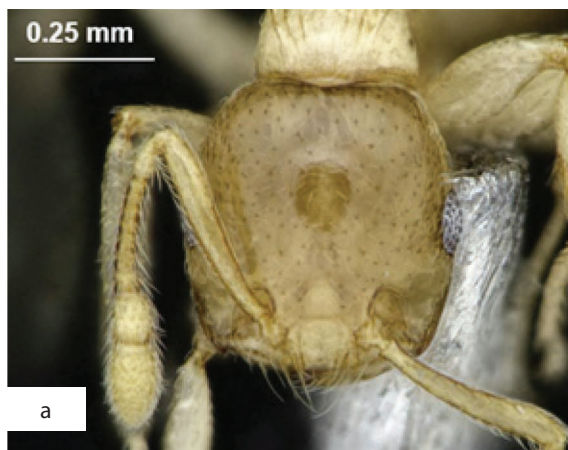


**Figure 156.** *Crematogaster borneensis* group sp.03, Z02.HymFrm256.rn. Worker.



**Figure 157.** *Crematogaster borneensis* group sp.04, Z02.HymFrm407.rn. Worker.





**Figure 158.** *Crematogaster* cf. *cylindriceps*, Z02.HymFrm074.rn. Worker.

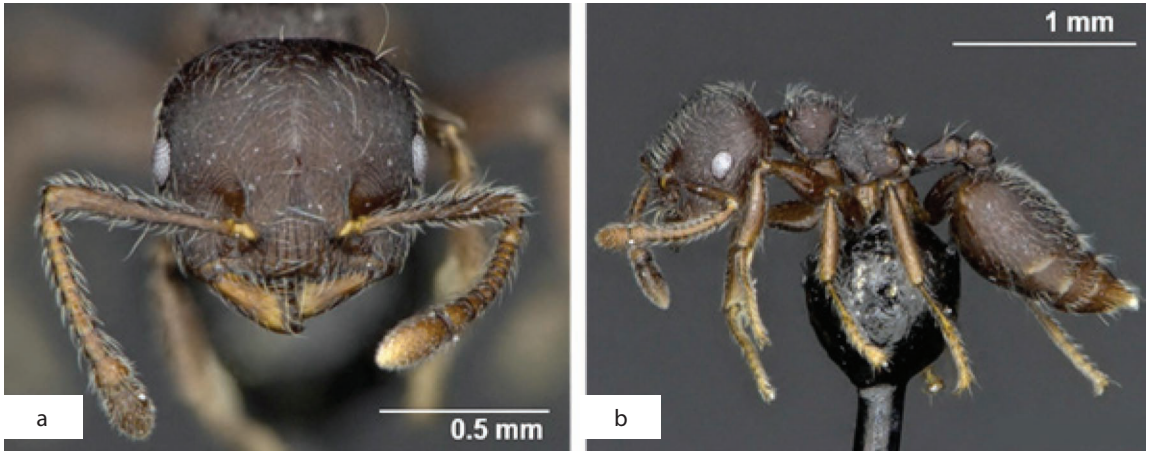


**Figure 159.** *Crematogaster* cf. *discinodis*, Z02.HymFrm226.rn. Worker.

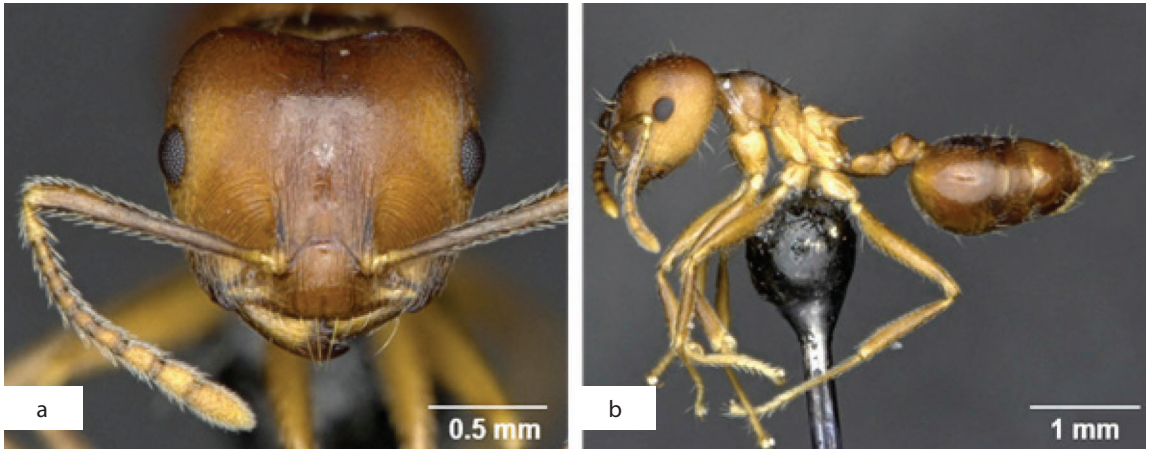


**Figure 160.** *Crematogaster* cf. *indosinensis*, Z02.HymFrm242.rn. Worker.

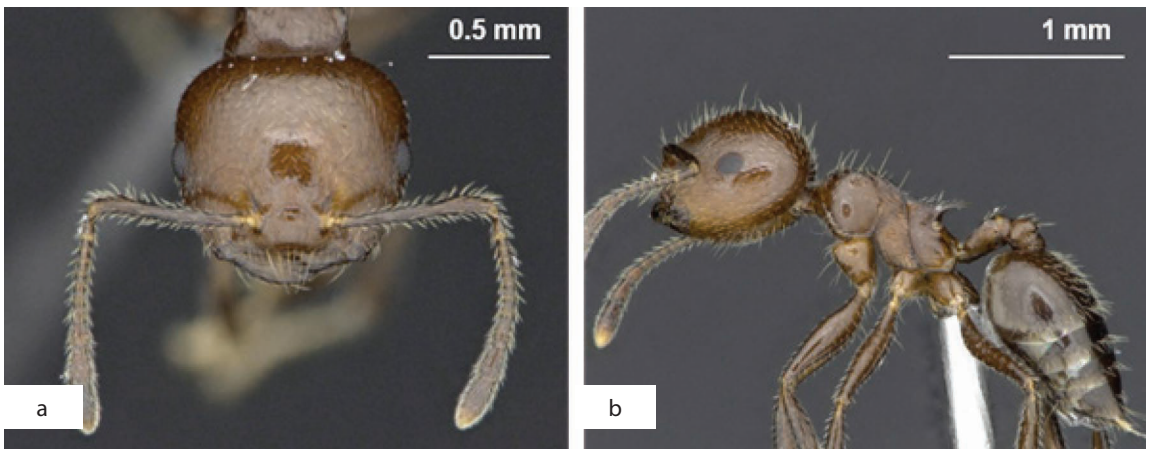




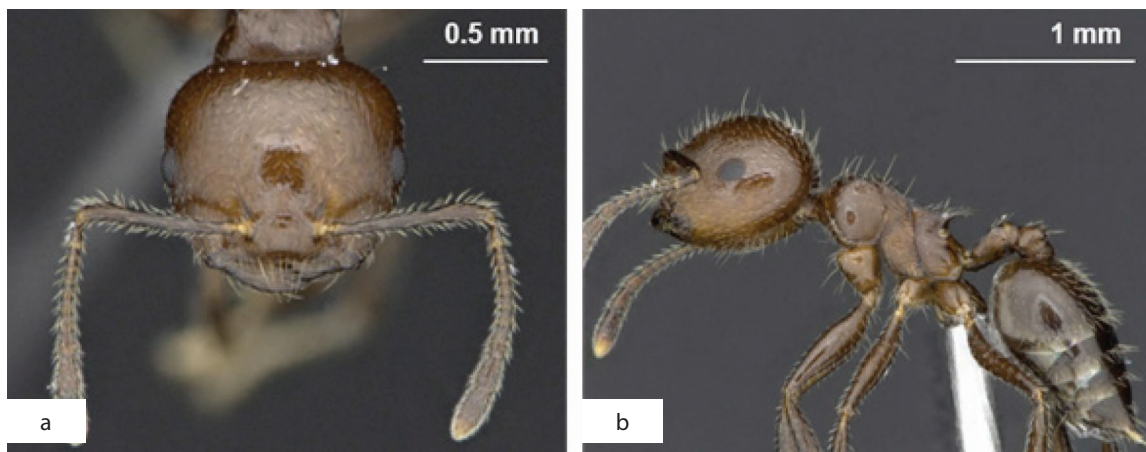
**Figure 161.** *Crematogaster* cf. *pfeifferi*, Z02.HymFrm242.rn. Worker.



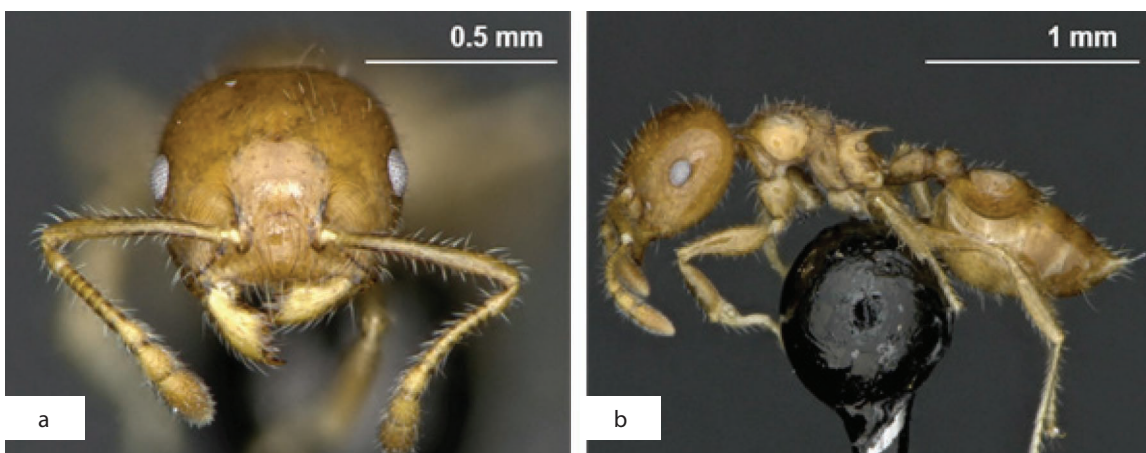
**Figure 162.** *Crematogaster* *coriaria*, Z02.HymFrm225.rn. Worker.



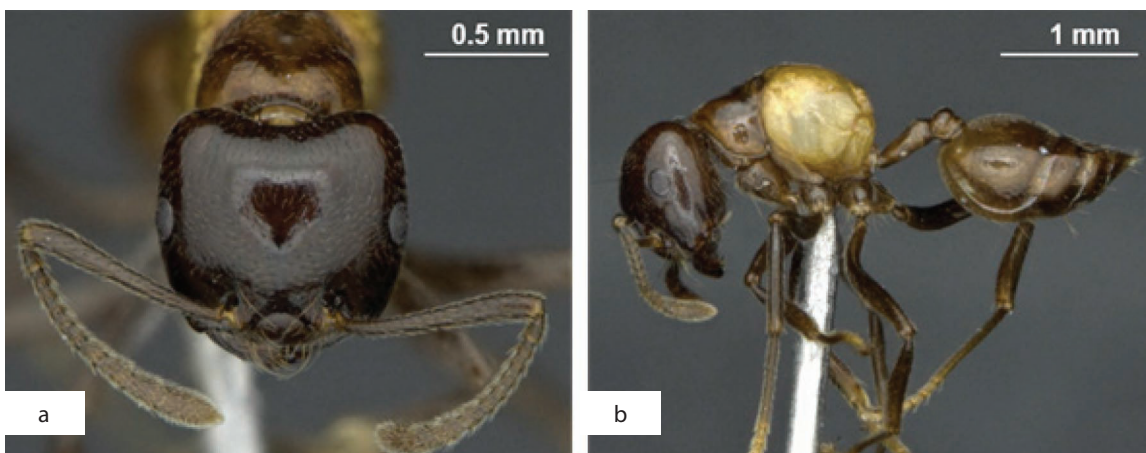
**Figure 163.** *Crematogaster* *ferrarii*, Z02.HymFrm237.rn. Worker.



**Figure 164.** *Crematogaster fraxatrix*, Z02.HymFrm254.rn. Worker.

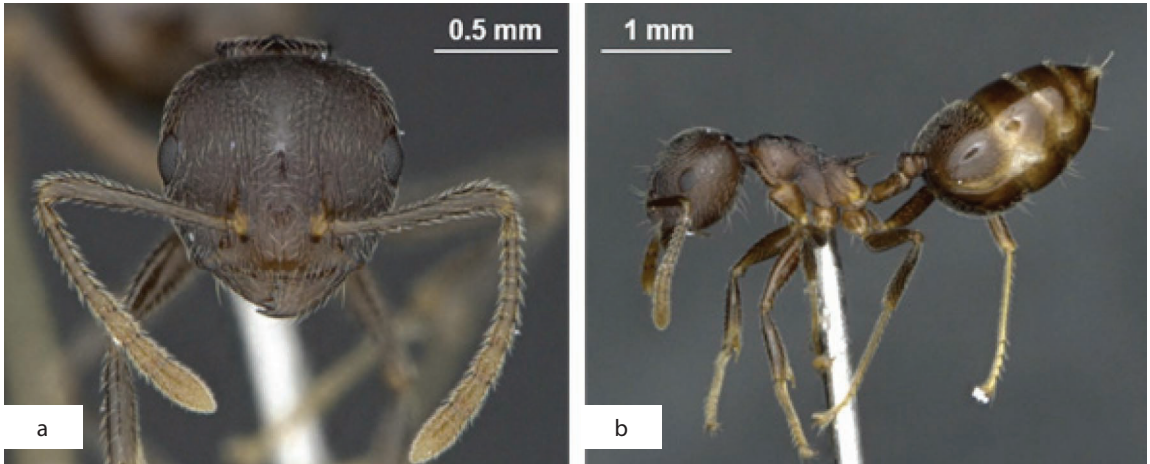


**Figure 165.** *Crematogaster fraxatrix* gr. *simboloni* sp.01, Z02.HymFrm244.rn. Worker.

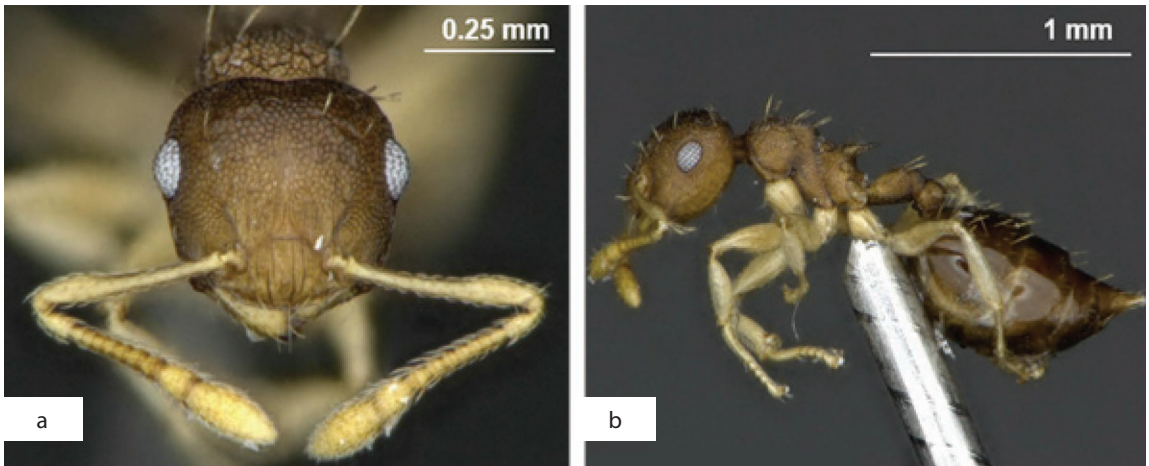


**Figure 166.** *Crematogaster inflata*, Z02.HymFrm313.rn. Worker.

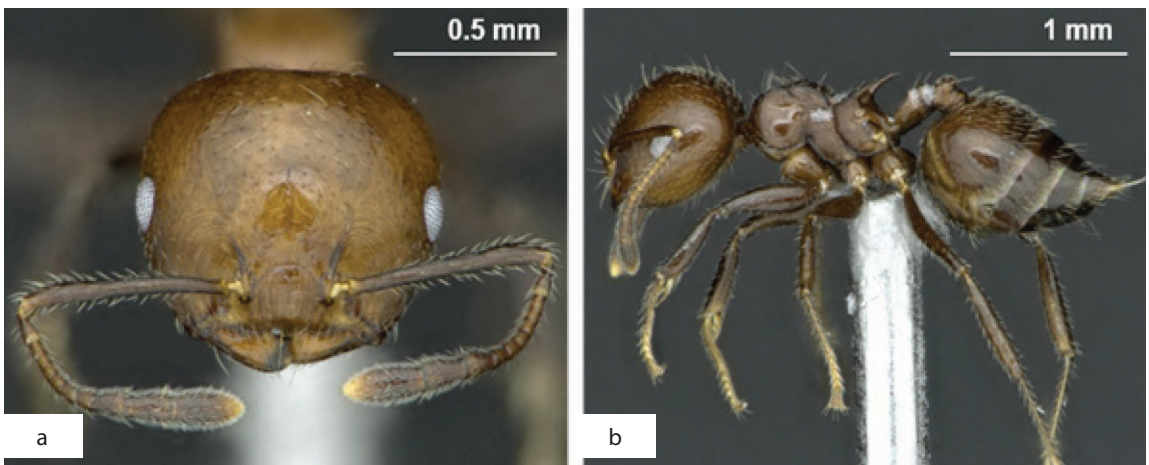




**Figure 167.** *Crematogaster modiglianii*, Z02.HymFrm301.rn. Worker.

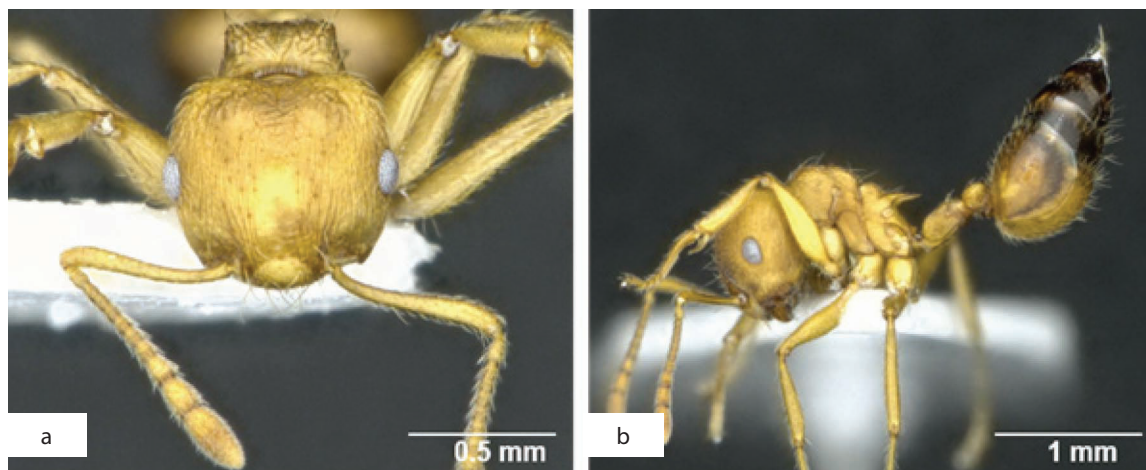


**Figure 168.** *Crematogaster reticulata*, Z02.HymFrm234.rn. Worker.

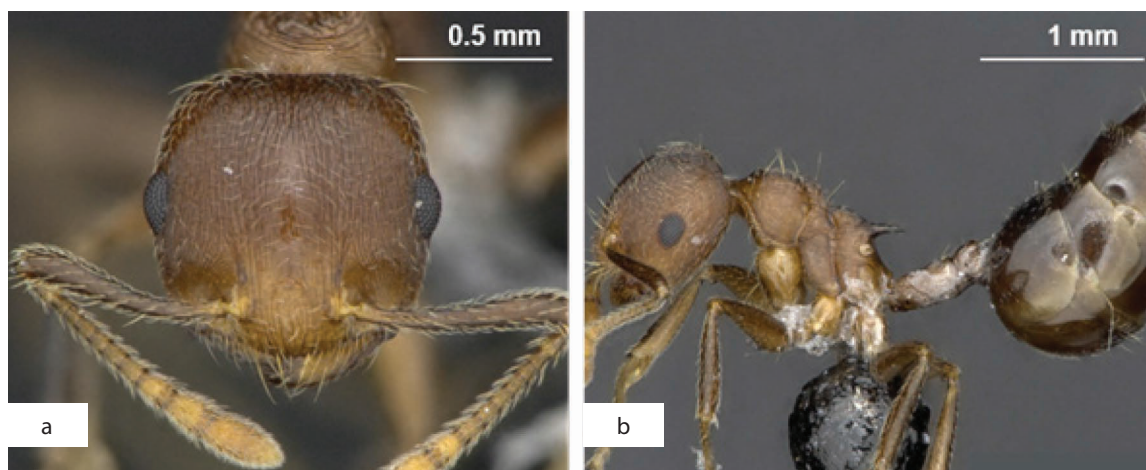


**Figure 169.** *Crematogaster rogenhoferi* gr. sp.01, Z02.HymFrm017.rn. Worker.

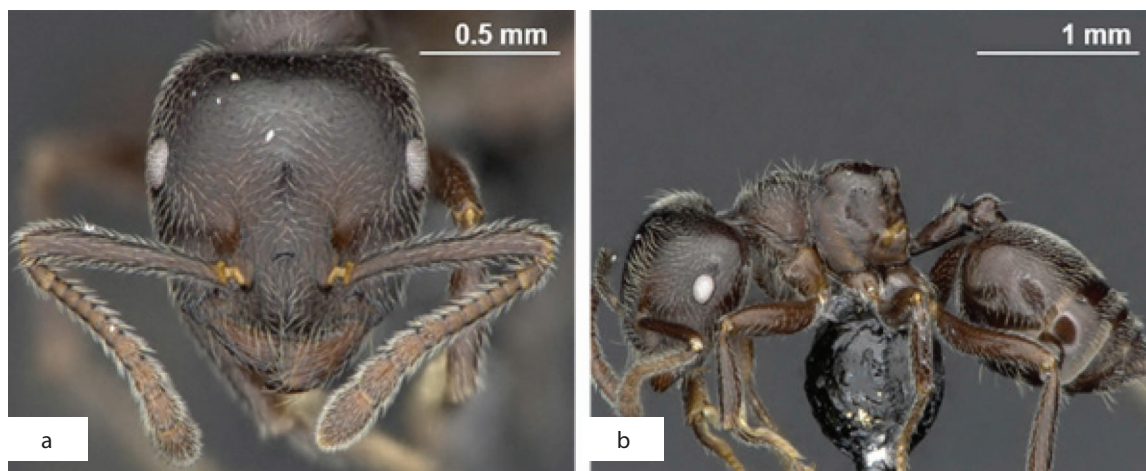




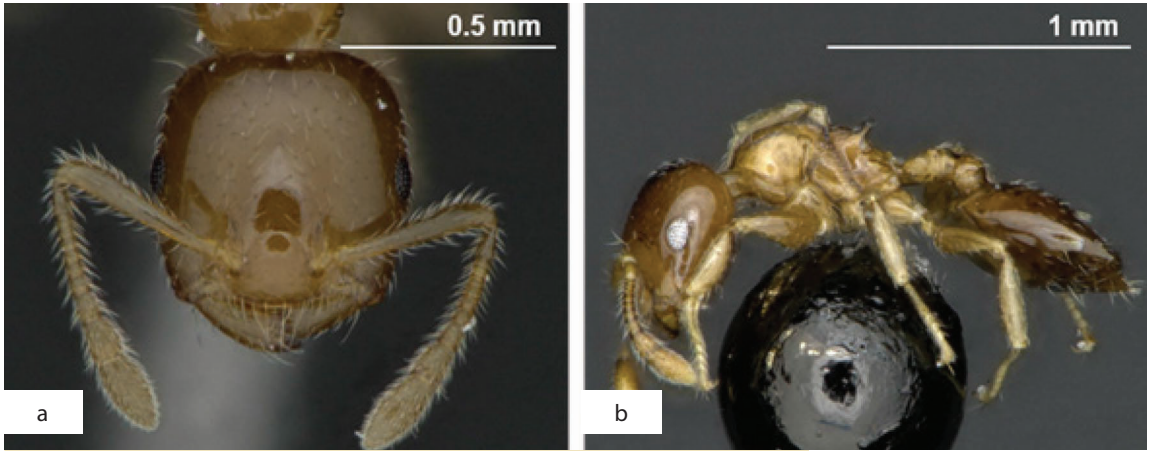
**Figure 170.** *Crematogaster rogenhoferi* gr. sp.02, Z02.HymFrm117.rn. Worker.



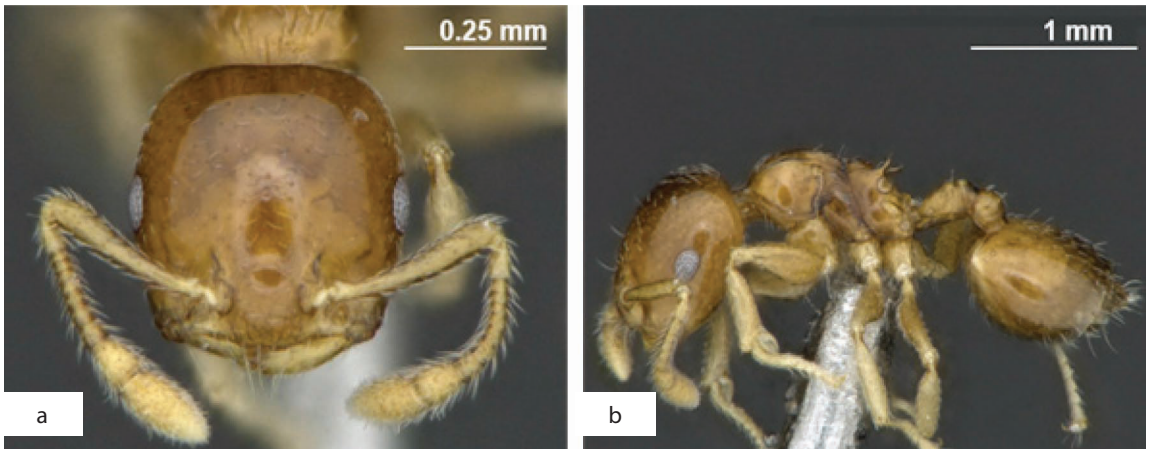
**Figure 171.** *Crematogaster rogenhoferi* gr. sp.03, Z02.HymFrm229.rn. Worker.



**Figure 172.** *Crematogaster sewardi*, Z02.HymFrm245.rn. Worker.



**Figure 173.** *Crematogaster treubi*, Z02.HymFrm238.rn. Worker.

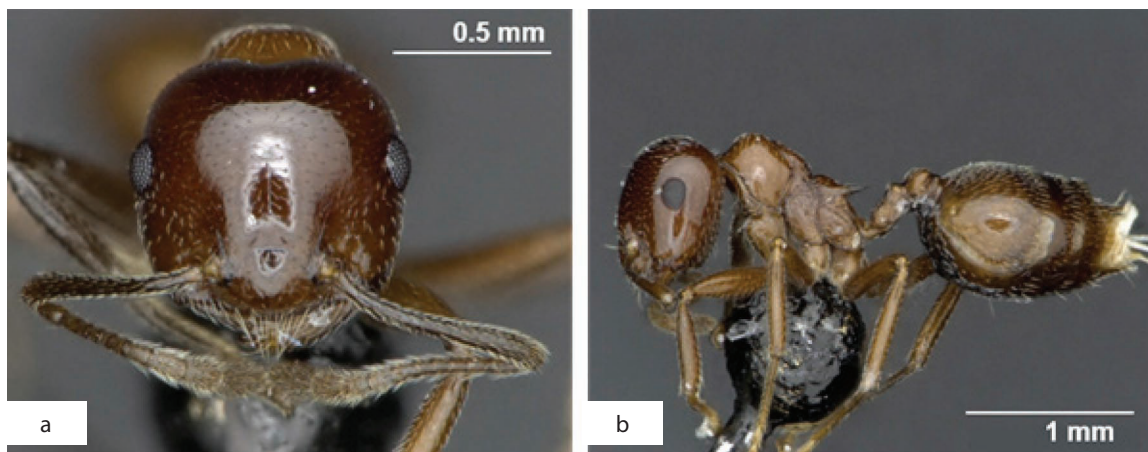


**Figure 174.** *Crematogaster treubi* gr. sp.01, Z02.HymFrm248.rn. Worker.

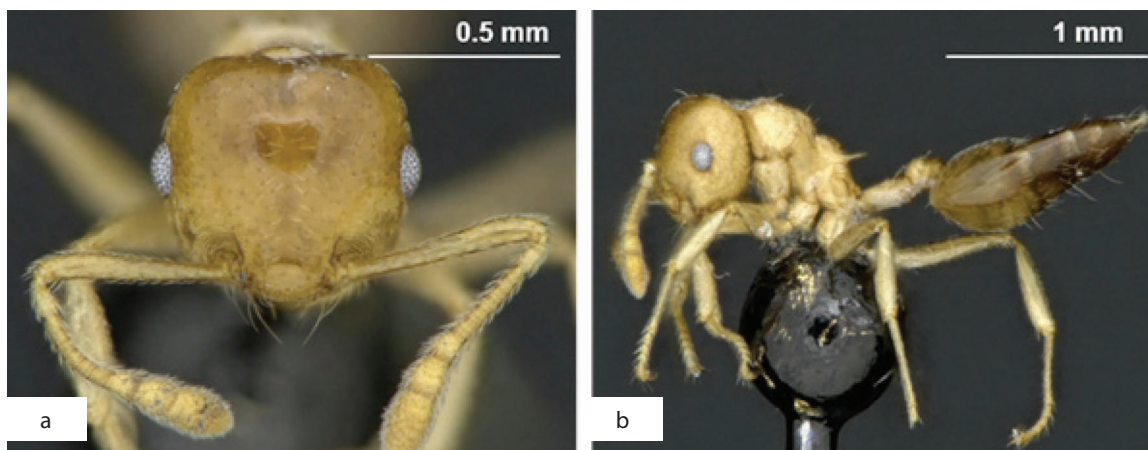


**Figure 175.** *Crematogaster treubi* gr. sp.02, Z02.HymFrm295.rn. Worker.

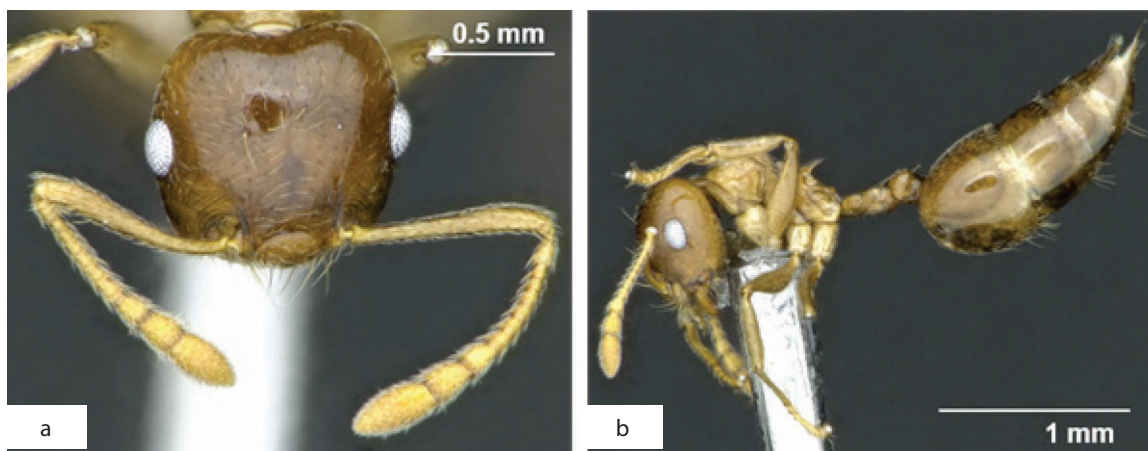




**Figure 176.** *Crematogaster tumidula*, Z02.HymFrm253.rn. Worker.



**Figure 177.** *Crematogaster* sp.02 of SH, Z02.HymFrm236.rn. Worker.



**Figure 178.** *Crematogaster* sp.02, Z02.HymFrm044.rn. Worker.





**Figure 179.** *Crematogaster* sp.06, B01.HymFrm232.jw. Worker.



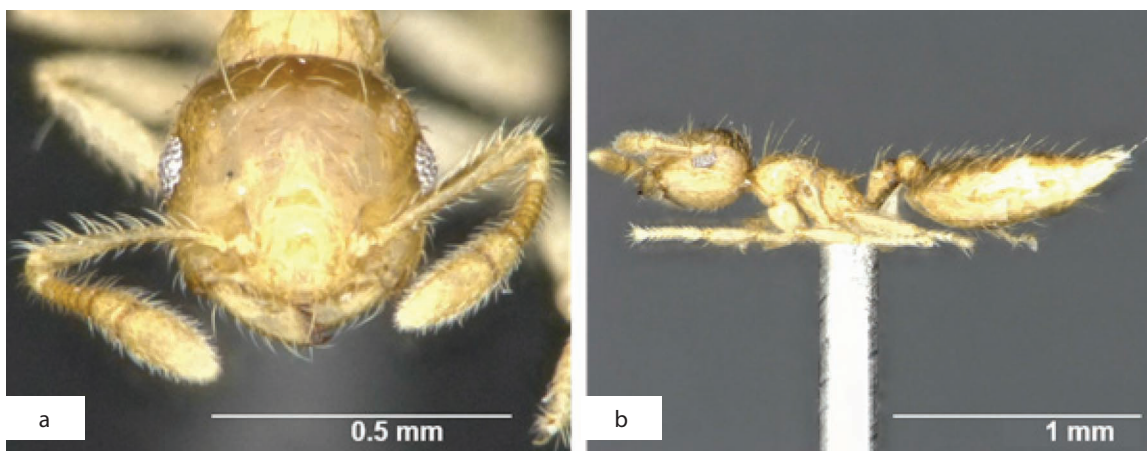
**Figure 180.** *Crematogaster* sp.07, B01.HymFrm233.jw. Worker.



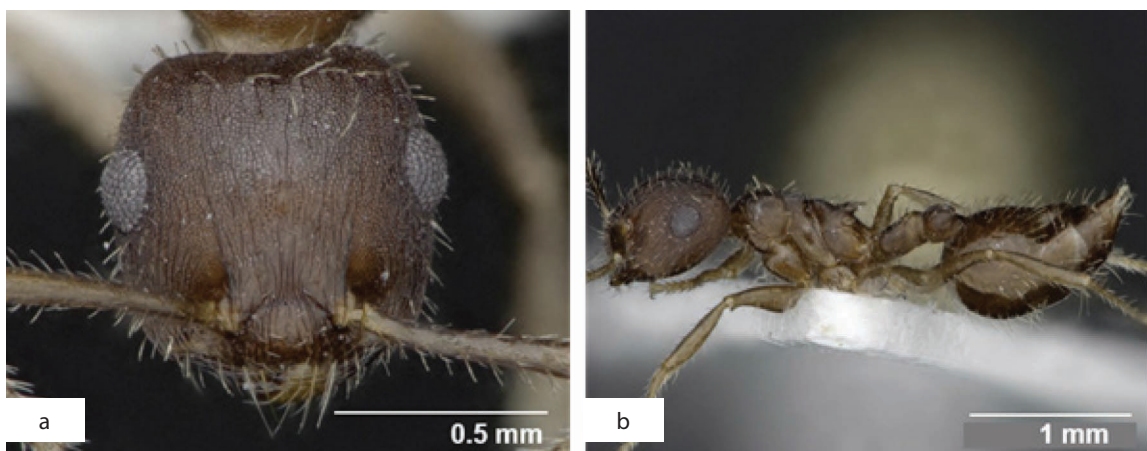
**Figure 181.** *Crematogaster* sp.10, B01.HymFrm236.jw. Worker.



**Figure 182.** *Crematogaster* sp.12, B01.HymFrm238.jw. Worker.

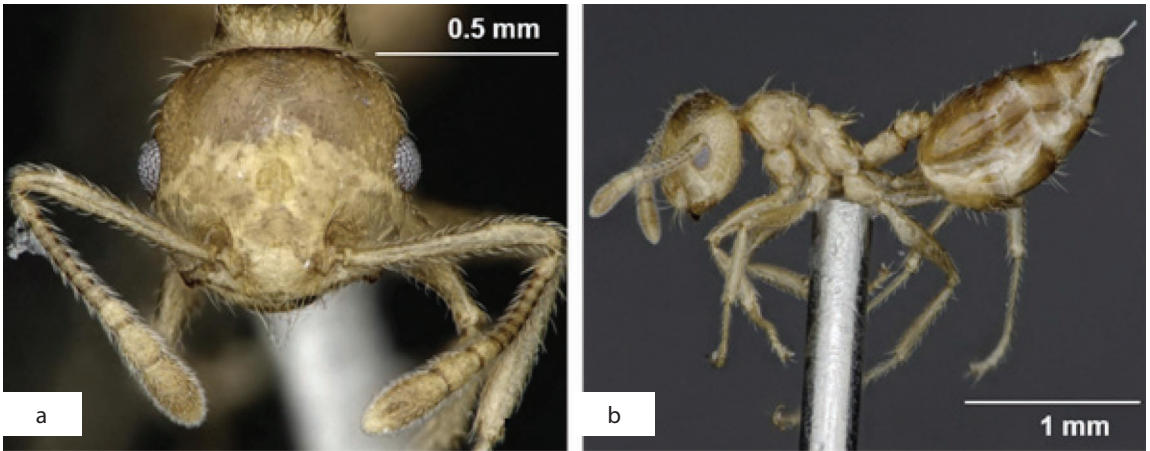


**Figure 183.** *Crematogaster* sp.13, B01.HymFrm239.jw. Worker.

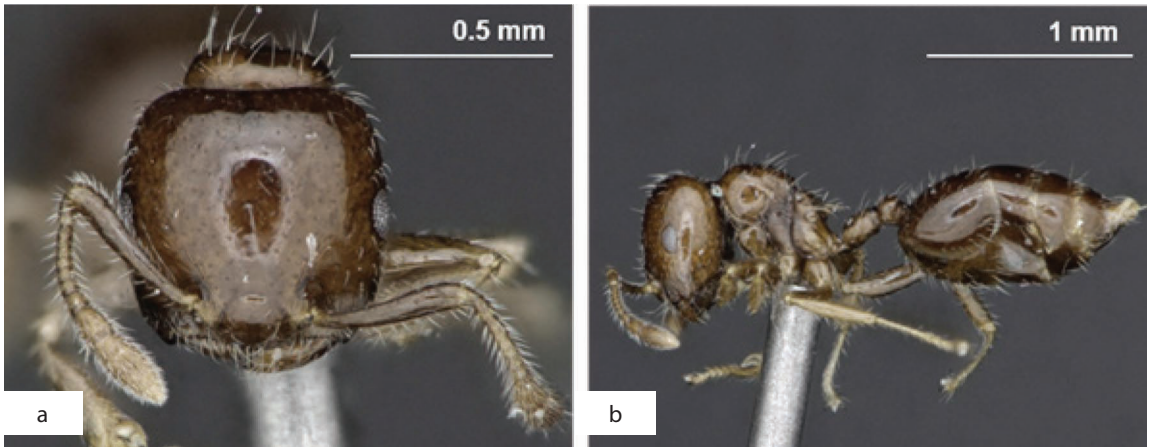


**Figure 184.** *Crematogaster* sp.14, B01.HymFrm305.jw. Worker.

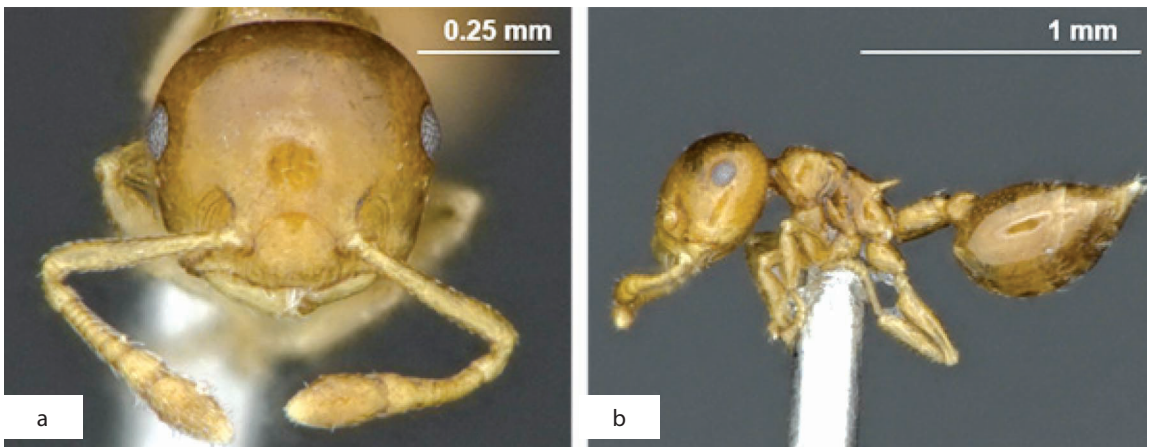




**Figure 185.** *Crematogaster* sp.16, B01.HymFrm307.jw. Worker.

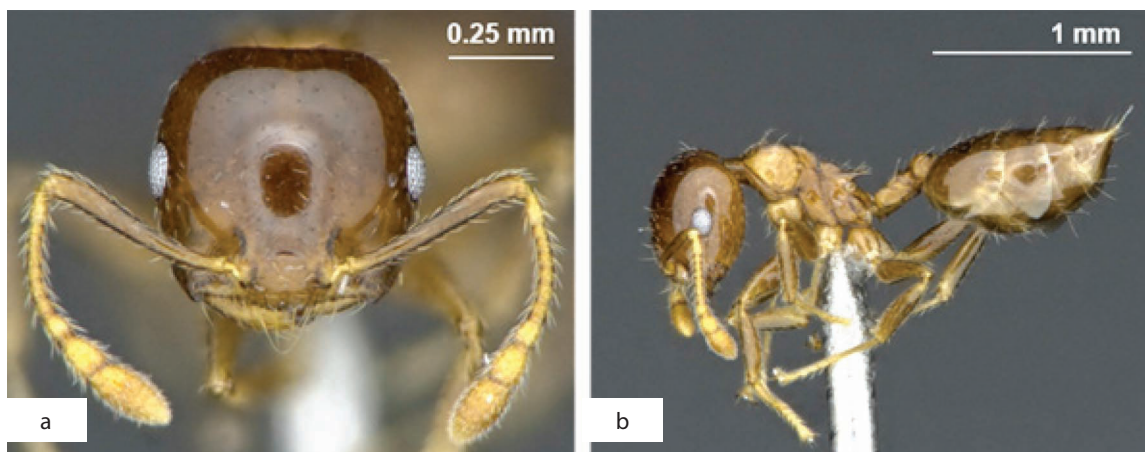


**Figure 186.** *Crematogaster* sp.18, B01.HymFrm309.jw. Worker.

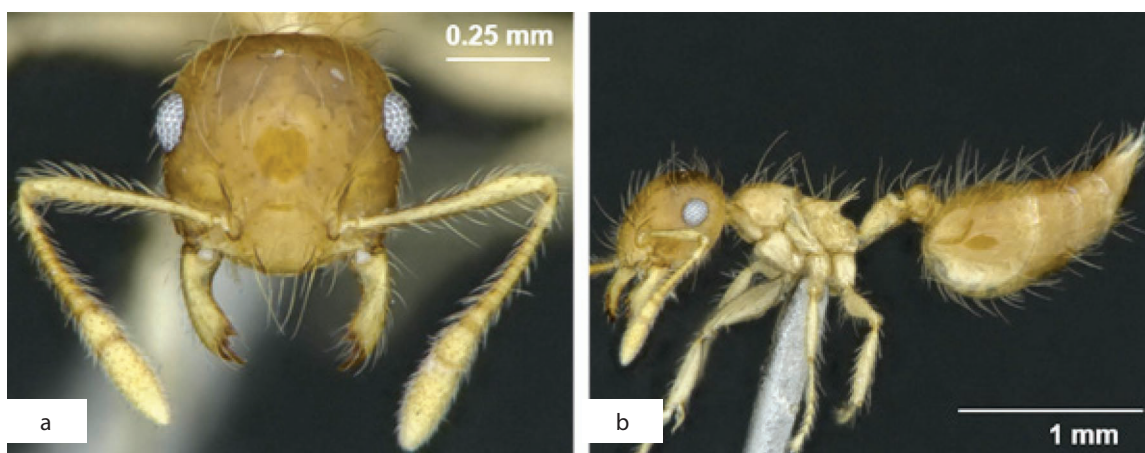


**Figure 187.** *Crematogaster* sp.30, Z02.HymFrm249.rn. Worker.





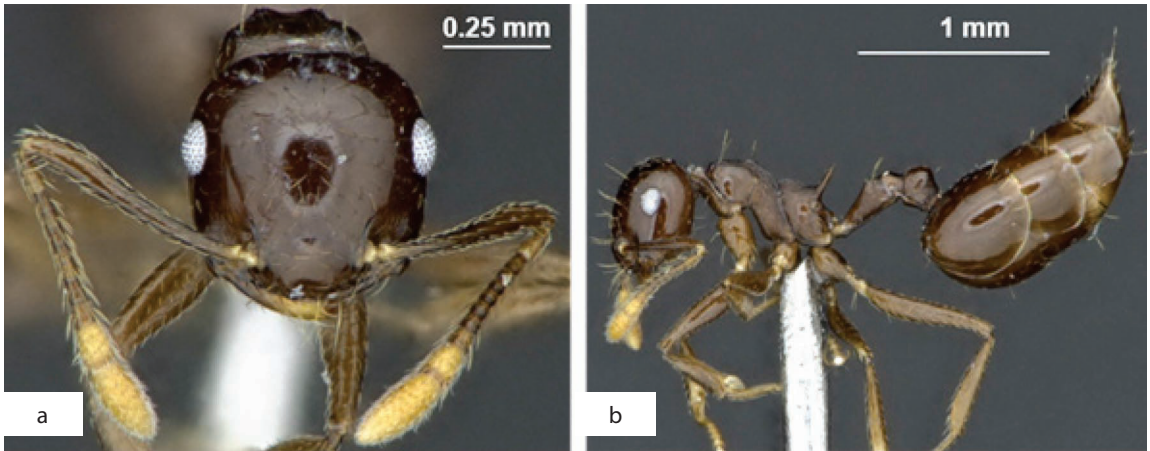
**Figure 188.** *Crematogaster* sp.47, Z02.HymFrm303.rn. Worker.



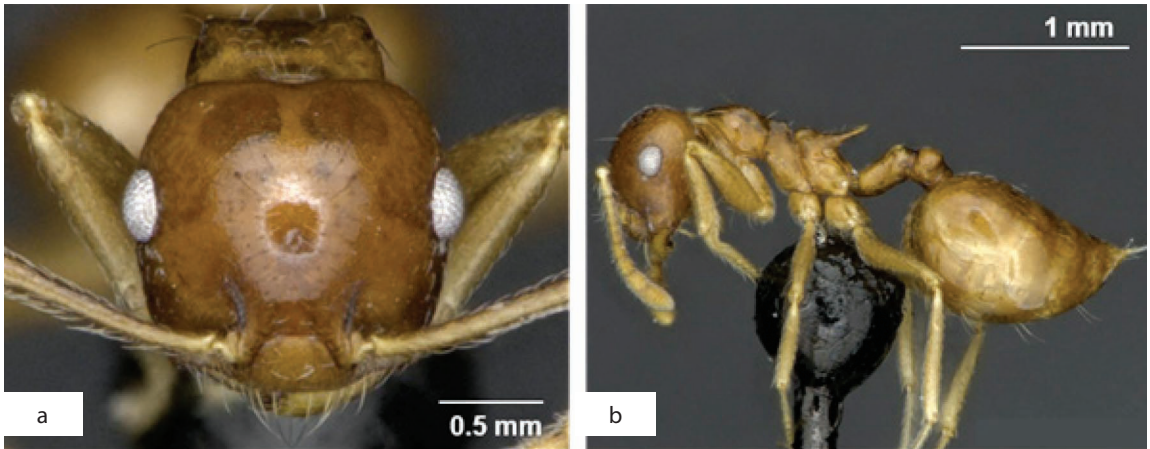
**Figure 189.** *Crematogaster* sp.77, Z02.HymFrm409.rn. Worker.



**Figure 190.** *Crematogaster* sp.78, Z02.HymFrm410.rn. Worker.



**Figure 191.** *Crematogaster* sp.79, Z02.HymFrm411.rn. Worker.



**Figure 192.** *Crematogaster* sp.101, Z02.HymFrm235.rn. Worker.



**Figure 193.** *Crematogaster* sp.102, Z02.HymFrm246.rn. Worker.





**Figure 194.** *Crematogaster* sp.103, Z02.HymFrm251.rn. Worker.

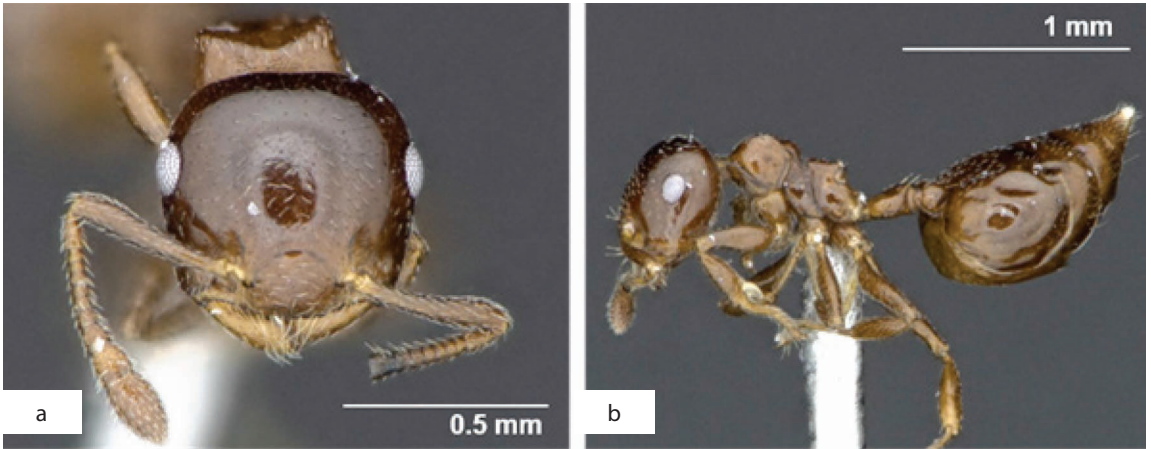


**Figure 195.** *Crematogaster* sp.104, Z02.HymFrm307.rn. Worker.

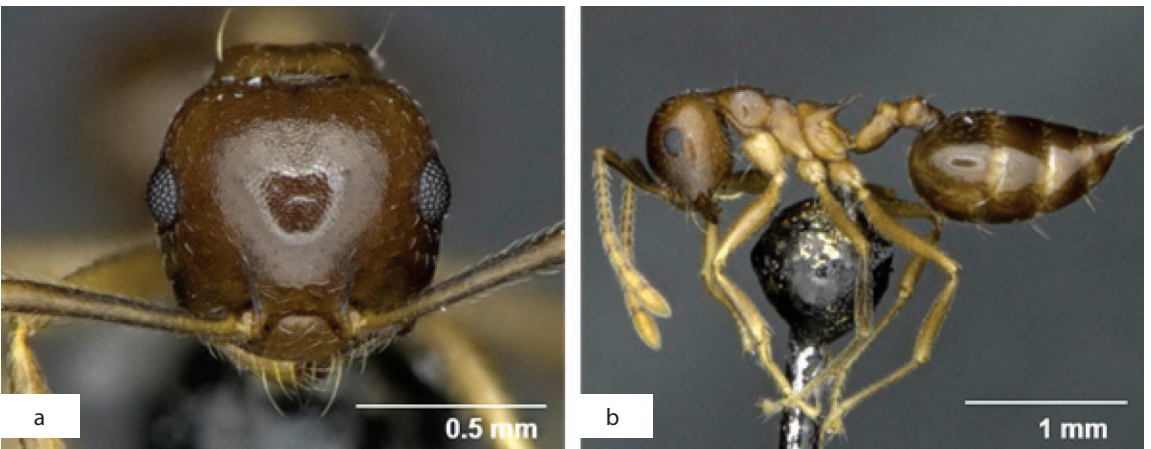


**Figure 196.** *Crematogaster* sp.105, Z02.HymFrm321.rn. Worker.

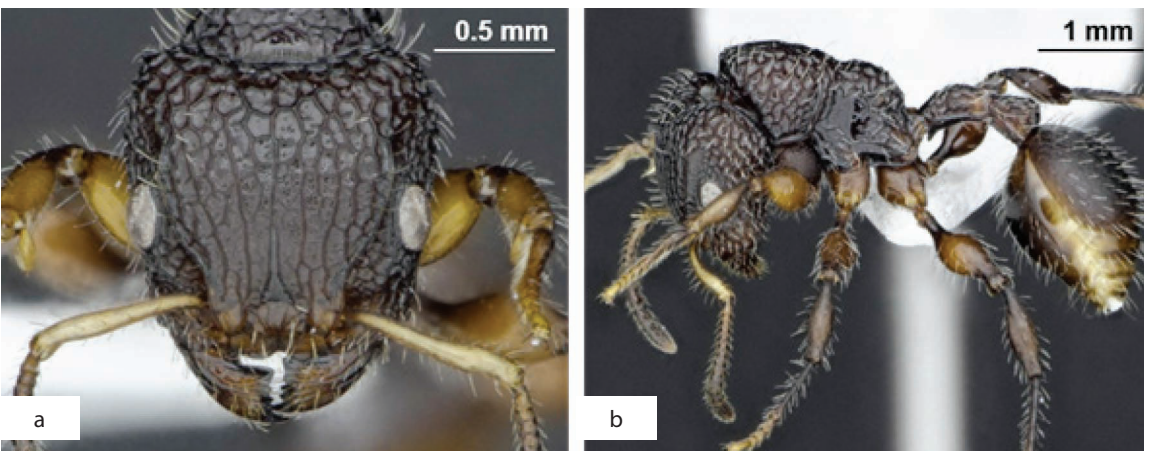




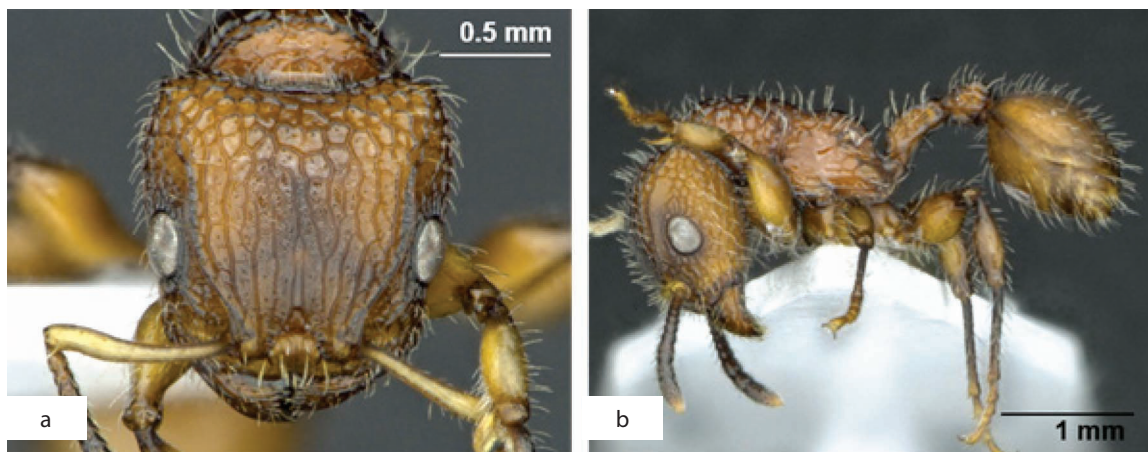
**Figure 197.** *Crematogaster* sp.106, Z02.HymFrm327.rn. Worker.



**Figure 198.** *Crematogaster* sp.107, Z02.HymFrm404.rn. Worker.



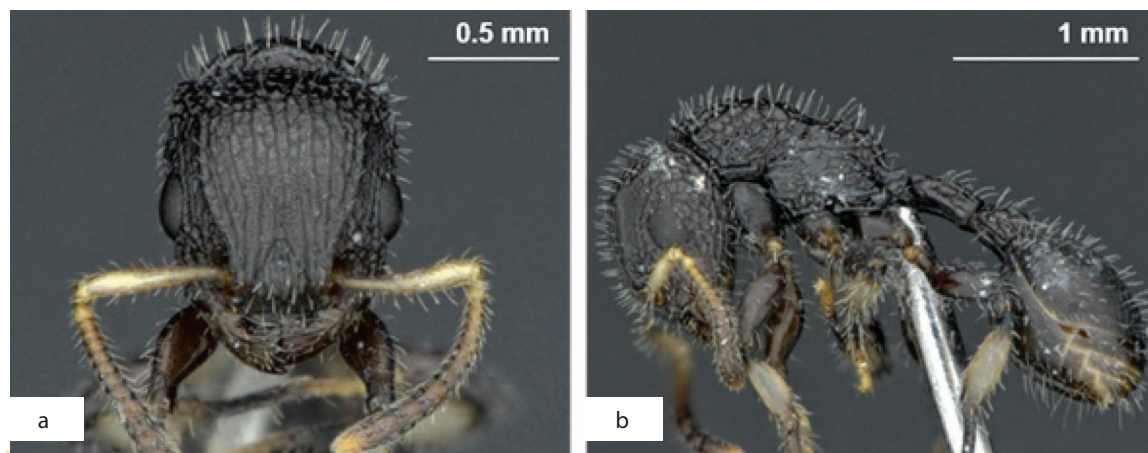
**Figure 199.** *Dilobocondyla borneensis*, Z02.HymFrm093.rn. Worker.



**Figure 200.** *Dilobocondyla* sp.01, Z02.HymFrm054.rn. Worker.

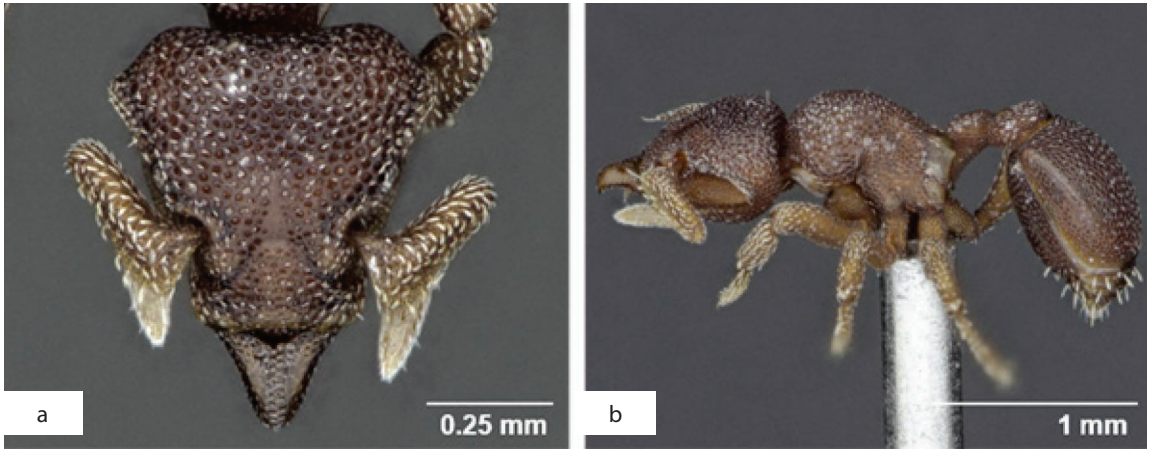


**Figure 201.** *Dilobocondyla* sp.02, Z02.HymFrm153.rn. Worker.-

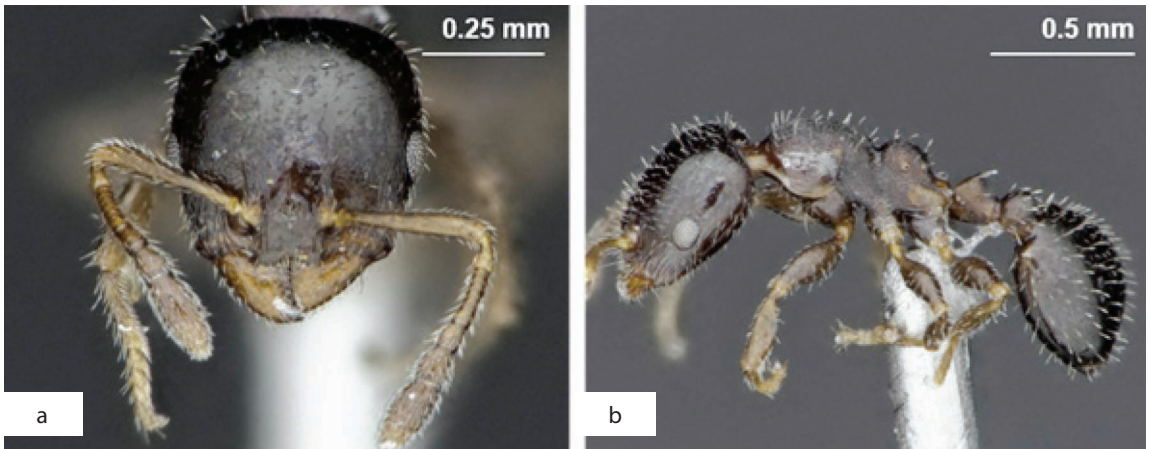


**Figure 202.** *Dilobocondyla* sp.03, Z02.HymFrm401.rn. Worker.





**Figure 203.** *Eurhopalothrix* sp.01, B01.HymFrm301.jw. Worker.

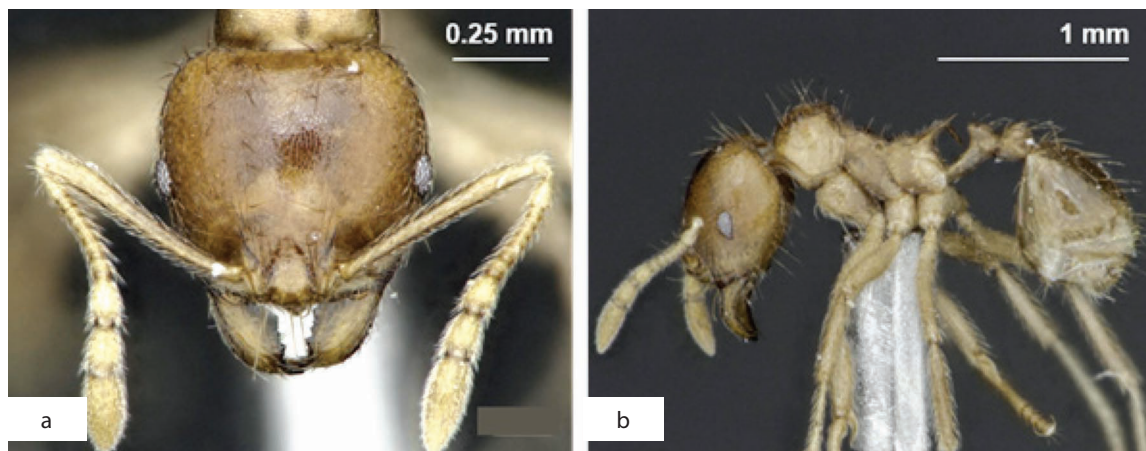


**Figure 204.** *Gauromyrmex* sp.01, Z02.HymFrm037.rn. Worker.



**Figure 205.** *Gauromyrmex* sp.02, Z02.HymFrm338.rn. Worker.

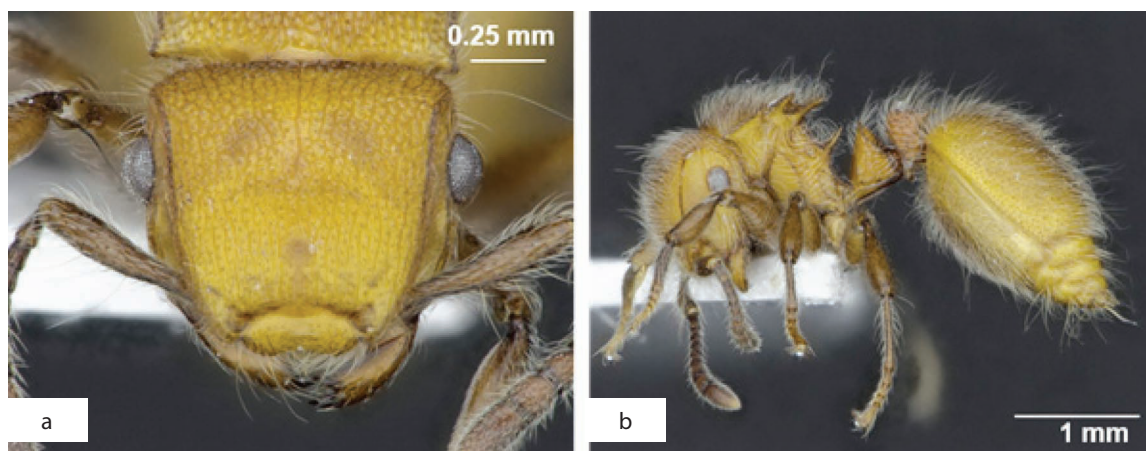




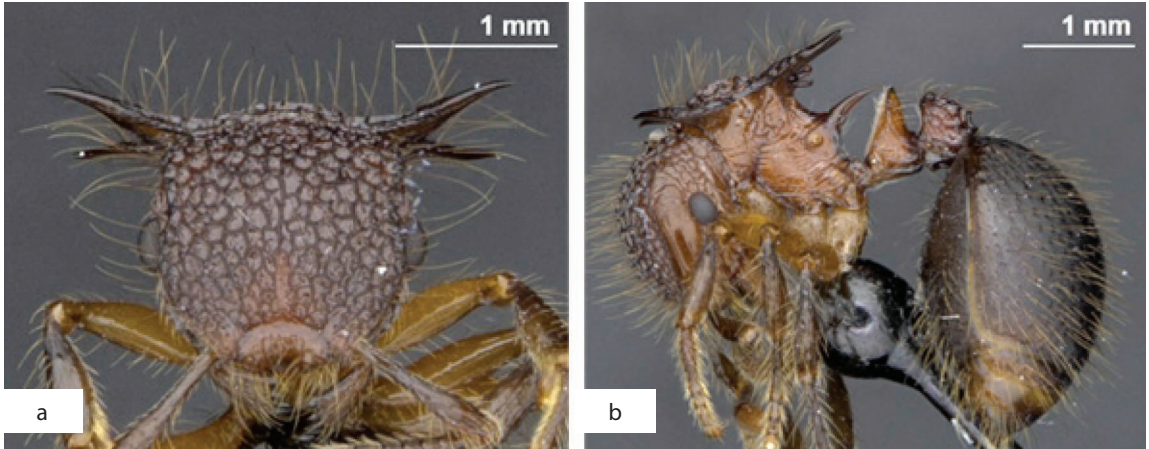
**Figure 206.** *Lophomyrmex bedoti*, B01.HymFrm209.jw. Worker.



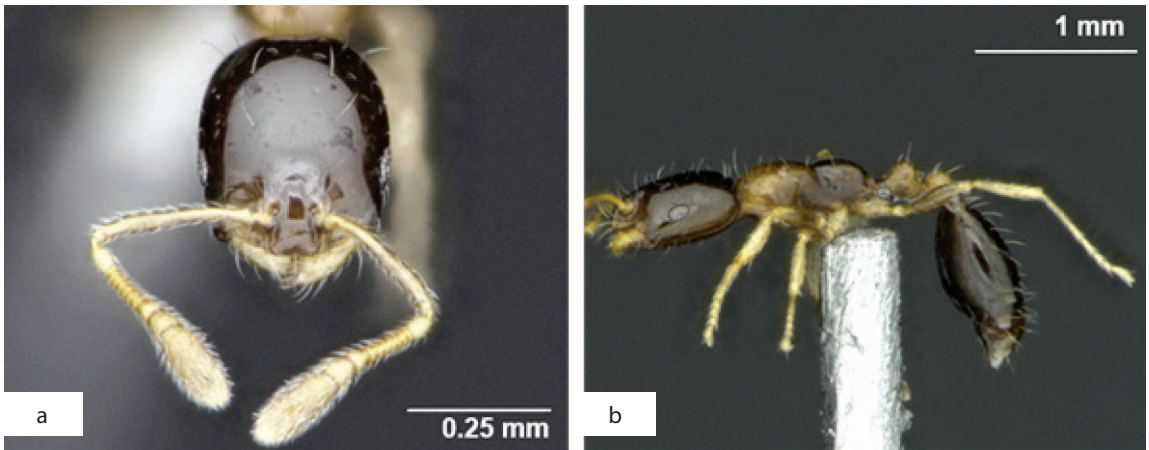
**Figure 207.** *Lophomyrmex* sp.01, Z02.HymFrm418.rn. Worker.



**Figure 208.** *Meranoplus castaneus*, Z02.HymFrm133.rn. Worker.



**Figure 209.** *Meranoplus mucronatus*, Z02.HymFrm332.rn. Worker.

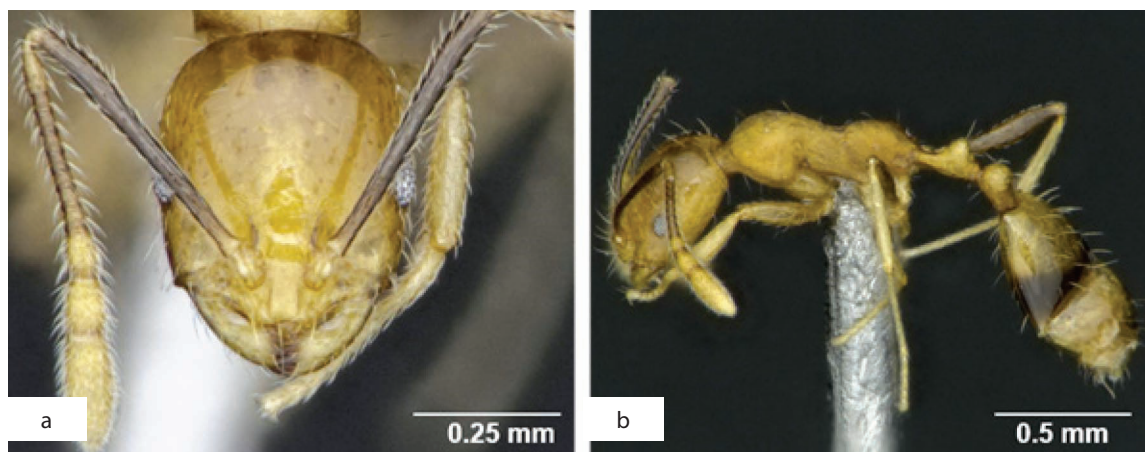


**Figure 210.** *Monomorium floricola*, Z02.HymFrm006.rn. Worker.

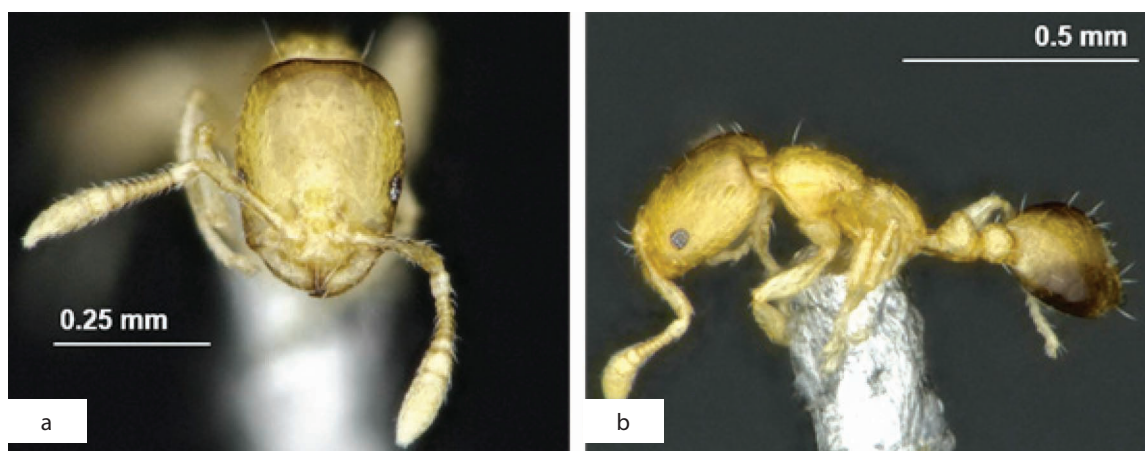


**Figure 211.** *Monomorium chinense*, Z02.HymFrm019.rn. Worker.





**Figure 212.** *Monomorium* sp.03, Z02.HymFrm111.rn. Worker.

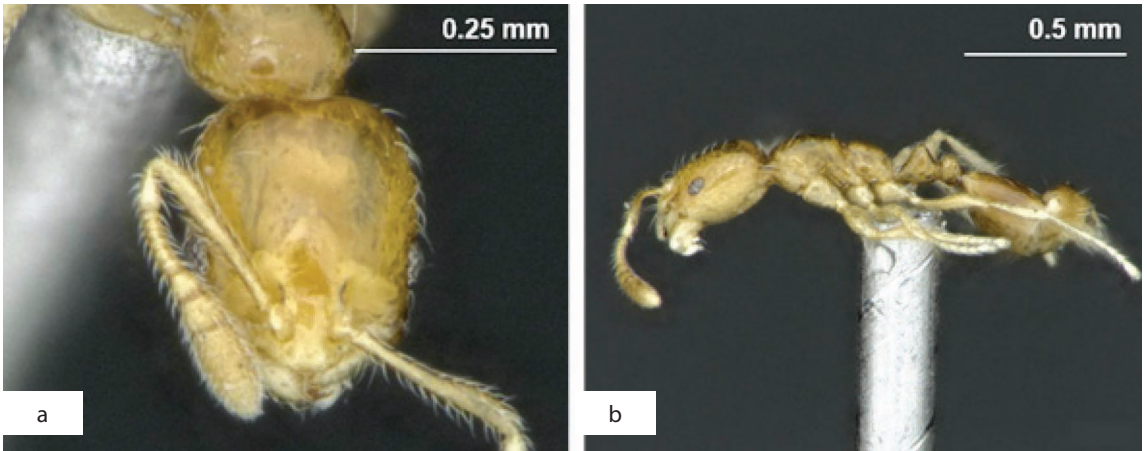


**Figure 213.** *Monomorium* sp.04, Z02.HymFrm036.rn. Worker.

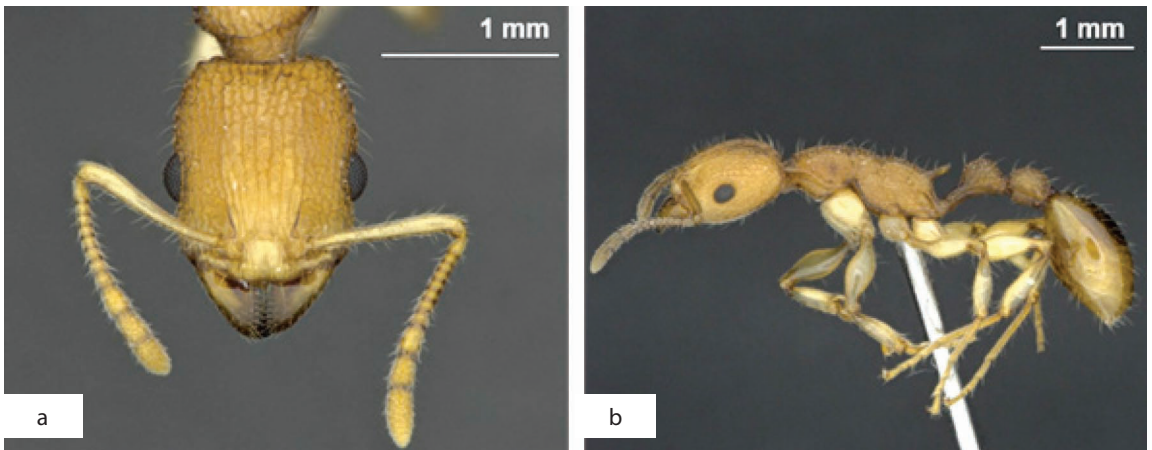


**Figure 214.** *Monomorium* sp.05, B01.HymFrm244.jw. Worker.

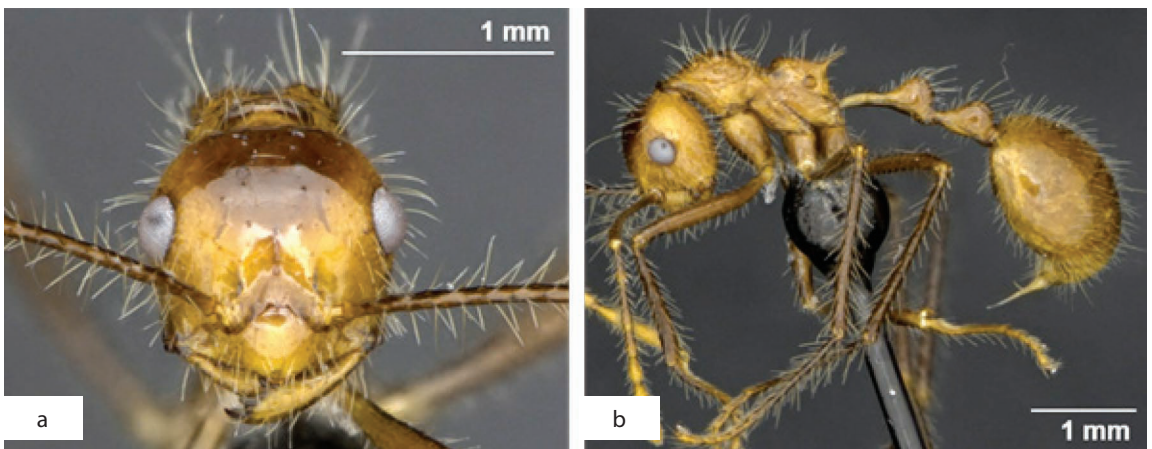




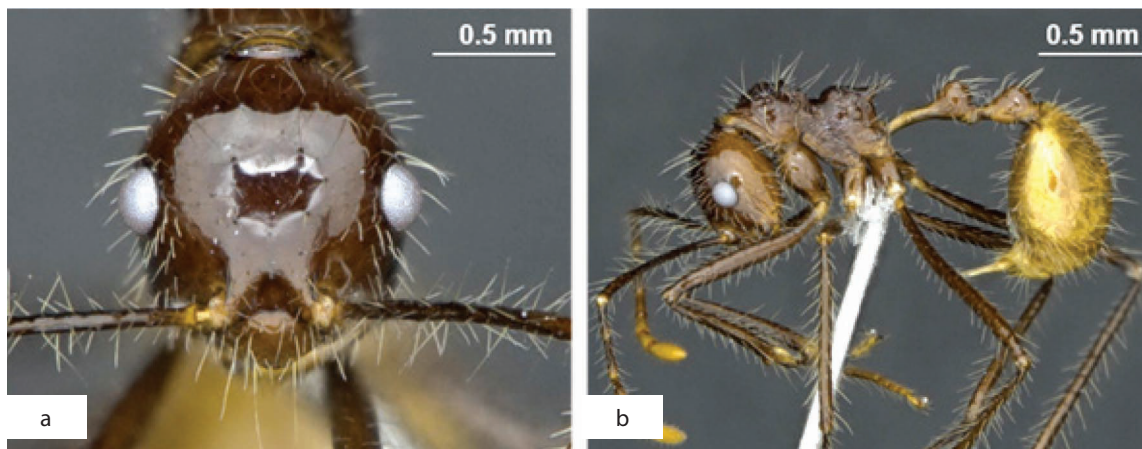
**Figure 215.** *Monomorium* sp.06, B01.HymFrm245.jw. Worker.



**Figure 216.** *Paratopula* sp.01, Z02.HymFrm203.rn. Worker.



**Figure 217.** *Myrmecaria adpressipilosa*, Z02.HymFrm339.rn. Worker.



**Figure 218.** *Myrmicaria luteiventris*, Z02.HymFrm416.rn. Worker.

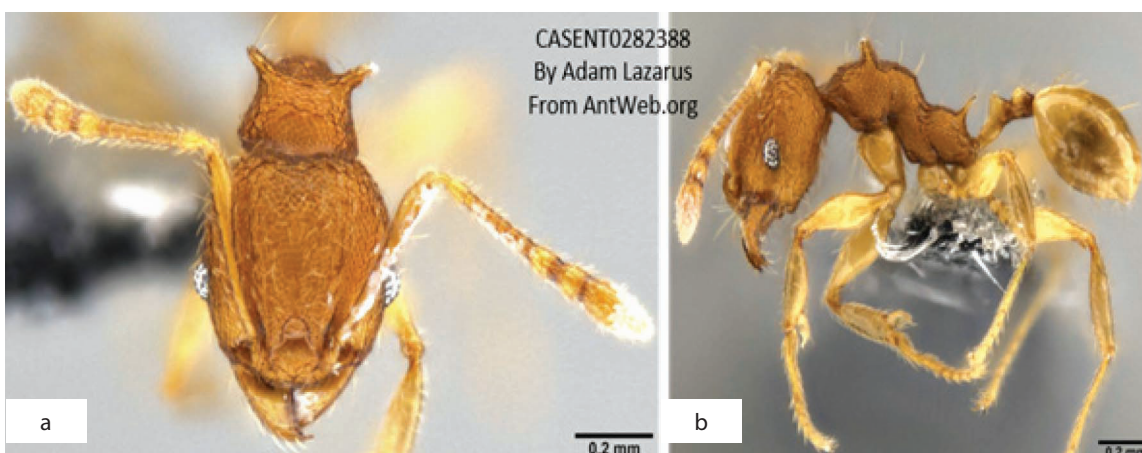


Photo: Adam Lazarus

**Figure 219.** *Pheidole aristotelis*, B01.HymFrm262.jw. Minor worker.

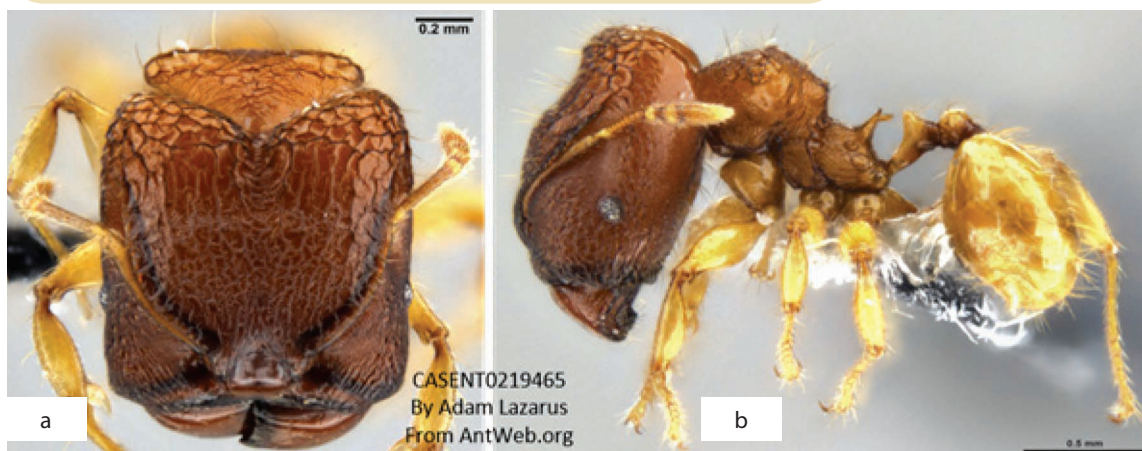


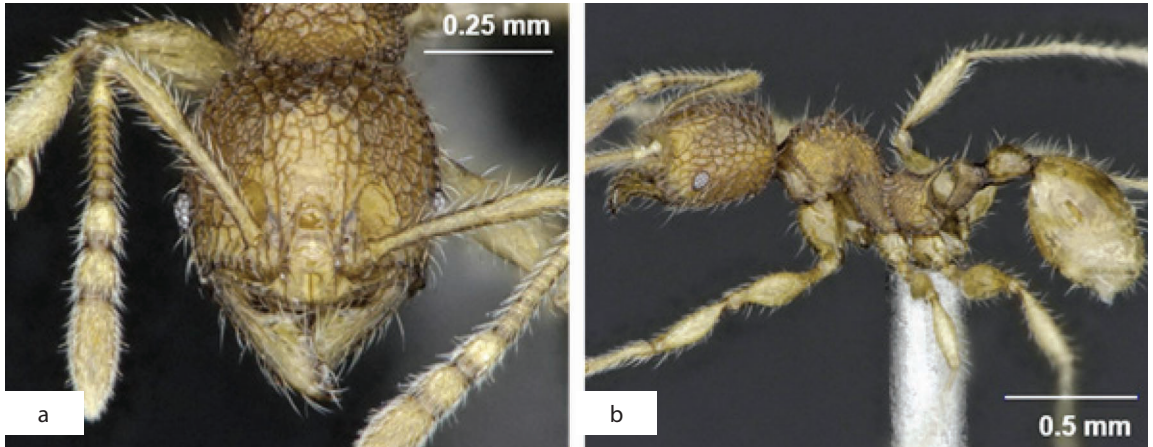
Photo: Adam Lazarus (2013)

**Figure 220.** *Pheidole aristotelis*, B01.HymFrm262.jw. Major worker.

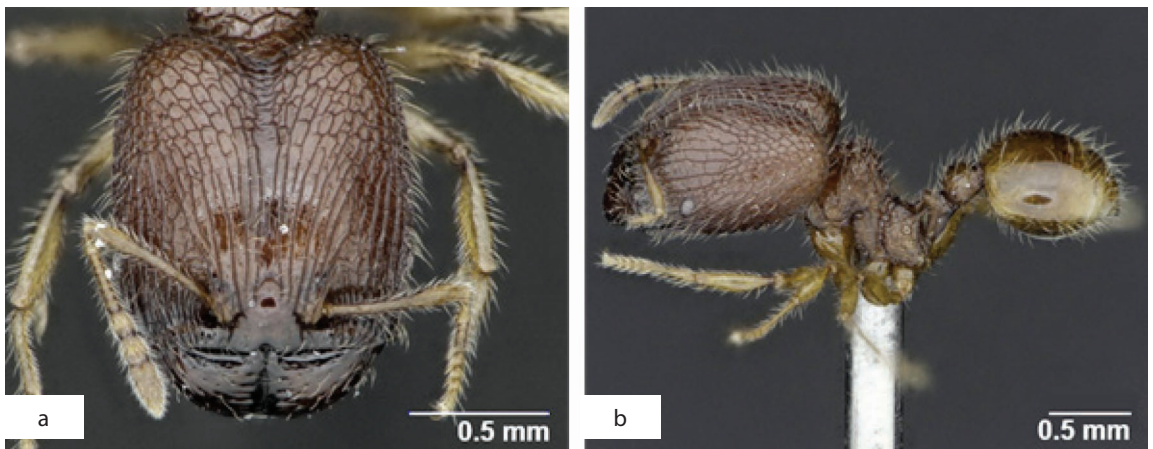




**Figure 221.** *Pheidole* cf. *annexa*, B01.HymFrm255.jw. Major worker.

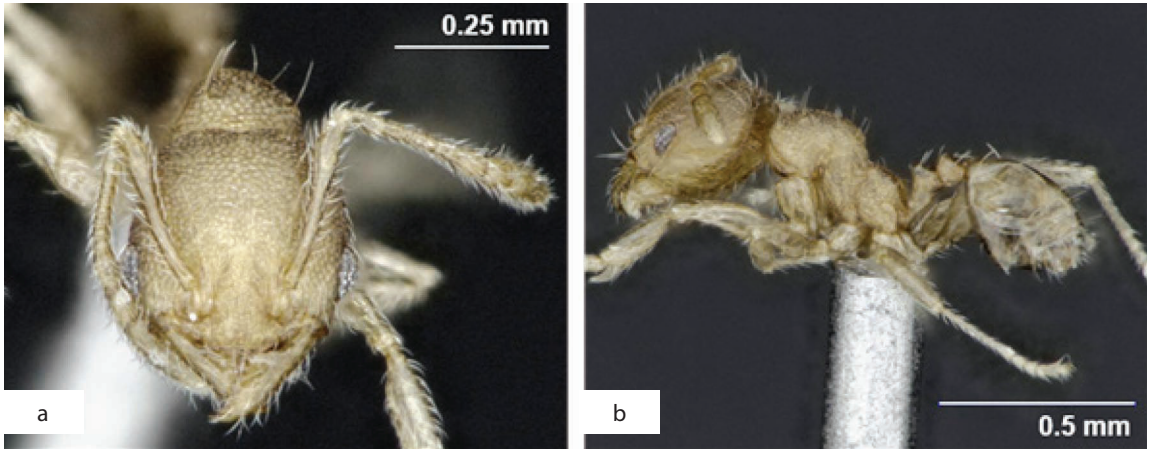


**Figure 222.** *Pheidole* cf. *poringensis*, B01.HymFrm314.jw. Minor worker.

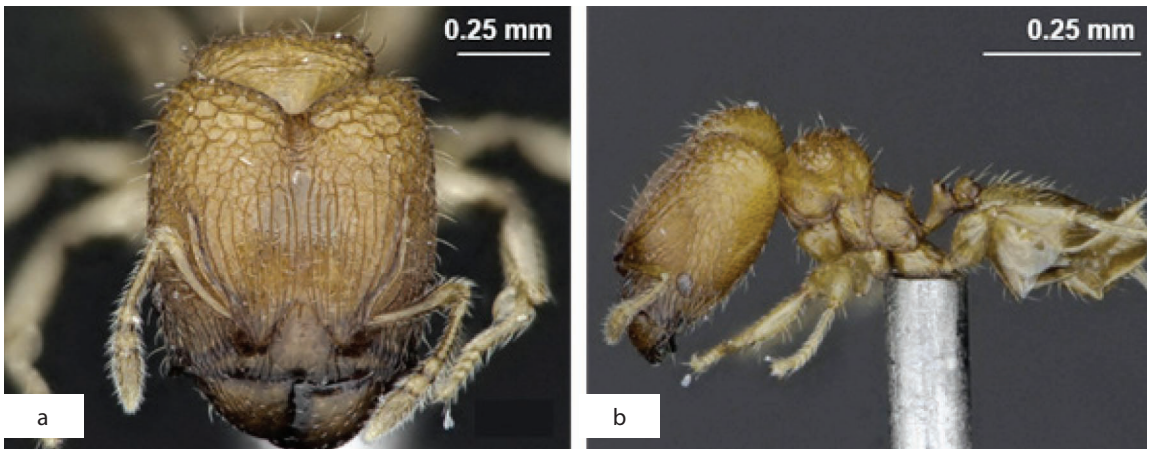


**Figure 223.** *Pheidole* cf. *poringensis*, B01.HymFrm314.jw. Major worker.





**Figure 224.** *Pheidole cf. rugifera*, B01.HymFrm312.jw. Minor worker.



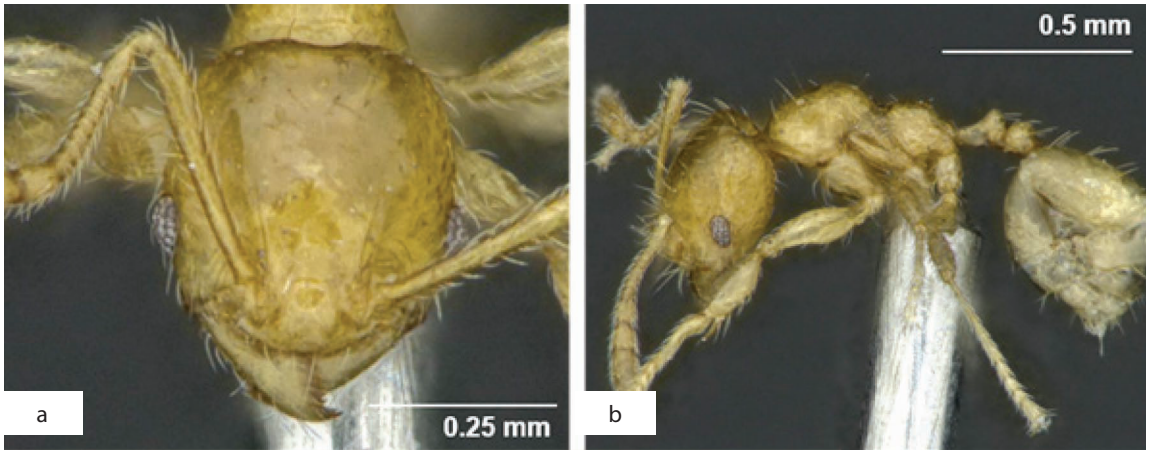
**Figure 225.** *Pheidole cf. rugifera*, B01.HymFrm312.jw. Major worker.



**Figure 226.** *Pheidole cf. sauberi*, B01.HymFrm311.jw. Minor worker.



**Figure 227.** *Pheidole* cf. *sauberi*, B01.HymFrm311.jw. Major worker.



**Figure 228.** *Pheidole clypeocornis*, B01.HymFrm261.jw. Minor worker.



**Figure 229.** *Pheidole clypeocornis*, B01.HymFrm261.jw. Major worker.





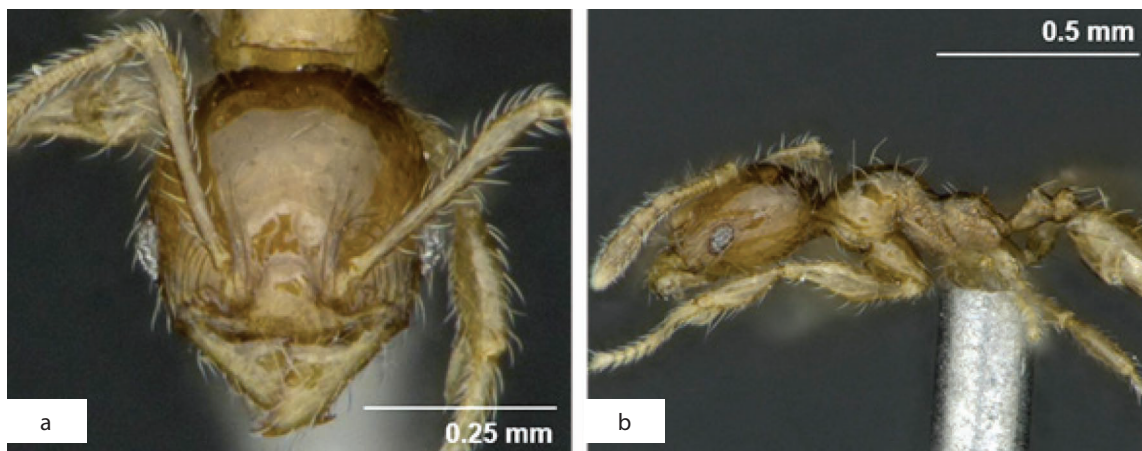
Photo: Will Ericson (2013)

**Figure 230.** *Pheidole ghigii*, B01.HymFrm313.jw. Minor worker.



Photo: Zach Liebermann (2013)

**Figure 231.** *Pheidole ghigii*, B01.HymFrm313.jw. Major worker.

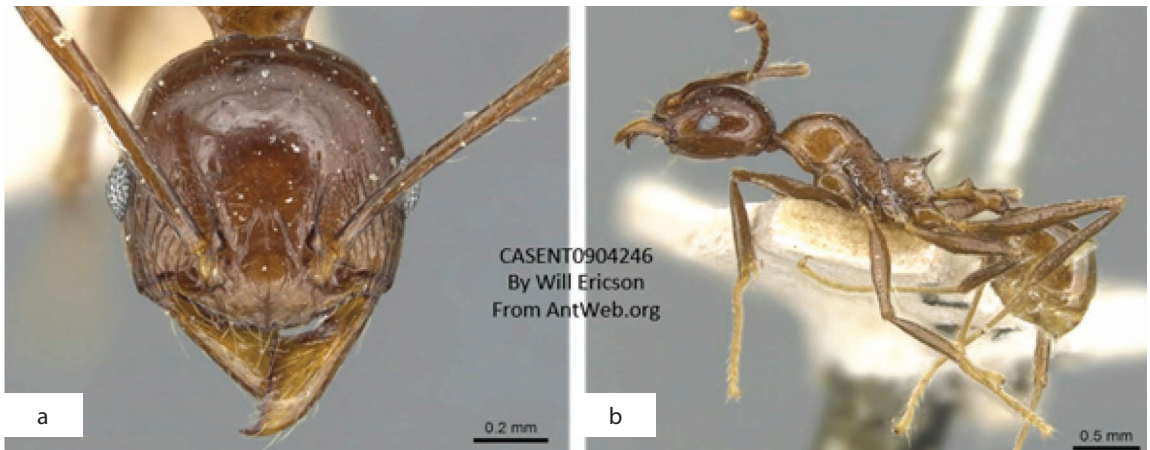


**Figure 232.** *Pheidole hortensis*, B01.HymFrm264.jw. Minor worker.



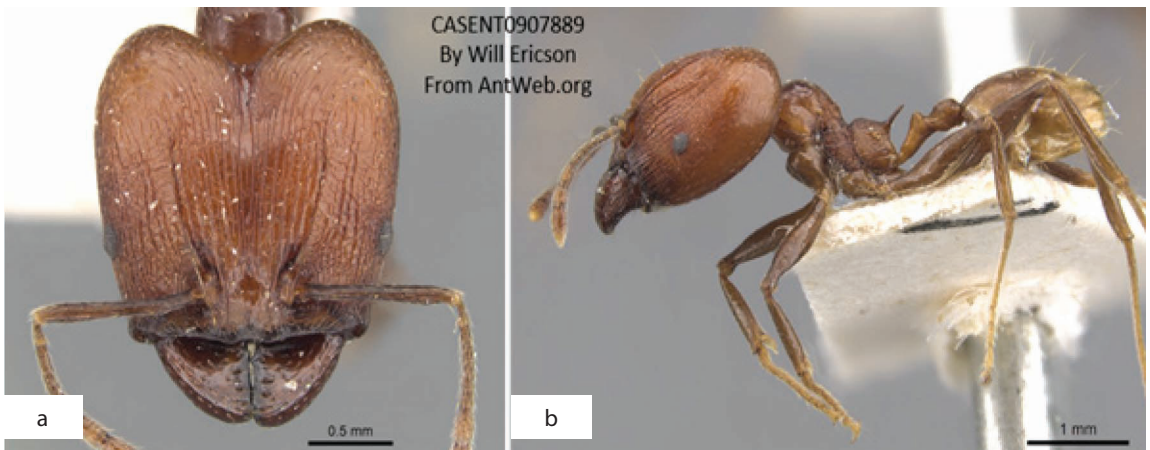


**Figure 233.** *Pheidole hortensis*, B01.HymFrm264.jw. Major worker.



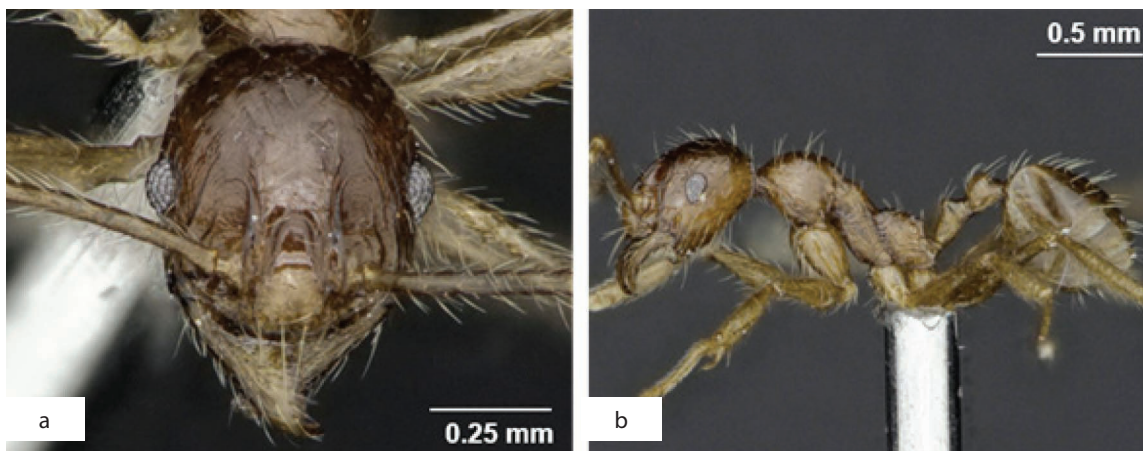
Source: Will Ericson

**Figure 234.** *Pheidole huberi*, B01.HymFrm315.jw. Minor worker.

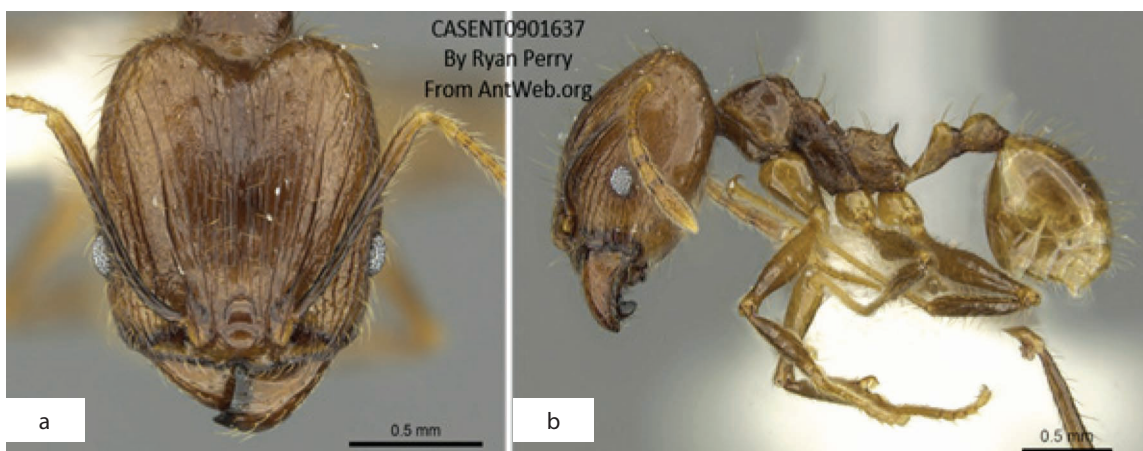


Source: Will Ericson

**Figure 235.** *Pheidole huberi*, B01.HymFrm315.jw. Major worker.

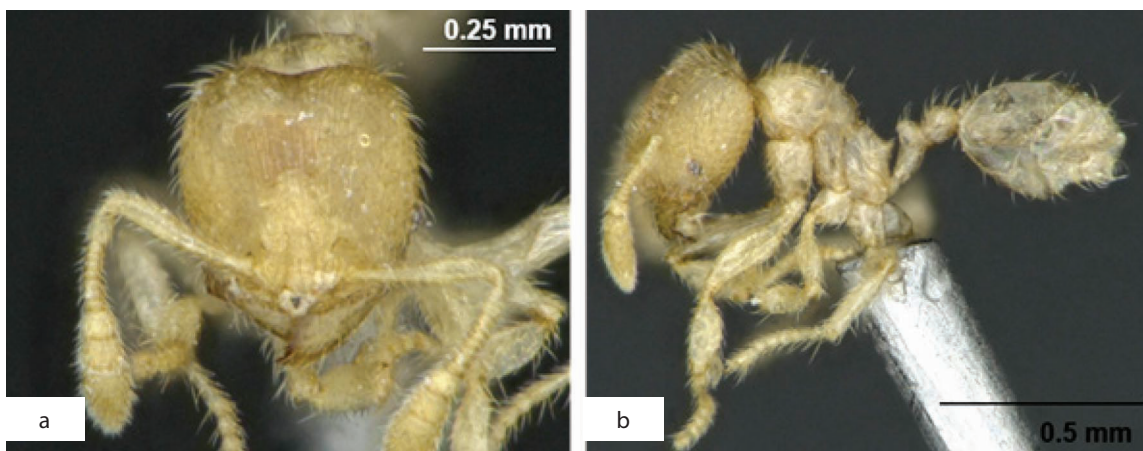


**Figure 236.** *Pheidole jacobsoni*, B01.HymFrm259.jw. Minor worker.



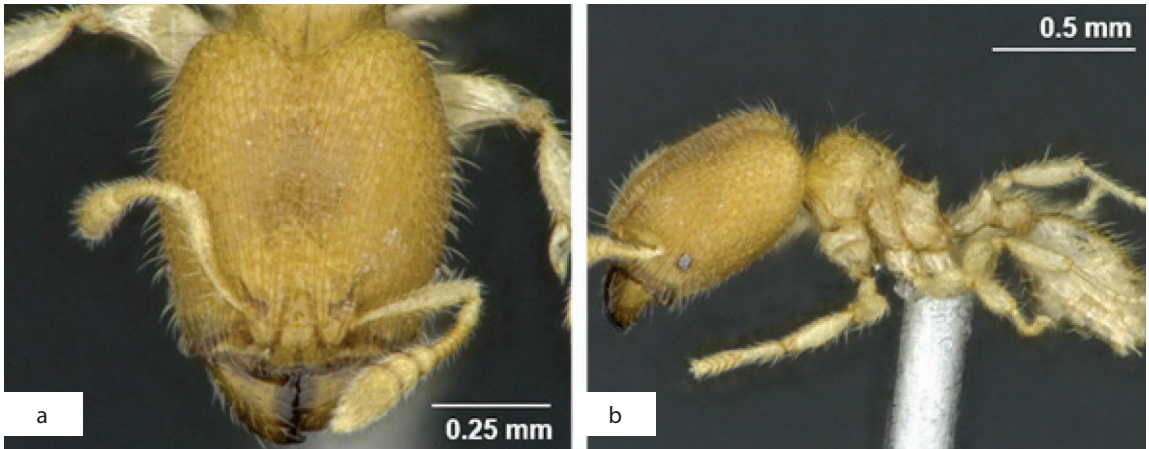
Source: Ryan Perry

**Figure 237.** *Pheidole jacobsoni*, B01.HymFrm259.jw. Major worker.

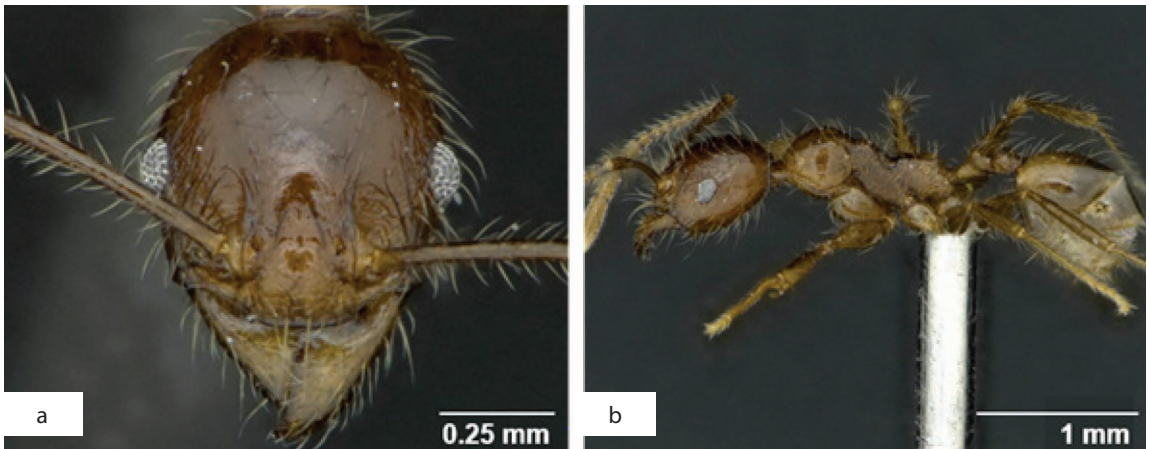


**Figure 238.** *Pheidole parvicorpus*, B01.HymFrm256.jw. Minor worker.

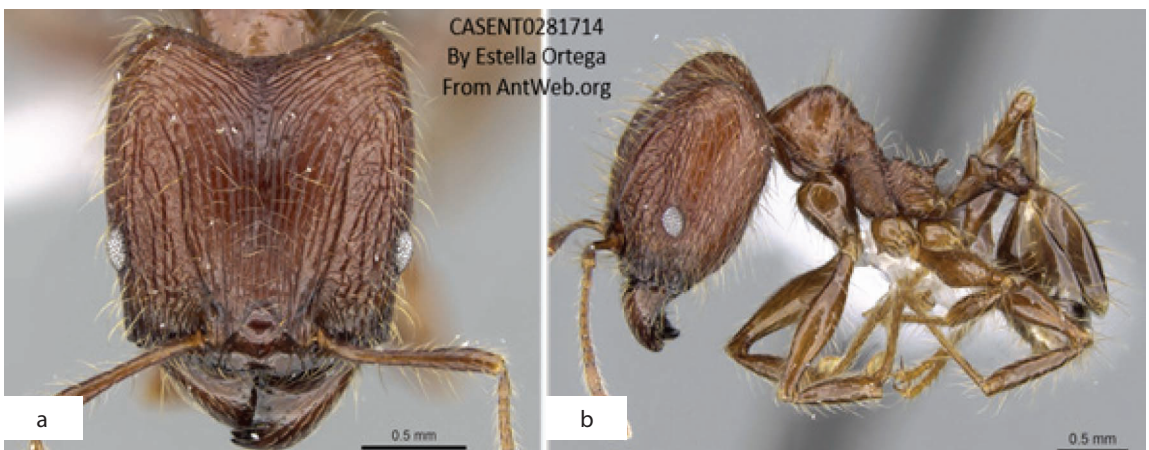




**Figure 239.** *Pheidole parvicorpus*, B01.HymFrm256.jw. Major worker.



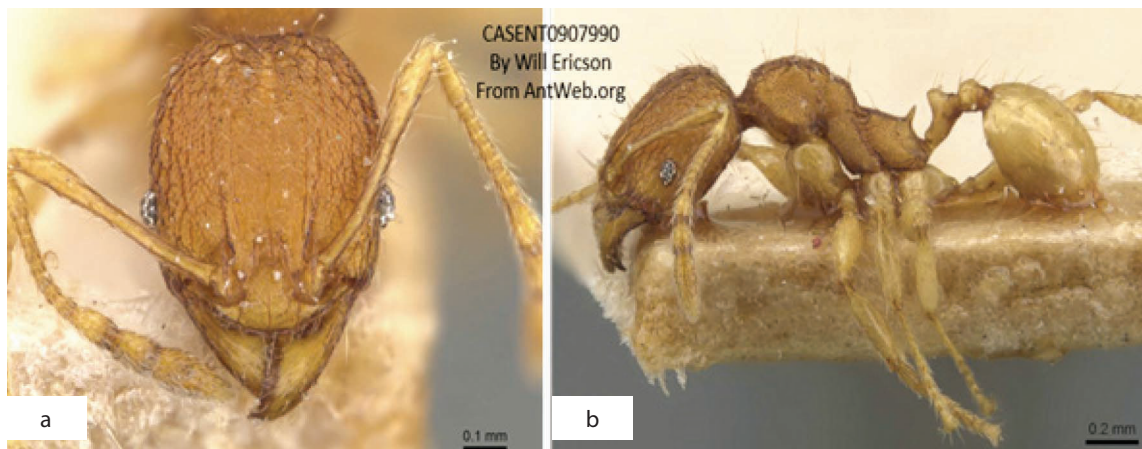
**Figure 240.** *Pheidole plagiaria*, B01.HymFrm257.jw. Minor worker.



Source: Estella Ortega

**Figure 241.** *Pheidole plagiaria*, B01.HymFrm257.jw. Major worker.





Source: Will Ericson

**Figure 242.** *Pheidole rabo*, B01.HymFrm263.jw. Minor worker.

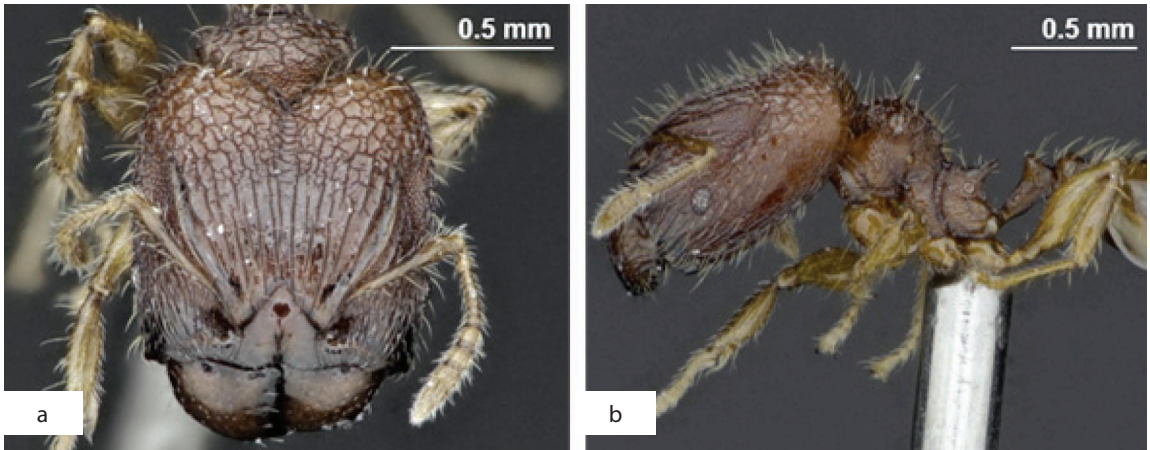


Source: Will Ericson

**Figure 243.** *Pheidole rabo*, B01.HymFrm263.jw. Major worker.



**Figure 244.** *Pheidole retivertex*, B01.HymFrm252.jw. Minor worker.



**Figure 245.** *Pheidole retivertex*, B01.HymFrm252.jw. Major worker.

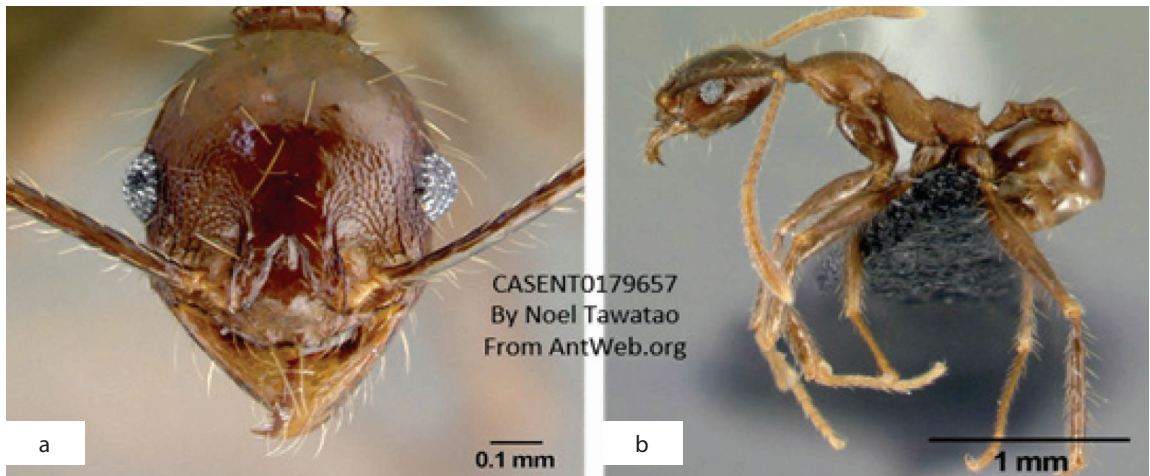
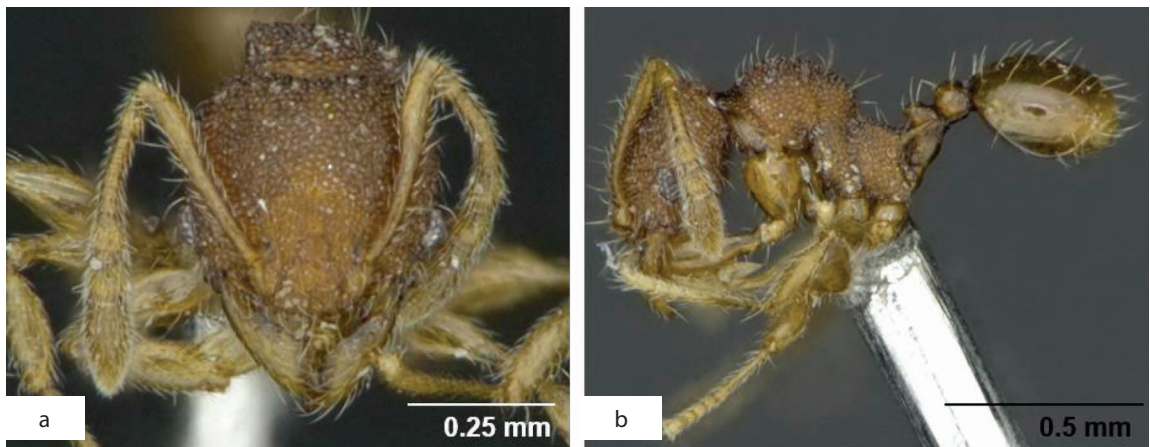


Photo: Noel Tawatao (2010)

**Figure 246.** *Pheidole submonticola*, B01.HymFrm316.jw. Minor worker.



**Figure 247.** *Pheidole tjibodana*, B01.HymFrm253.jw. Minor worker.



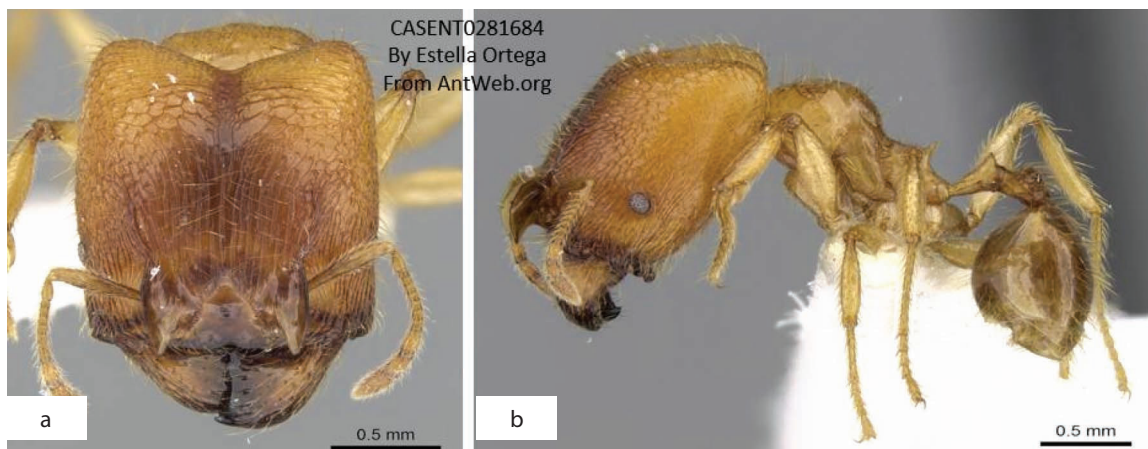


Photo: Estella Ortega (2012)

**Figure 248.** *Pheidole tijbodana*, B01.HymFrm253.jw. Major worker.



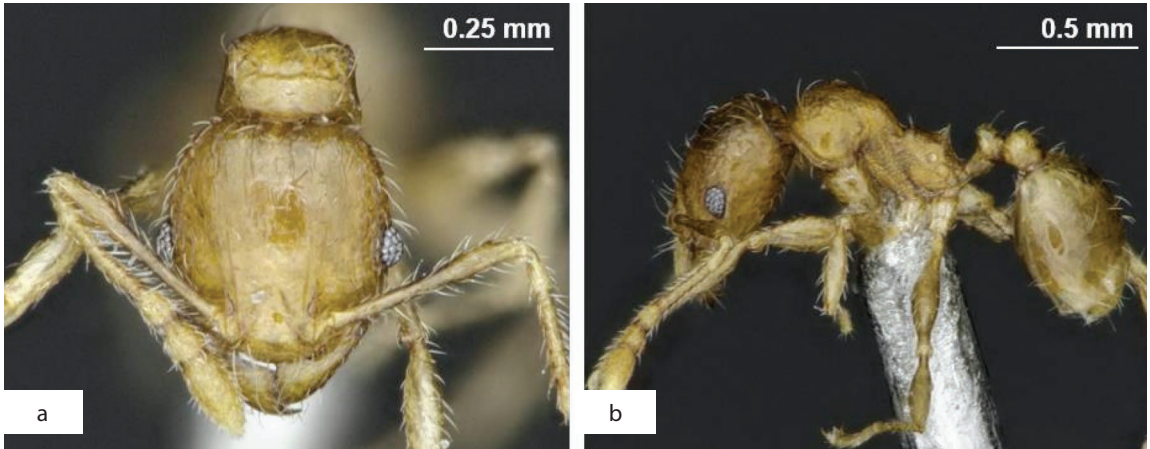
**Figure 249.** *Pheidole upeneci*, B01.HymFrm258.jw. Minor worker.



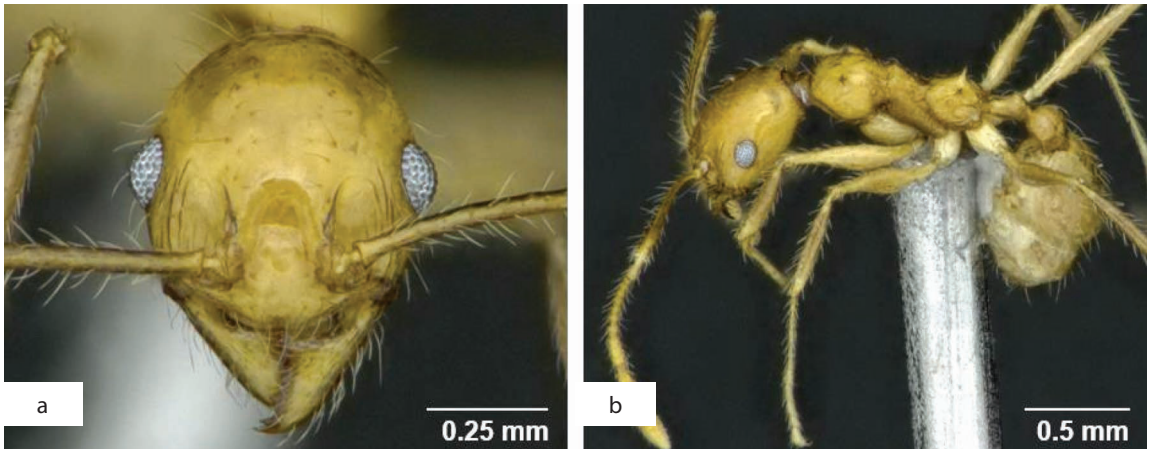
Source: Estella Ortega

**Figure 250.** *Pheidole upeneci*, B01.HymFrm258.jw. Major worker.

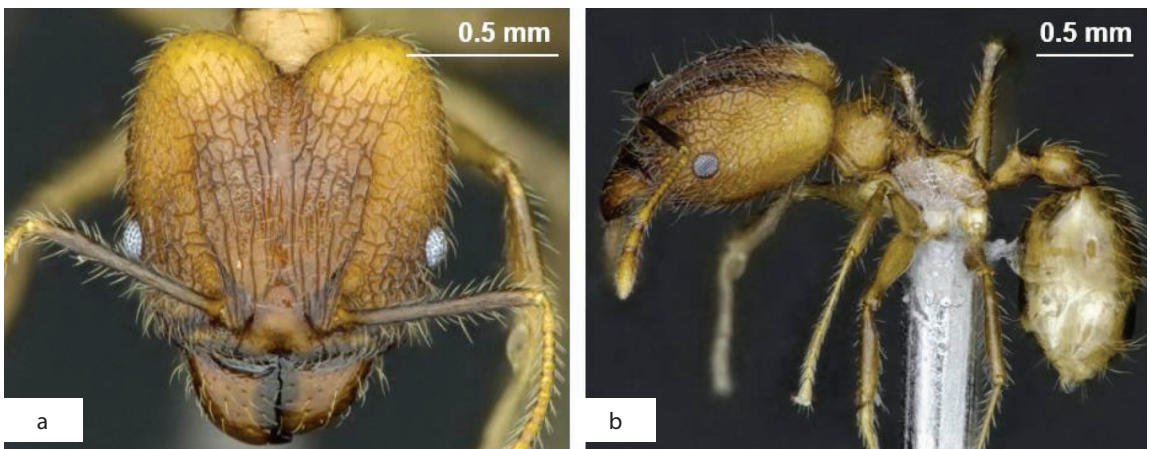




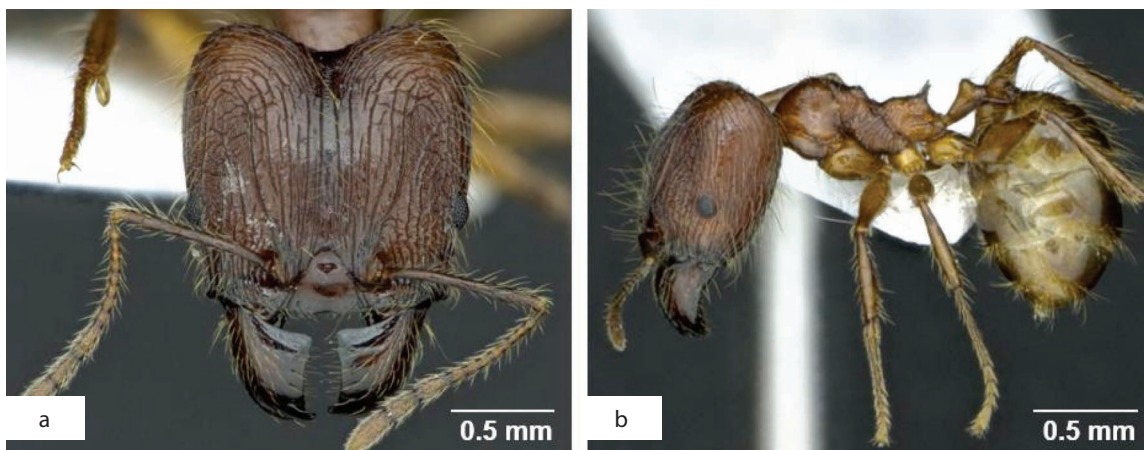
**Figure 251.** *Pheidole* sp.01, Z02.HymFrm038.rn. Minor worker.



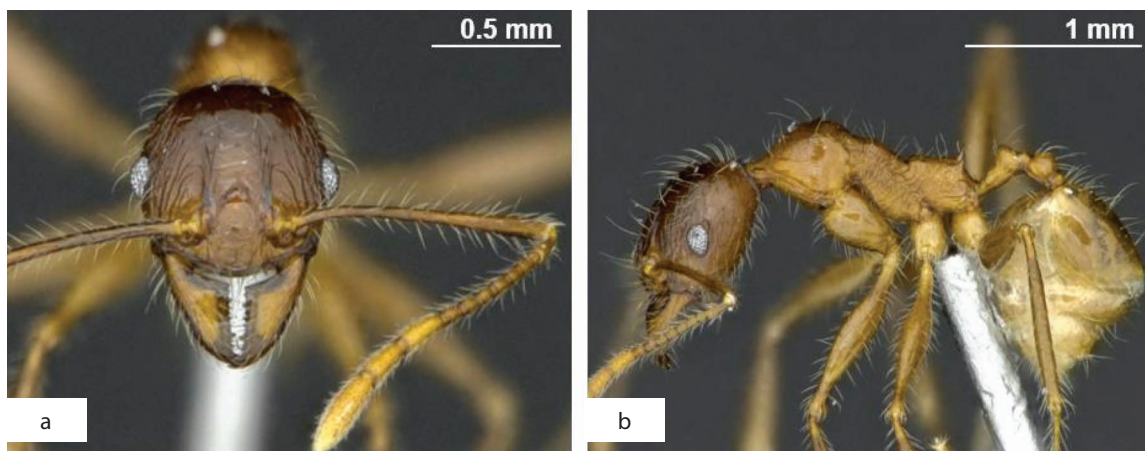
**Figure 252.** *Pheidole* sp.02 Z02.HymFrm067.rn. Minor worker.



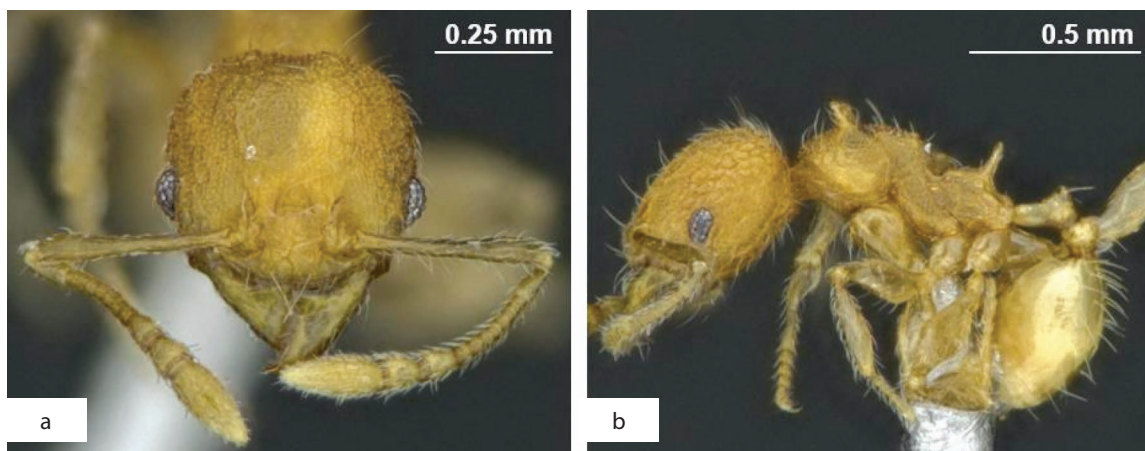
**Figure 253.** *Pheidole* sp.03, Z02.HymFrm081.rn. Major worker.



**Figure 254.** *Pheidole* sp.04, Z02.HymFrm122.rn. Major worker.



**Figure 255.** *Pheidole* sp.05, Z02.HymFrm197.rn. Minor worker.

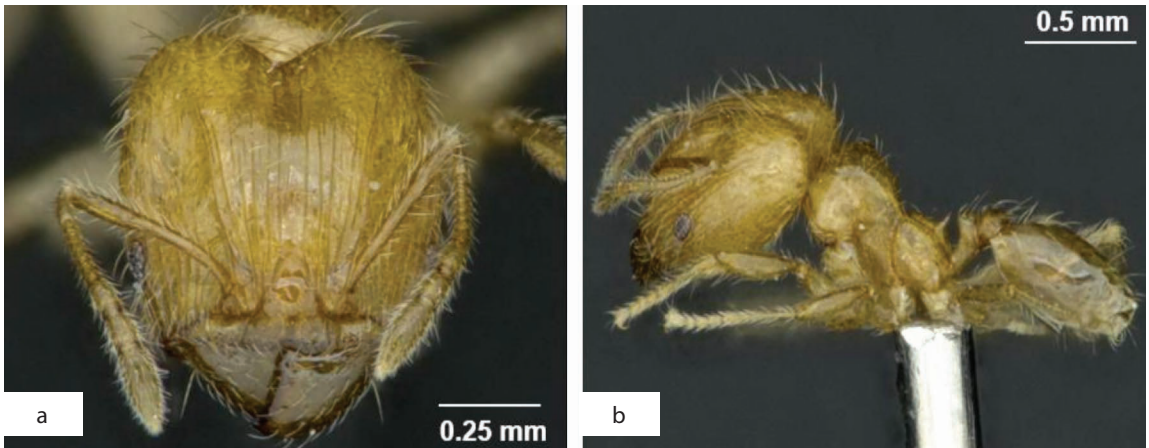


**Figure 256.** *Pheidole* sp.06, Z02.HymFrm292.rn. Minor worker.

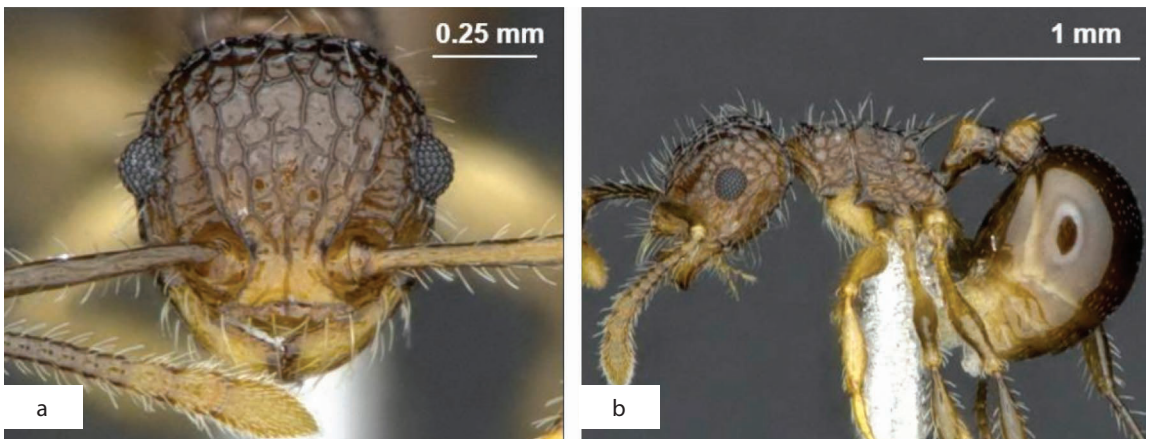




**Figure 257.** *Pheidole* sp.07, Z02.HymFrm254.rn. Minor worker.



**Figure 258.** *Pheidole* sp.07, Z02.HymFrm254.rn. Major worker.



**Figure 259.** *Pristomyrmex* sp.01, Z02.HymFrm269.rn. Worker.

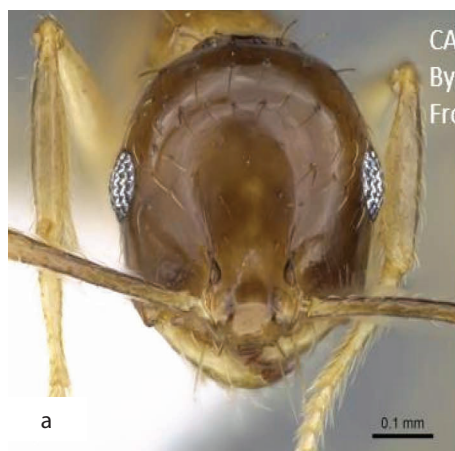




**Figure 260.** *Proatta butteli*, Z02.HymFrm116.rn. Worker.



**Figure 261.** *Proatta butteli*, Z02.HymFrm116.rn. Alate queen.



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From AntBase.org

Photo: Zach Lieberman (2014)

**Figure 262.** *Recurvidris kemneri*, B01.HymFrm200.jw. Worker.



**Figure 263.** *Rhopalomastix* sp.01, Z02.HymFrm042.rn. Worker



**Figure 264.** *Rotastruma* sp.01, Z02.HymFrm029.rn. Worker.



**Figure 265.** *Strumigenys indagatrix*, Z02.HymFrm060.rn. Worker.





**Figure 266.** *Strumigenys treptodens*, Z02.HymFrm271.rn. Worker.

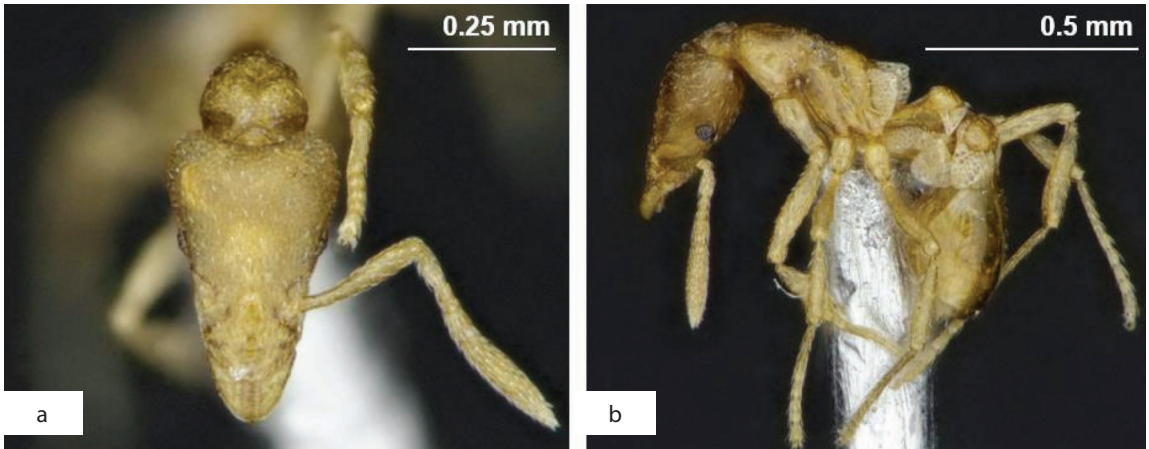


**Figure 267.** *Strumigenys rogeri*, B01.HymFrm250.jw. Worker.



**Figure 268.** *Strumigenys* cf. *sydorata*, B01.HymFrm297.jw. Worker.

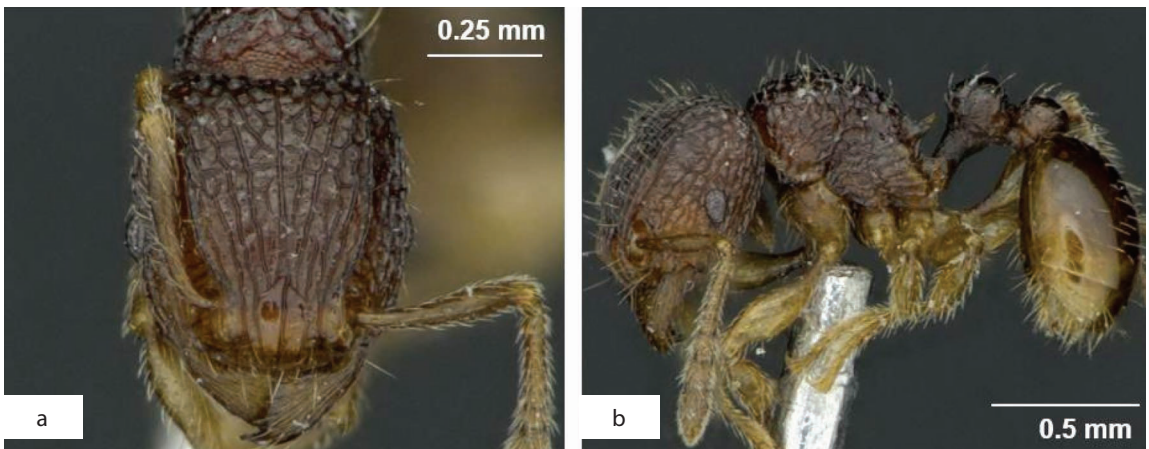




**Figure 269.** *Strumigenys mitis*, Z02.HymFrm107.rn. Worker.



**Figure 270.** *Temnothorax* sp.01, Z02.HymFrm402.rn. Worker.



**Figure 271.** *Tetramorium* cf. *curtulum*, B01.HymFrm206.jw. Worker.



**Figure 272.** *Tetramorium* cf. *noratum*, B01.HymFrm268.jw. Worker.

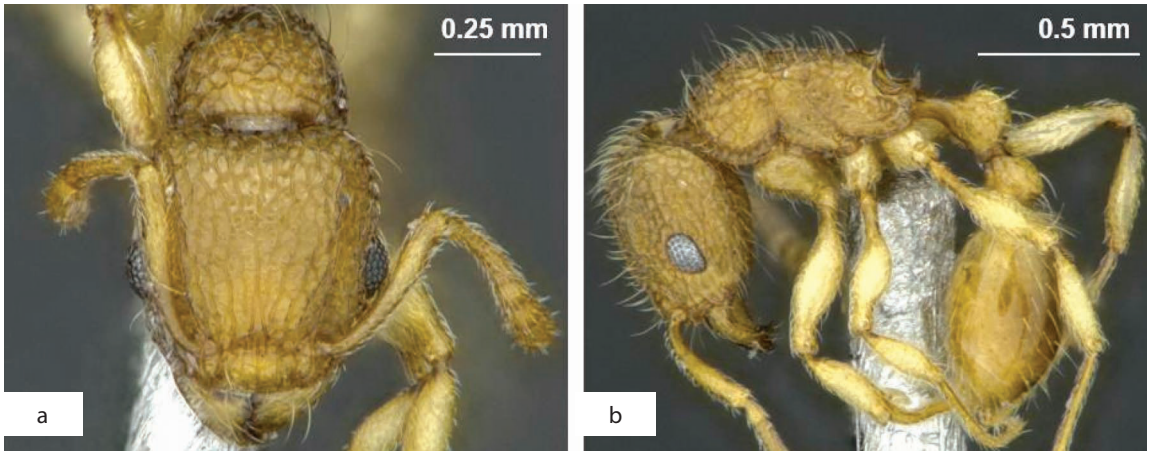


**Figure 273.** *Tetramorium* *simillimum*, B01.HymFrm205.jw. Worker.

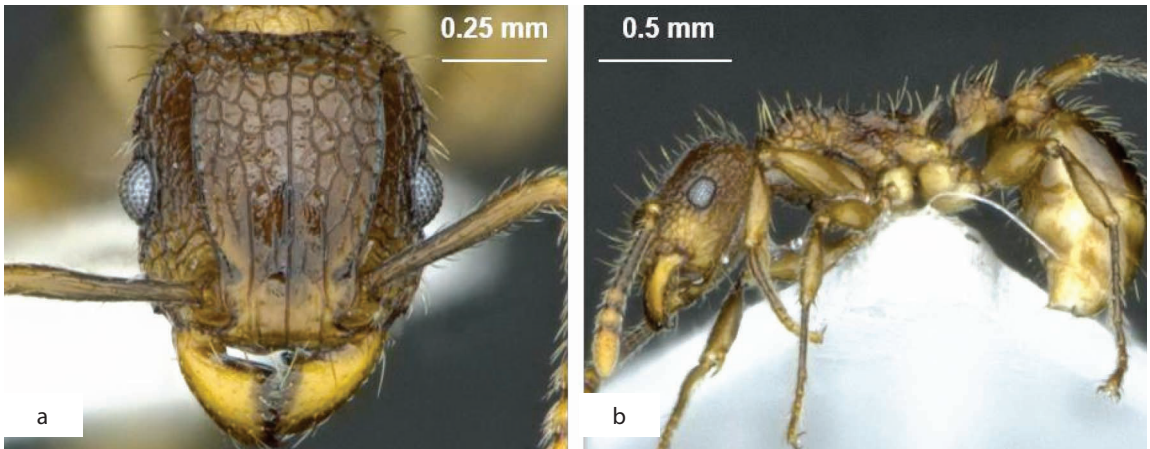


**Figure 274.** *Tetramorium* sp.01, Z02.HymFrm098.rn. Worker.





**Figure 275.** *Tetramorium* sp.02, Z02.HymFrm110.rn. Worker.



**Figure 276.** *Tetramorium* sp.03, Z02.HymFrm120.rn. Worker



**Figure 277.** *Tetramorium* sp.05, Z02.HymFrm224.rn. Worker.





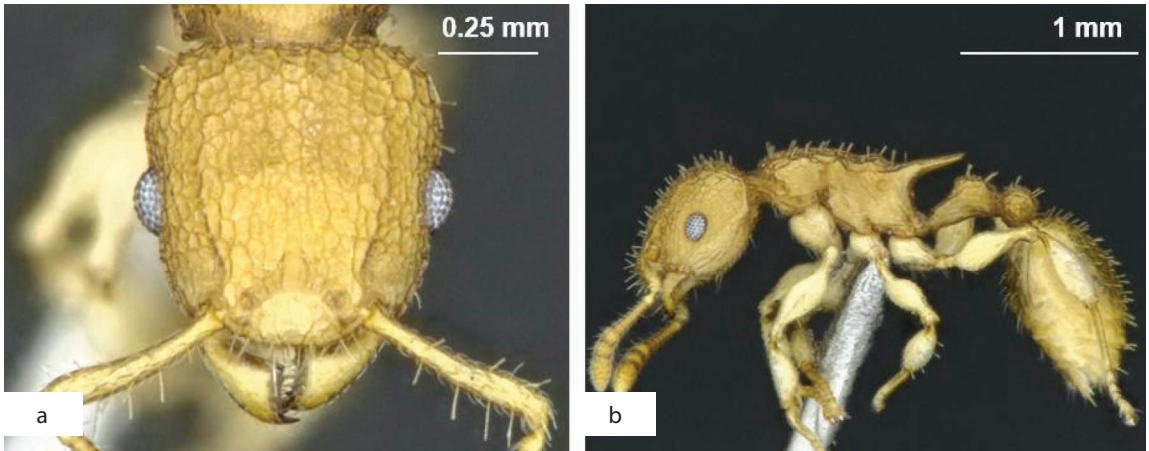
**Figure 278.** *Tetramorium* sp.08, B01.HymFrm207.jw. Worker



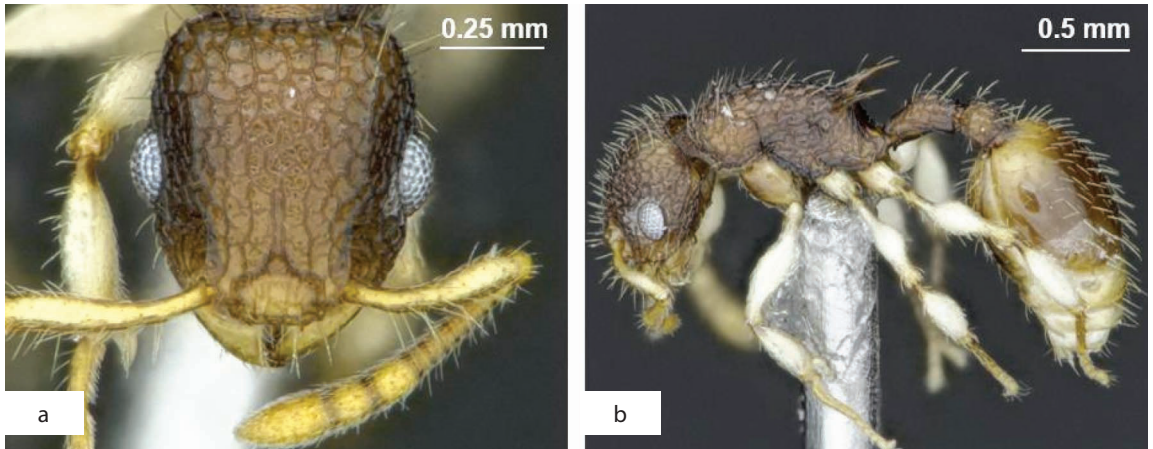
**Figure 279.** *Tetramorium* sp.09, B01.HymFrm271.jw. Worker



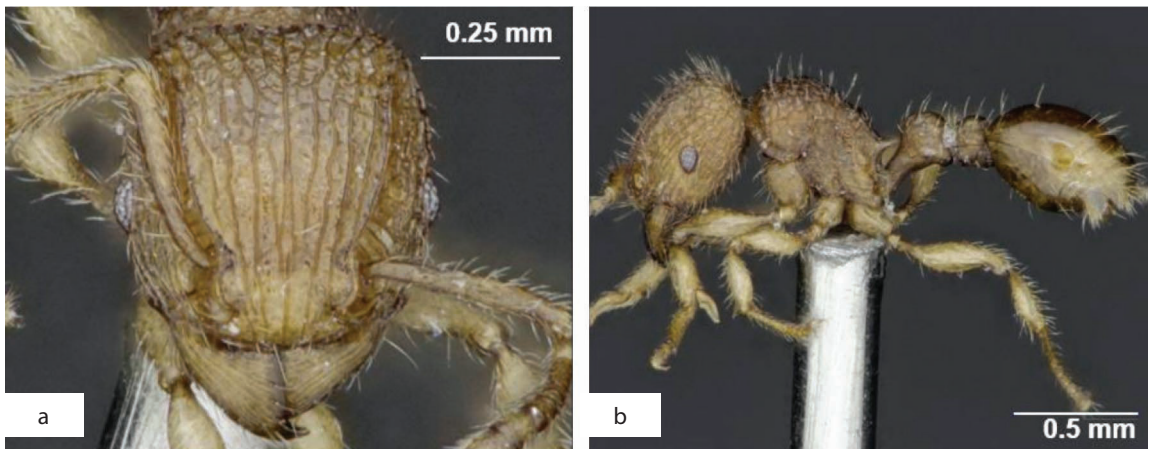
**Figure 280.** *Tetramorium* sp.10, Z02.HymFrm257.rn. Worker.



**Figure 281.** *Tetramorium* sp.11, Z02.HymFrm289.rn. Worker.

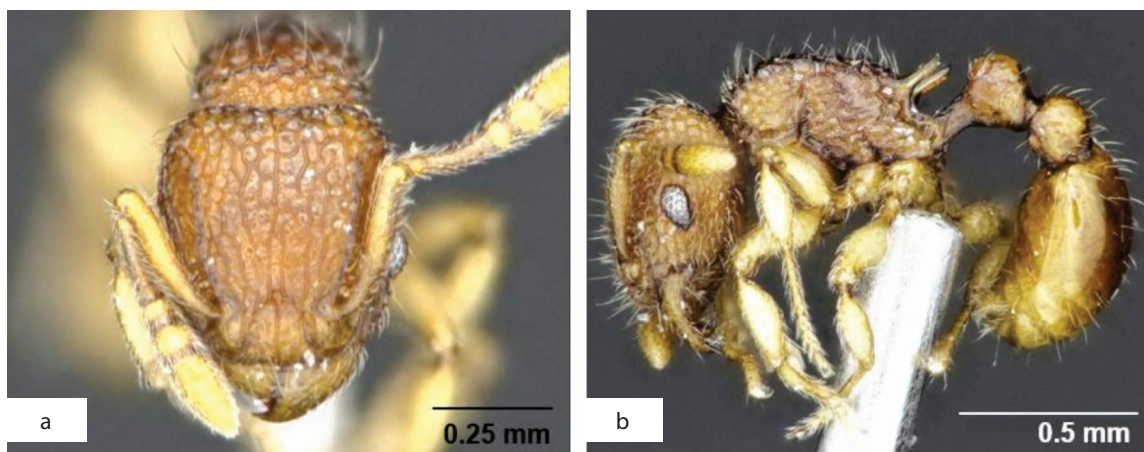


**Figure 282.** *Tetramorium* sp.101, Z02.HymFrm511.jd. Worker

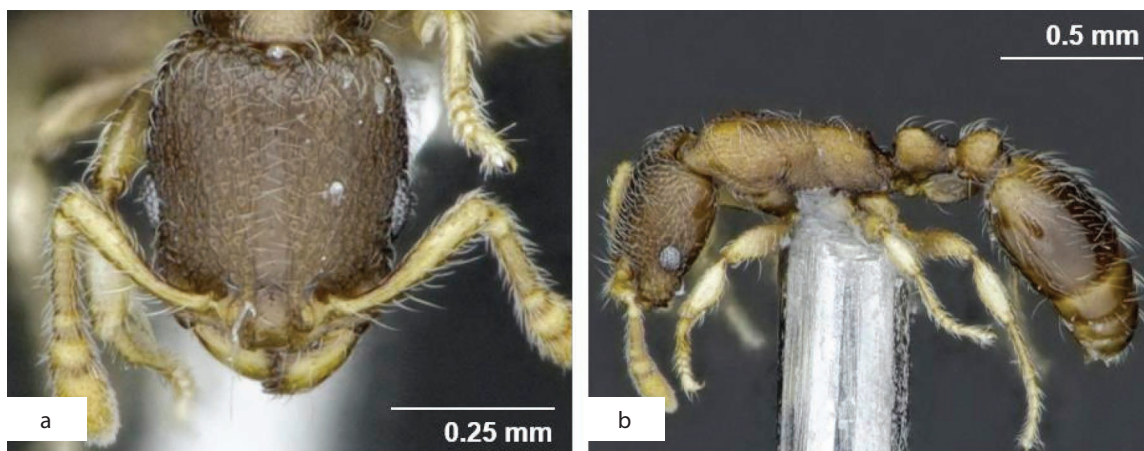


**Figure 283.** *Tetramorium* sp.104, B01.HymFrm267.jw. Worker.

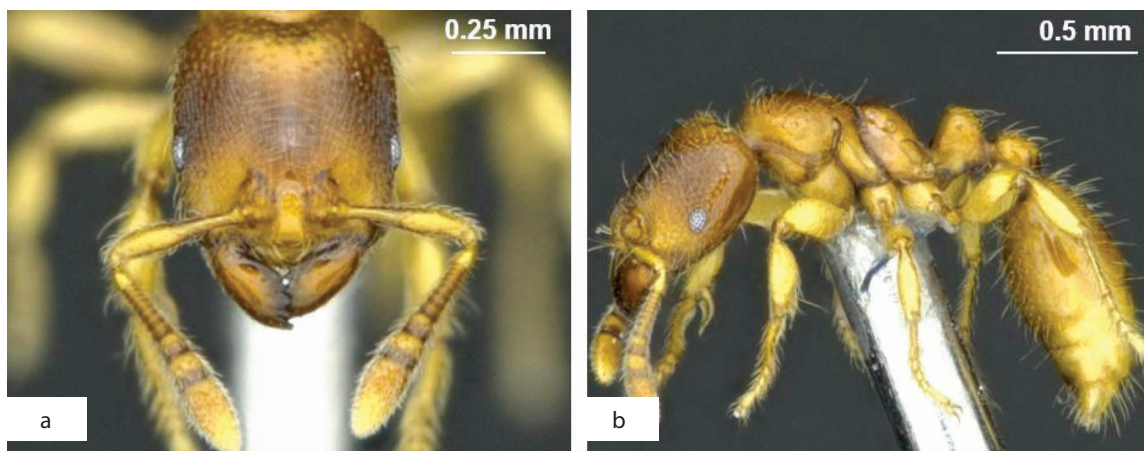




**Figure 284.** *Tetramorium* sp.107, B01.HymFrm208.jw. Worker.



**Figure 285.** *Vollenhovia* sp.01, Z02.HymFrm007.rn. Worker.



**Figure 286.** *Vollenhovia* sp.02, Z02.HymFrm131.rn. Worker.





**Figure 287.** *Vollenhovia* sp.03, Z02.HymFrm202.rn. Worker



**Figure 288.** *Vollenhovia* sp.04, B01.HymFrm248.jw. Worker



**Figure 289.** *Vombisidris* sp.01, Z02.HymFrm204.rn. Worker.



**Figure 290.** *Vombisidris* sp.02, Z02.HymFrm205.rn. Worker



**Figure 291.** *Vombisidris* sp.03, Z02.HymFrm223.rn. Worker.

## 7. Ponerinae



**Figure 292.** *Anochetus myops*, B01.HymFrm212.jw. Worker.





**Figure 293.** *Anochetus* sp.01, Z02.HymFrm012.rn. Worker

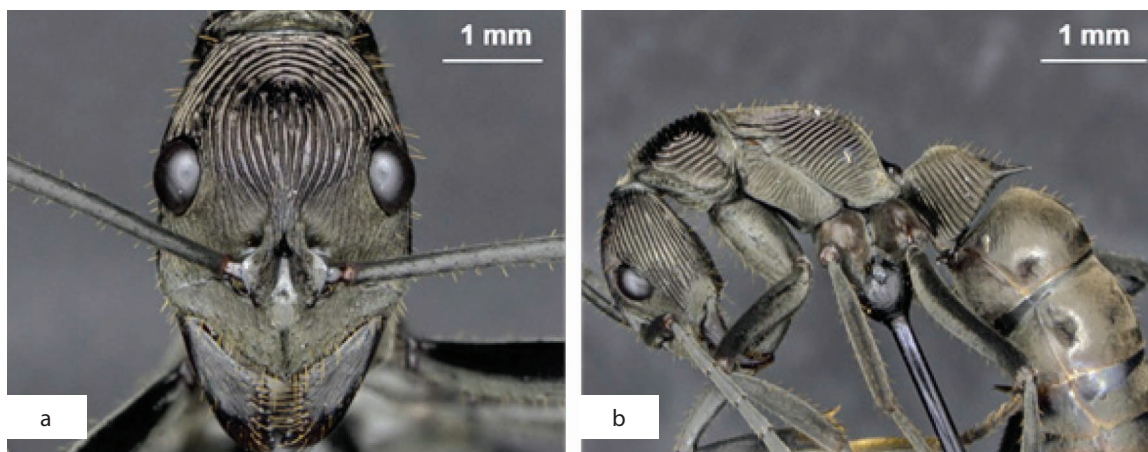


**Figure 294.** *Brachyponera* sp.01, B01.HymFrm281.jw. Worker.

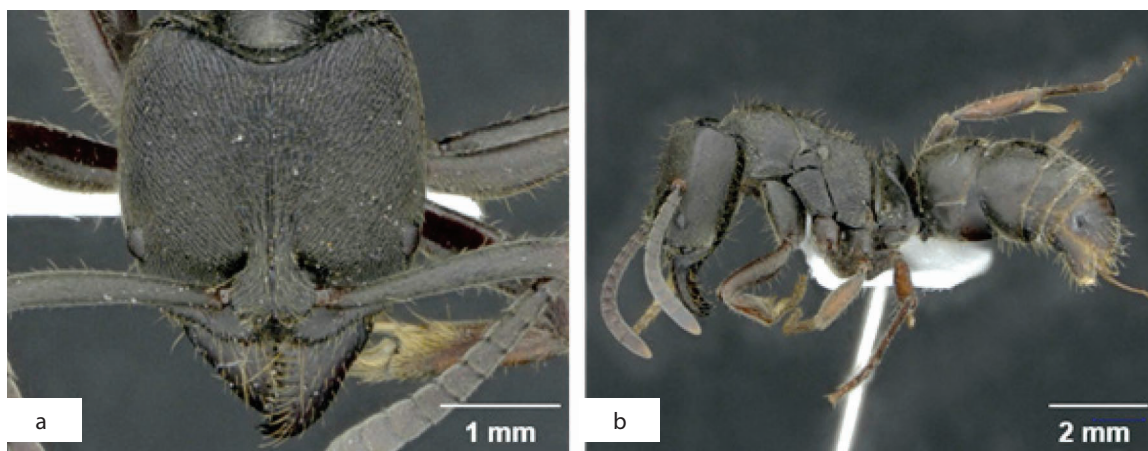


**Figure 295.** *Diacamma rugosum*, Z02.HymFrm022.rn. Worker.

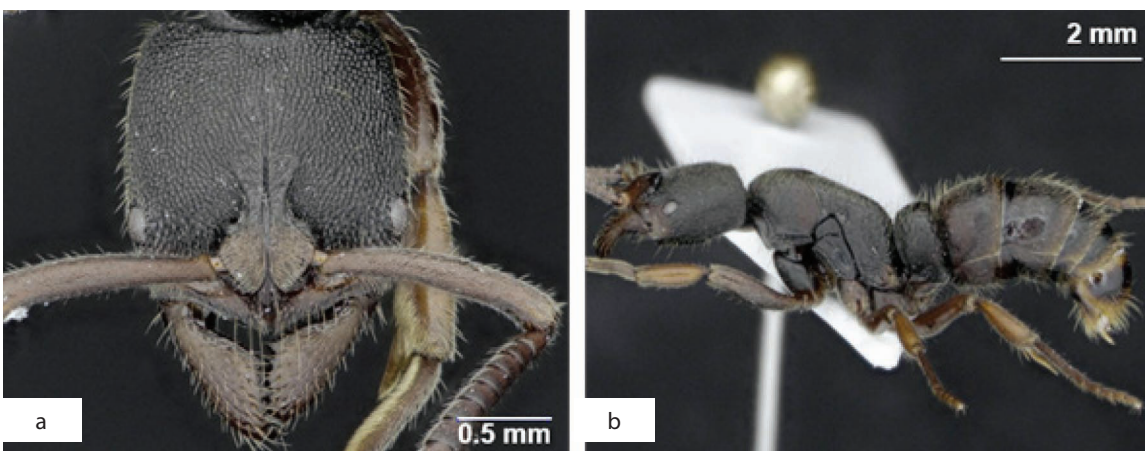




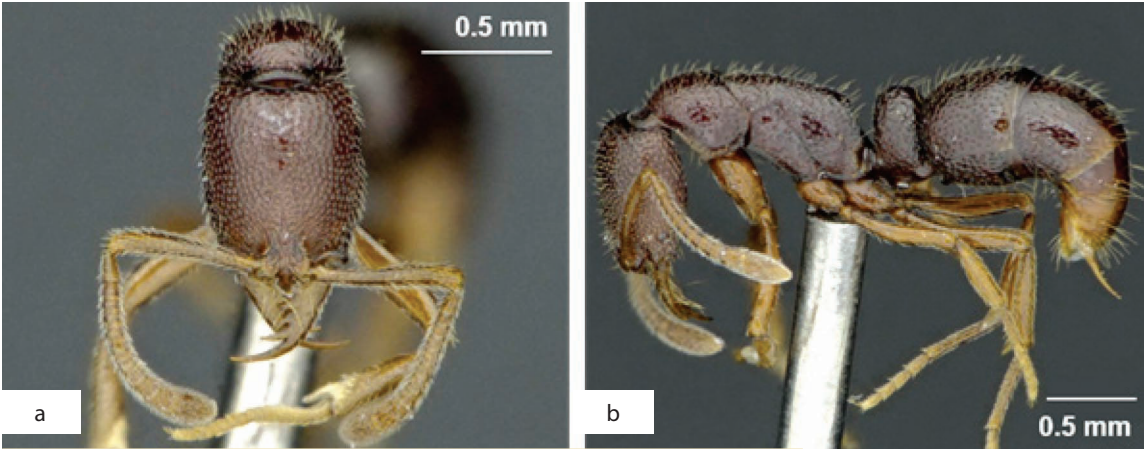
**Figure 296.** *Diacamma* sp.01, Z02.HymFrm329.rn. Worker.



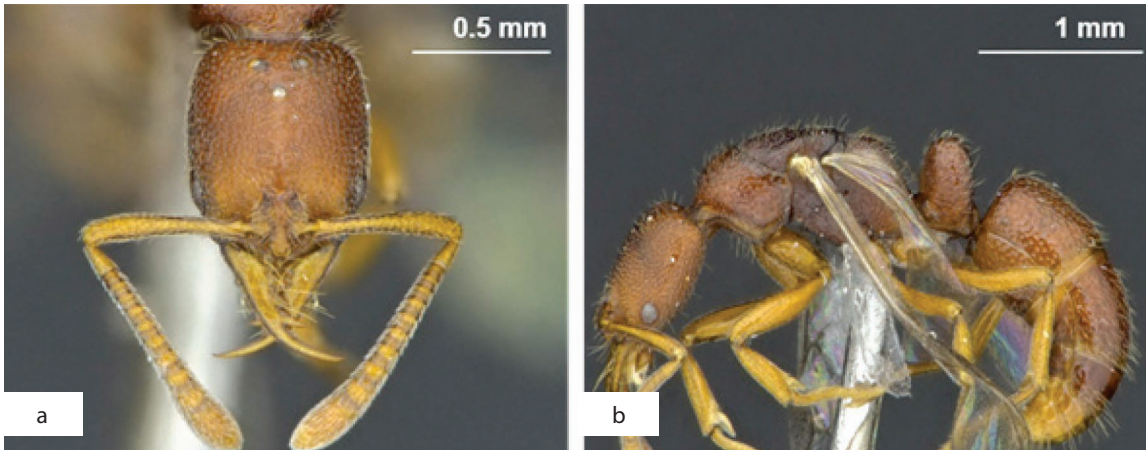
**Figure 297.** *Ectomomyrmex* sp.01, B01.HymFrm273.jw. Worker.



**Figure 298.** *Ectomomyrmex* sp.02, B01.HymFrm274.jw. Worker.



**Figure 299.** *Emeryopone buttelreeperi*, Z02.HymFrm282.rn. Worker.



**Figure 300.** *Emeryopone buttelreeperi*, Z02.HymFrm282.rn. Alate queen.

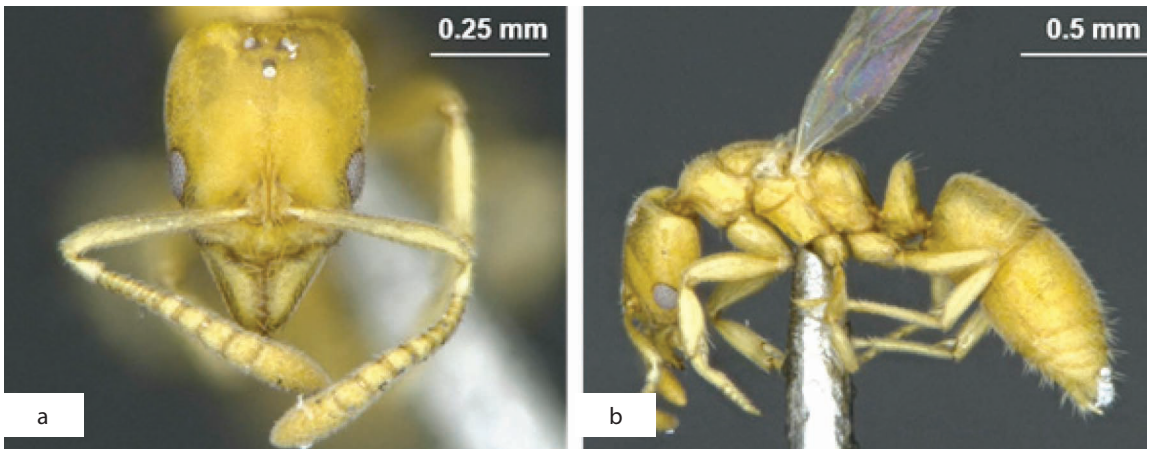


**Figure 301.** *Hypoponera* sp.01, Z02.HymFrm085.rn. Alate queen.

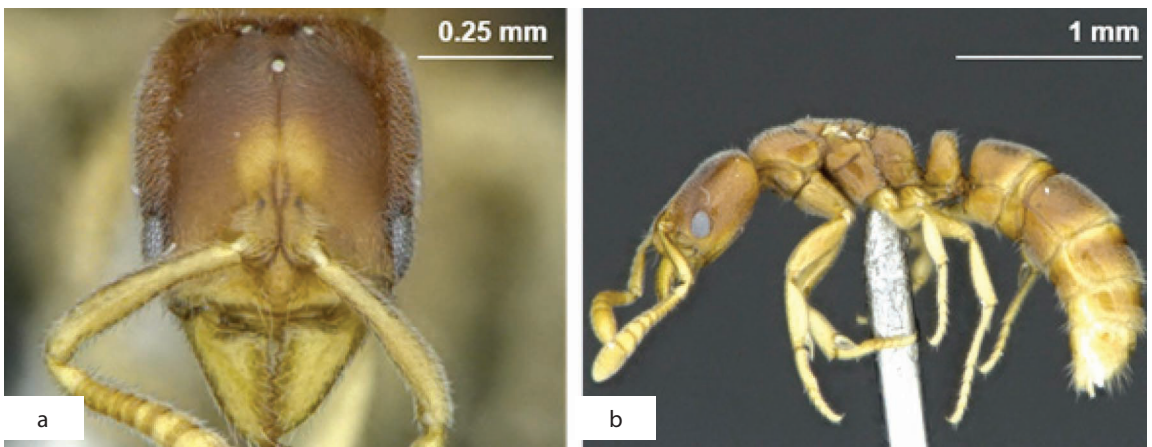




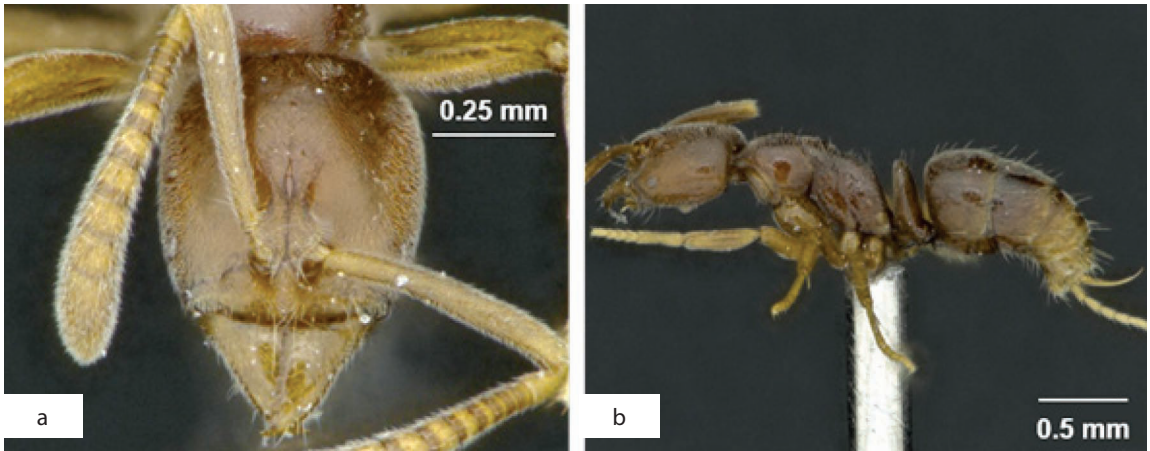
**Figure 302.** *Hypoponera* sp.02, B01.HymFrm278.jw. Worker.



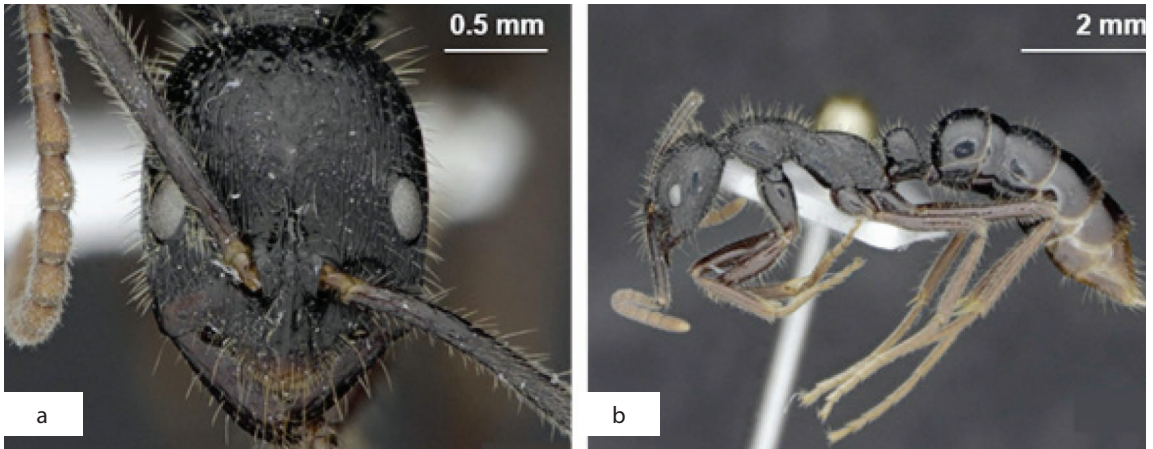
**Figure 303.** *Hypoponera* sp.03, Z02.HymFrm261.rn. Alate queen.



**Figure 304.** *Hypoponera* sp.04, Z02.HymFrm262.rn. Dealate queen.



**Figure 305.** *Hypoponera* sp.10, B01.HymFrm280.jw. Worker.

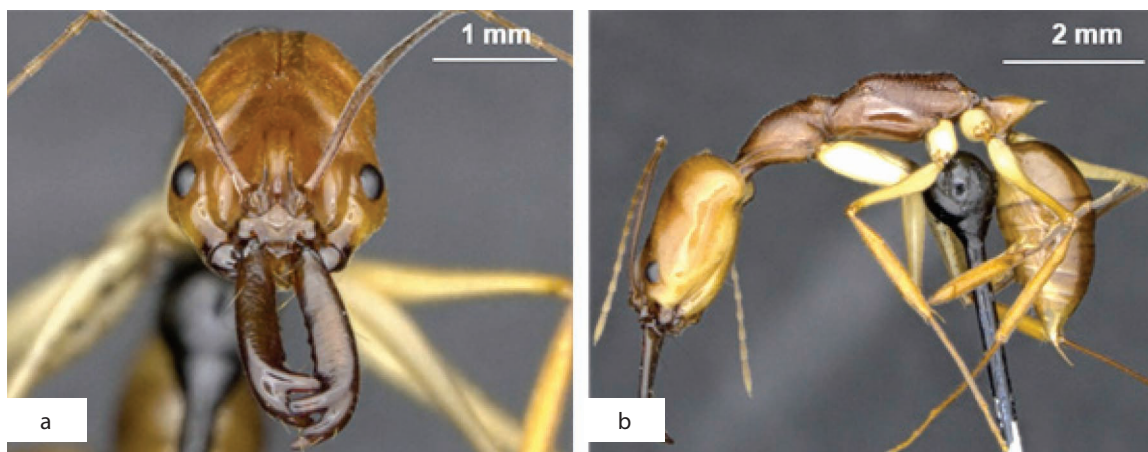


**Figure 306.** *Leptogenys* sp.01, B01.HymFrm216.jw. Worker.

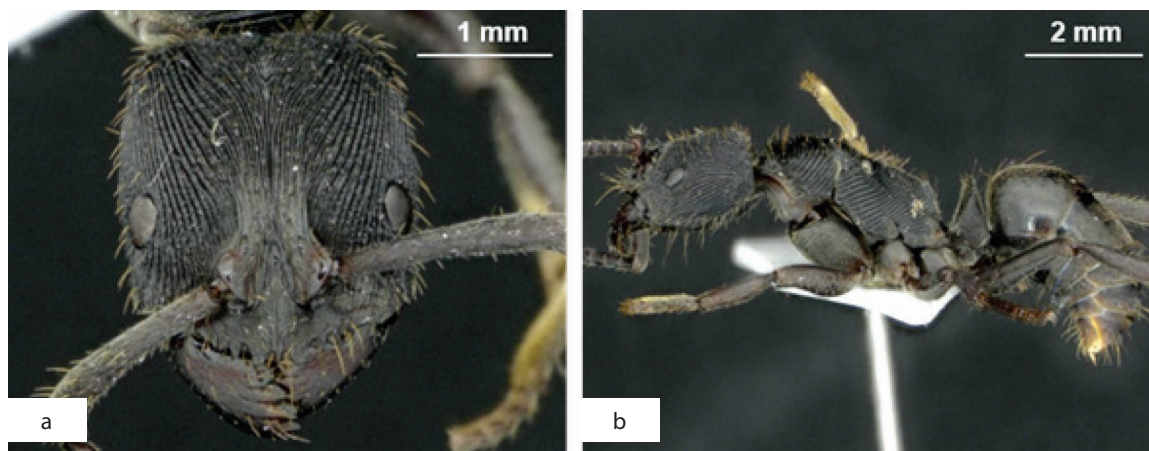


**Figure 307.** *Odontomachus rixosus* sp.01, B01.HymFrm219.jw. Worker.

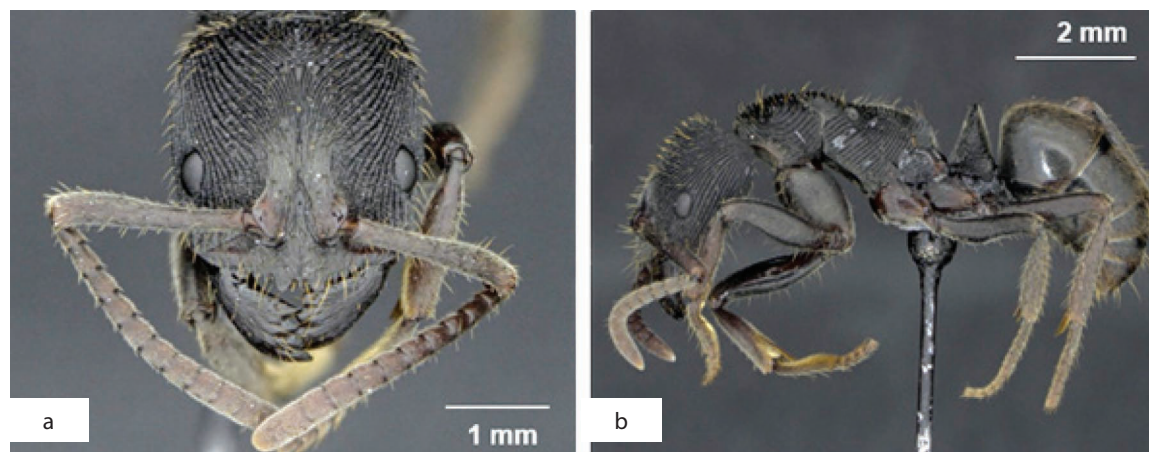




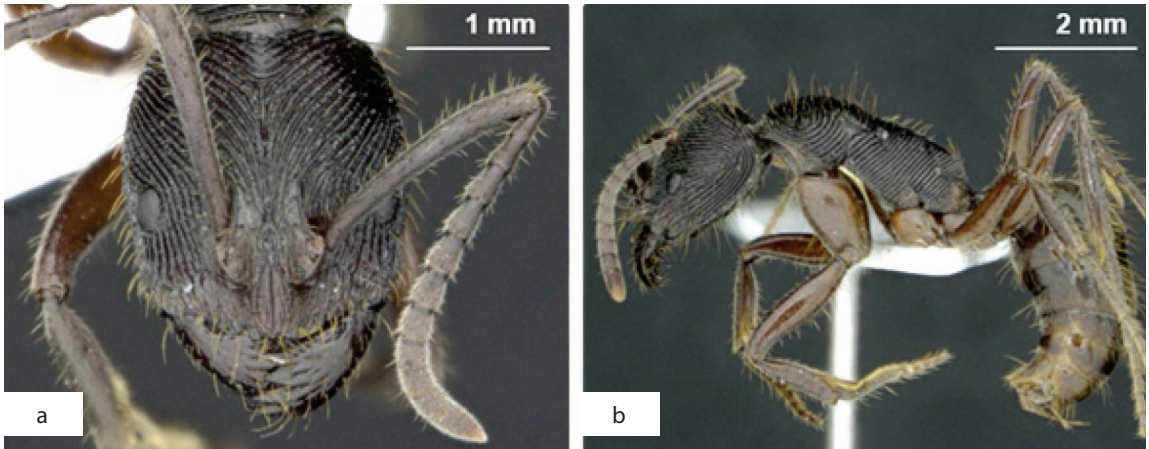
**Figure 308.** *Odontomachus* sp.01, Z02.HymFrm260.rn. Worker.



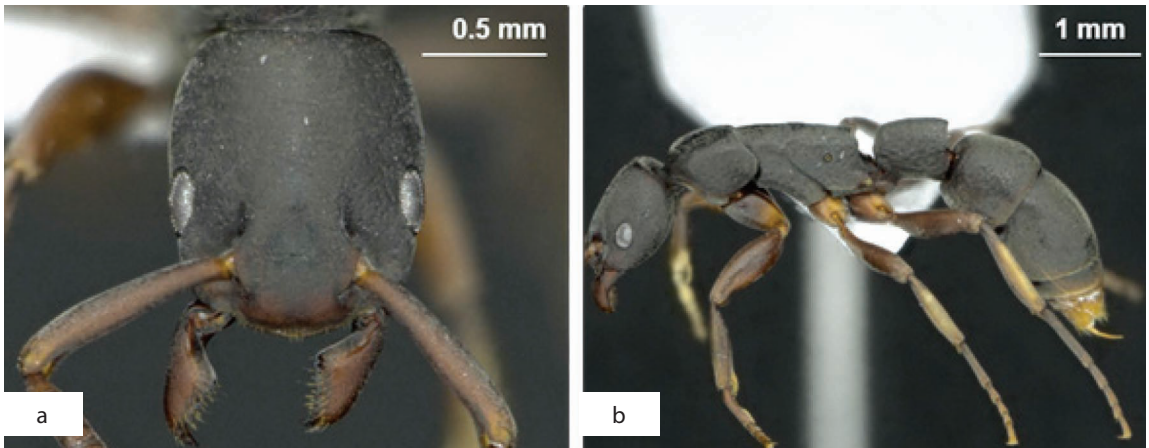
**Figure 309.** *Odontoponera denticulata*, B01.HymFrm201.jw. Worker.



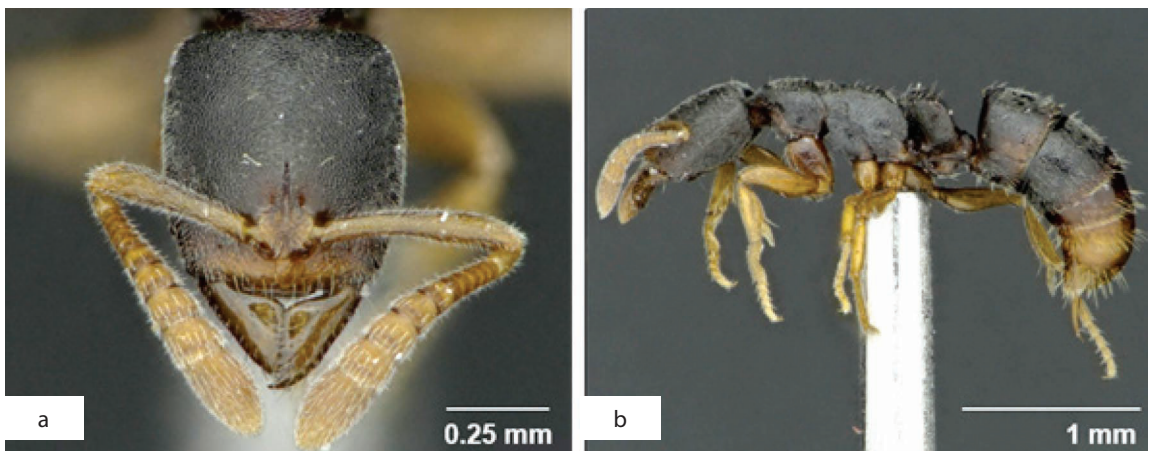
**Figure 310.** *Odontoponera* sp.01, Z02.HymFrm196.rn. Worker.



**Figure 311.** *Odontoponera transversa*, B01.HymFrm202.jw. Worker.



**Figure 312.** *Platythyrea* sp.01, Z02.HymFrm065.rn. Worker.

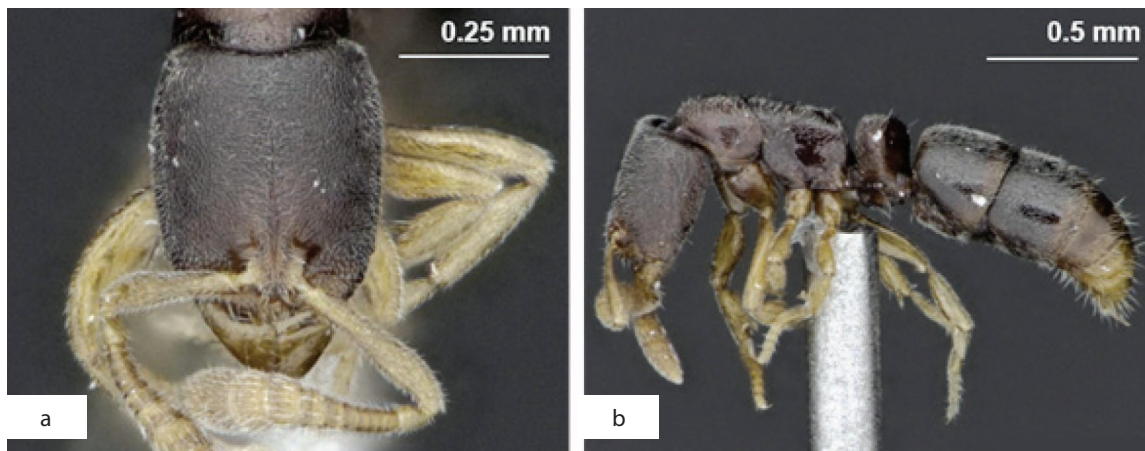


**Figure 313.** *Ponera* sp.01, B01.HymFrm282.jw. Worker.

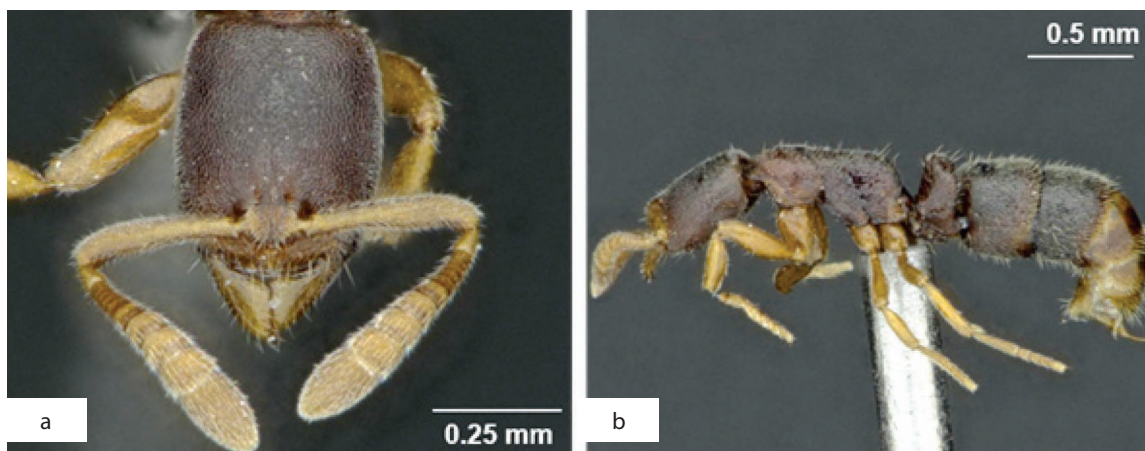




**Figure 314.** *Ponera* sp.03, Z02.HymFrm258.rn. Worker.

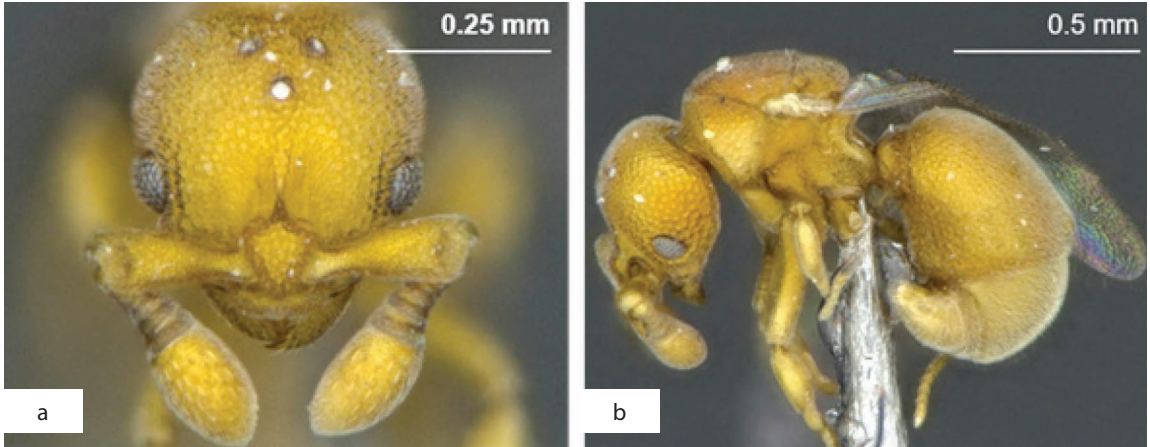


**Figure 315.** *Ponera* sp.04, B01.HymFrm283.jw. Worker.



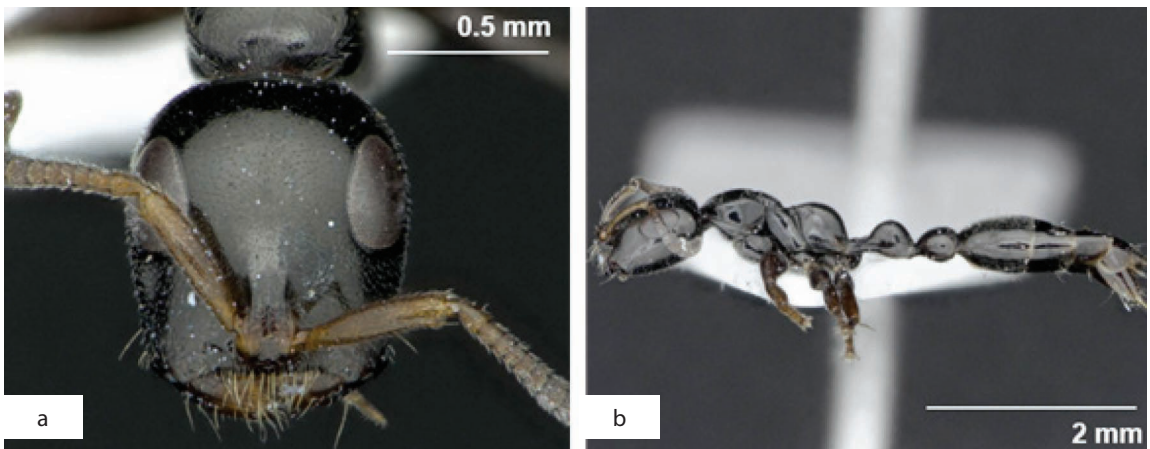
**Figure 316.** *Ponera* sp.04, B01.HymFrm284.jw. Worker.

## 8. Proceratiinae



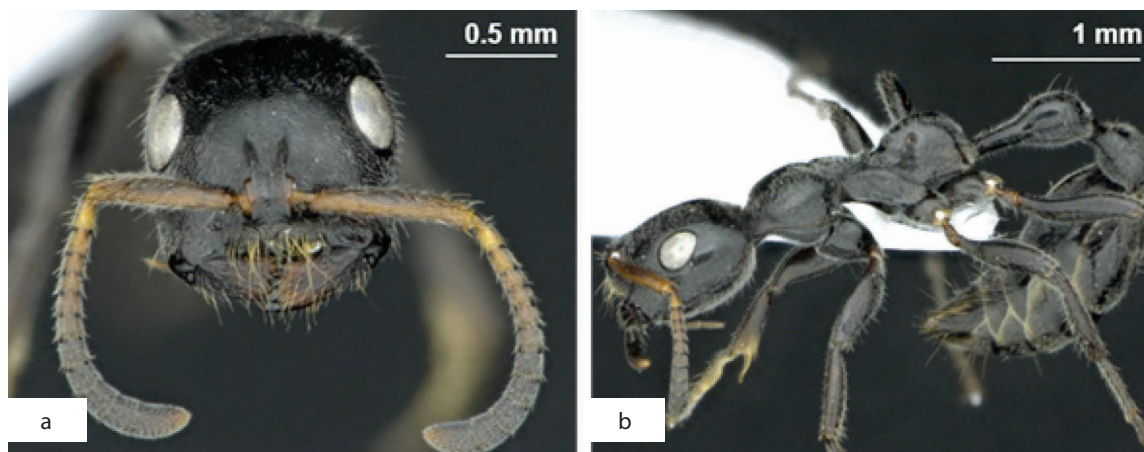
**Figure 317.** *Discothyrea* sp.01, Z02.HymFrm266.rn. Worker.

## 9. Pseudomyrmecinae

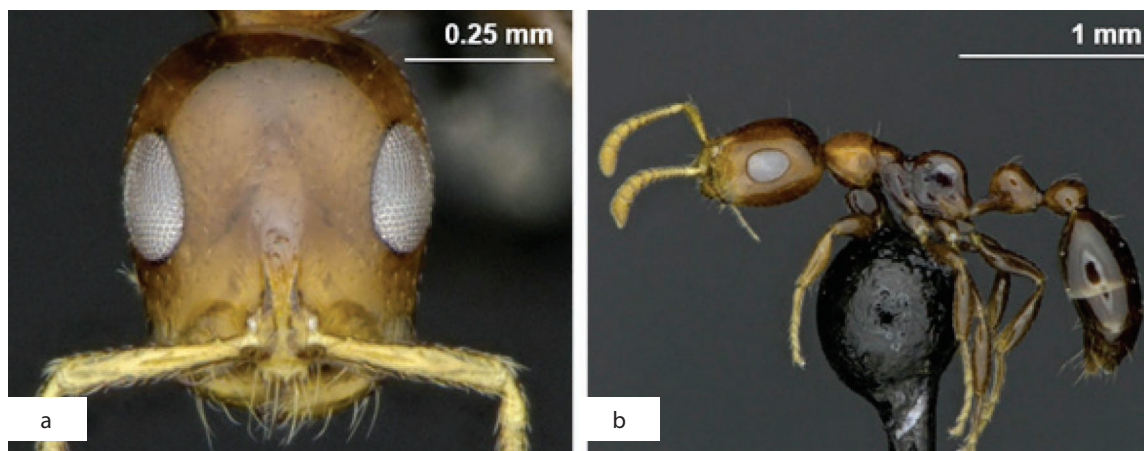


**Figure 318.** *Tetraponera alloborans*, B01.HymFrm298.jw. Worker.

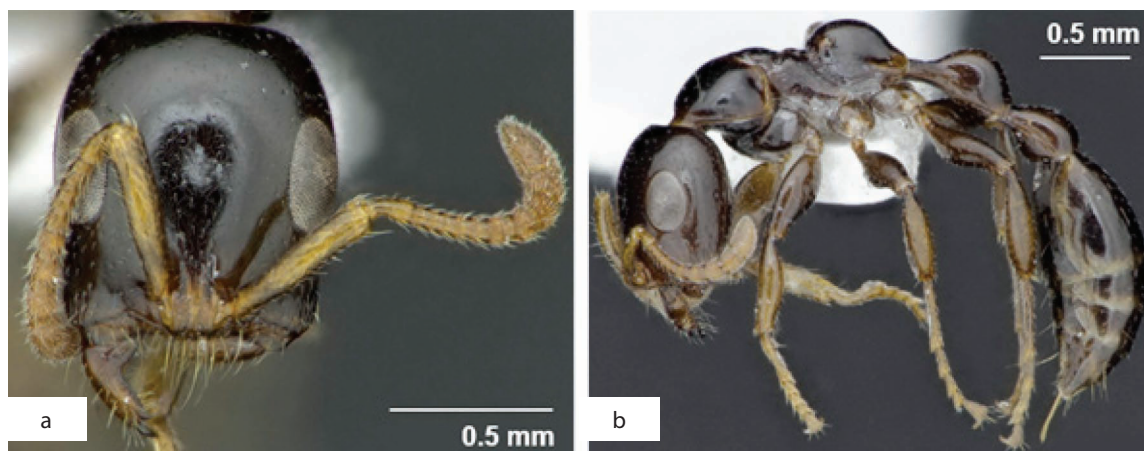




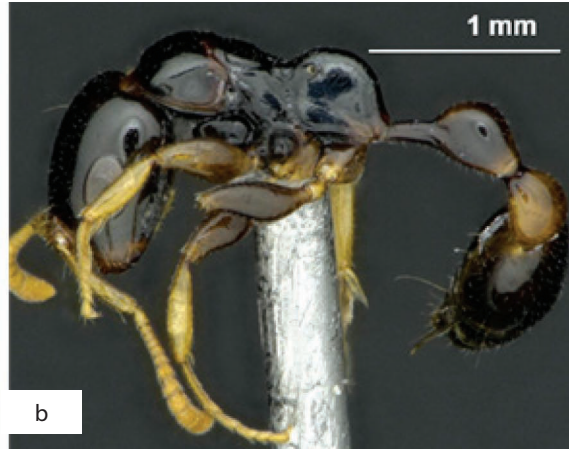
**Figure 319.** *Tetraoponera attenuata* sp.01, Z02.HymFrm112.rn. Worker.



**Figure 320.** *Tetraoponera crassiuscula*, Z02.HymFrm193.rn. Worker.



**Figure 321.** *Tetraoponera difficilis*, Z02.HymFrm043.rn. Worker.



**Figure 322.** *Tetraponera extenuata*, Z02.HymFrm128.rn. Worker.



**Figure 323.** *Tetraponera modesta*, Z02.HymFrm018.rn. Worker.



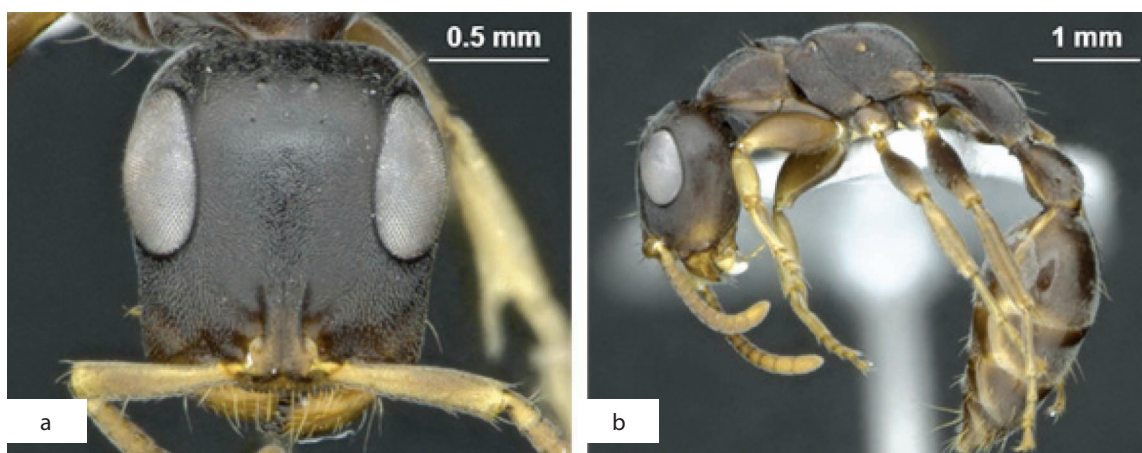
**Figure 324.** *Tetraponera nitida*, Z02.HymFrm002.rn. Worker.





Photo: Estella Ortega (2012)

**Figure 325.** *Tetraoponera nodosa*, Z02.HymFrm500.jd. Worker.



**Figure 326.** *Tetraoponera pilosa*, Z02.HymFrm072.rn. Worker.

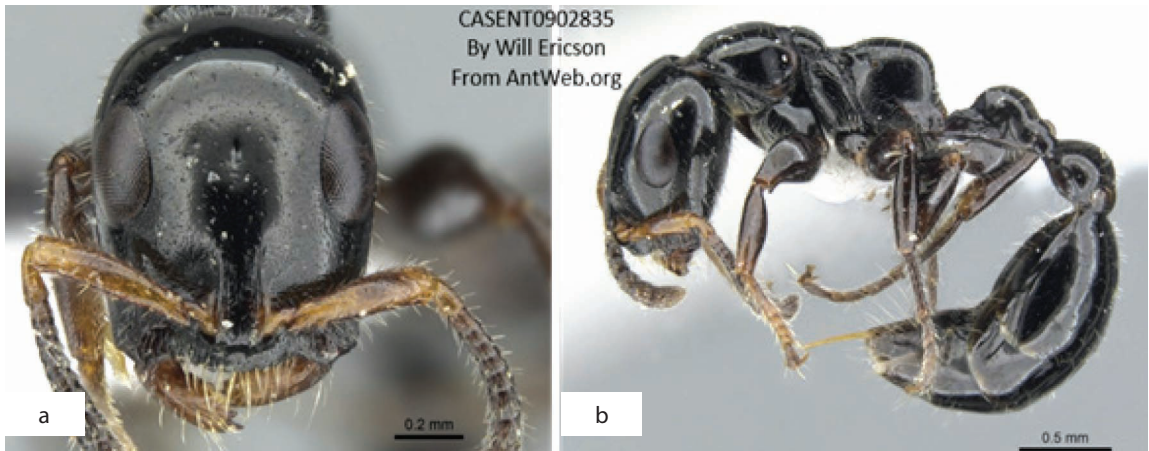
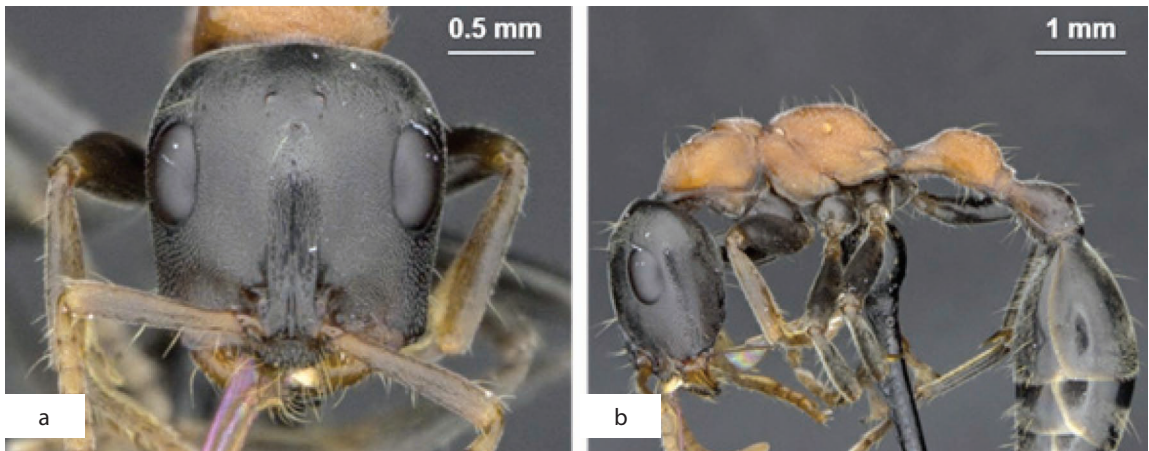


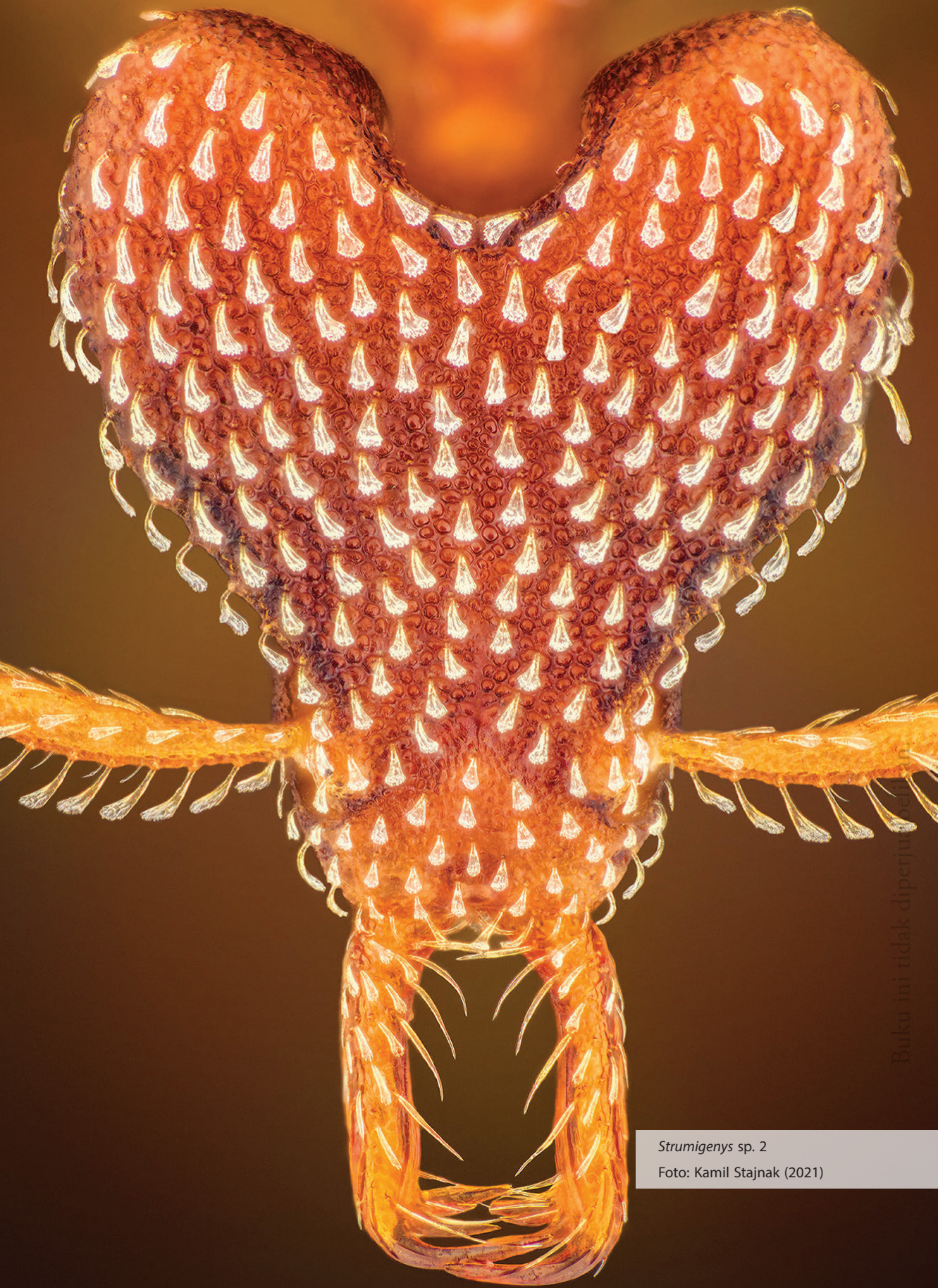
Photo: Will Ericson (2013)

**Figure 327.** *Tetraoponera polita*, Z02.HymFrm506.jd. Worker.



**Figure 328.** *Tetraoponera rufonigra*, Z02.HymFrm268.rn. Worker.





*Strumigenys* sp. 2

Foto: Kamil Stajnak (2021)







Yellow Crazy Ants *Anoplolepis gracilipes*  
(photo: Rizki Pradana)

## EPILOGUE

Ants are highly abundant social insects with a tendency to dominate the ecology of invertebrates in tropical forest canopies by sheer numbers and biomass. As a part of Sundaland, Indonesia hosts a considerable fraction of this planet's biodiversity, including more than thirteen hundred species and subspecies of ants<sup>1</sup>. Many more species of ants are expected to exist in Indonesia, but have not yet been scientifically described. Knowing which species form part of the ecosystem they inhabit is fundamentally important for understanding their biology and their interaction with other components of the ecosystem. This book represents the first step to a detailed inventory of the ants that inhabit four major ecosystems in Sumatra, Indonesia; rainforest, jungle rubber (rubber agroforestry), and rubber and oil palm monoculture plantations. The reason this book is focused on ants in Jambi Province, Sumatra is due to the international EForTS research consortium. However, this book is by no means limited to ants of Jambi Province only. Along with high resolution images of more than 300 ant species from Jambi Province, this book contains an identification key to ant genera covering most of Southeast Asia (Hashimoto, 2003). We thus hope this book will be of use to anyone studying ants, or conducting ant related research, whether specifically in Jambi Province or in Southeast Asia in general.







(photo: Rizki Pradana)

## REFERENCES

- Alpert, G. (2014). *Technomyrmex wheeleri* [Online image]. AntWiki. [https://www.antwiki.org/wiki/Technomyrmex\\_wheeleri](https://www.antwiki.org/wiki/Technomyrmex_wheeleri).
- AntWeb. (2020, August 5). *Country: Indonesia*. <https://www.antweb.org/country.do?name=Indonesia>
- Bolton, B. (1994). *Identification guide to the ant genera of the world*. Harvard University Press.
- Borowiec, M. (2013). *CASENT0106328 Euprenolepis procera* [Online image]. AntWeb. <https://www.antweb.org/specimenImages.do?name=casent0106328>.
- Borowiec, M. (2013). *CASENT0106280 Carebara pygmaea* [Online image]. AntWeb. <https://www.antweb.org/specimenImages.do?name=casent0106280>.
- Drescher, J., Rembold, K., Allen, K., Beckschäfer, P., Buchori, D., Clough, Y., Faust, H., Fauzi, A.M., Gunawan, D., Hertel, D., Irawan, B., Jaya, I.N.S., Klarner, B., Kleinn, C., Knohl, A., Kotowska, M.M., Krashevskaya, V., Krishna, V., Leuschner, C., Lorenz, W., Meijide, A., Melati, D., Nomura, M., Pérez-Cruzado, C., Qaim, M., Siregar, I.Z., Steinebach, S., Tjoa, A., Tscharnkte, T., Wick, B., Wiegand, K., Kreft, H., & Scheu, S. (2016). Ecological and socio-economic functions across tropical land use systems after rainforest conversion. *Philosophical Transactions of the Royal Society B-Biological Sciences*, 371(1694). <https://doi.org/10.1098/rstb.2015.0275>.
- Ericson, W. (2012). *CASENT0901893 Camponotus festinus* [Online image]. AntWeb. <https://www.antweb.org/specimenImages.do?name=casent0901893>.
- Ericson, W. (2013). *CASENT0903250 Myrmoteras estrudae* [Online image]. AntWeb. <https://www.antweb.org/specimenImages.do?name=casent0903250>.



- Ericson, W. (2013). *CASENT0904185 Aphaenogaster feae* [Online image]. AntWeb. <https://www.antweb.org/specimenImages.do?name=casent0904185>.
- Ericson, W. (2013). *CASENT0905765 Pheidole ghigii* [Online image]. AntWeb. <https://www.antweb.org/specimenImages.do?name=casent0905765>.
- Ericson, W. (2013). *CASENT0904246 Pheidole huberi* [Online image]. AntWeb. <https://www.antweb.org/specimenImages.do?name=casent0904246>.
- Ericson, W. (2013). *CASENT0907889 Pheidole huberi* [Online image]. AntWeb. <https://www.antweb.org/specimenImages.do?name=casent0907889>.
- Ericson, W. (2013). *CASENT0907990 Pheidole rabo* [Online image]. AntWeb. <https://www.antweb.org/specimenImages.do?name=casent0907990>.
- Ericson, W. (2013). *CASENT0907989 Pheidole rabo* [Online image]. AntWeb. <https://www.antweb.org/specimenImages.do?name=casent0907989>.
- Ericson, W. (2013). *CASENT0902835 Tetraponera polita* [Online image]. AntWeb. <https://www.antweb.org/specimenImages.do?name=casent0902835>.
- Fayle, T. M., Yusah, K. & Hashimoto, Y. (2014). *Key to the ant genera of Borneo in English and Malay*. Retrieved May 1, 2020, from <https://www.tomfayle.com/Ant%20key.htm>.
- Gouyon, A., de Foresta, H., & Levang, P. (1993). Does 'jungle rubber' deserve its name? An analysis of rubber agroforestry systems in Southeast Sumatra. *Agroforestry System*, 22, 181–206. <https://doi.org/10.1007/BF00705233>.
- Hashimoto, Y. (2003). Identification guide to ant genera of Borneo. In Y. Hashimoto & H. Rahman (Eds.), *Inventory & Collection - Total protocol for understanding of biodiversity* (pp. 89-162). Institute for Tropical Biology and Conservation, Universiti Malaysia Sabah and Japan International Cooperation Agency (JICA).
- Hölldobler, B., & Wilson, E. O. (1990). *The ants*. Harvard University Press.
- Hölldobler, B., & Wilson, E. O. (2009). *The superorganism – The beauty, elegance, and strangeness of insect societies*. W. W. Norton & Company.
- Keller, L., & Gordon, É. (2009). *The lives of ants*. Oxford University Press.
- Lazarus, A. (2013). *CASENT0282388 Pheidole aristotelis* [Online image]. AntWeb. <https://www.antweb.org/specimenImages.do?name=casent0282388>.



- Lazarus, A. (2013). *CASENT0219465 Pheidole aristotelis* [Online image]. AntWeb. <https://www.antweb.org/specimenImages.do?name=casent0219465>.
- Lieberman, Z. (2013). *CASENT0904268 Pheidole ghigii* [Online image]. AntWeb. <https://www.antweb.org/specimenImages.do?name=casent0904268>.
- Lieberman, Z. (2014). *CASENT0914657 Recurvidris kemneri* [Online image]. AntWeb. <https://www.antweb.org/specimenImages.do?name=casent0914657>.
- Nobile, A. (2008). *CASENT0103251 Nylanderia bourbonica* [Online image]. AntWeb. <https://www.antweb.org/specimenImages.do?name=casent0103251>.
- Ortega, E. (2012). *CASENT0281714 Pheidole plagiaris* [Online image]. AntWeb. <https://www.antweb.org/specimenImages.do?name=casent0281714>.
- Ortega, E. (2012). *CASENT0281725 Pheidole tjibodana* [Online image]. AntWeb. <https://www.antweb.org/specimenImages.do?name=casent0281725>.
- Ortega, E. (2012). *CASENT0281684 Pheidole upeneci* [Online image]. AntWeb. <https://www.antweb.org/specimenImages.do?name=casent0281684>.
- Ortega, E. (2012). *CASENT0281874 Tetraponera nodosa* [Online image]. AntWeb. <https://www.antweb.org/specimenImages.do?name=casent0281874>.
- Perry, R. (2012). *CASENT0901637 Pheidole jacobsoni* [Online image]. AntWeb. <https://www.antweb.org/specimenImages.do?name=casent0901637>.
- Potapov, A., Sandmann, D., & Scheu, S. (2019). *Ecotaxonomy virtual research environment – Traits and species*. Ecotaxonomy. <http://ecotaxonomy.org>.
- Steiner, F. (2018, June 15). How many ant species are there on earth?. *Myrmecological News Blog*. <https://blog.myrmecologicalnews.org/2018/06/15/how-many-ant-species-are-there-on-earth/>.
- Tawatao, N. (2010). *CASENT0179657 Pheidole submonticola* [Online image]. AntWeb. <https://www.antweb.org/specimenImages.do?name=casent0179657>.
- Williams, J. L. (2016). *Prenolepis subopaca worker USNMENT00755090* [Online image]. Zenodo. [https://zenodo.org/record/182078#.Yllq\\_OgzbDf](https://zenodo.org/record/182078#.Yllq_OgzbDf).





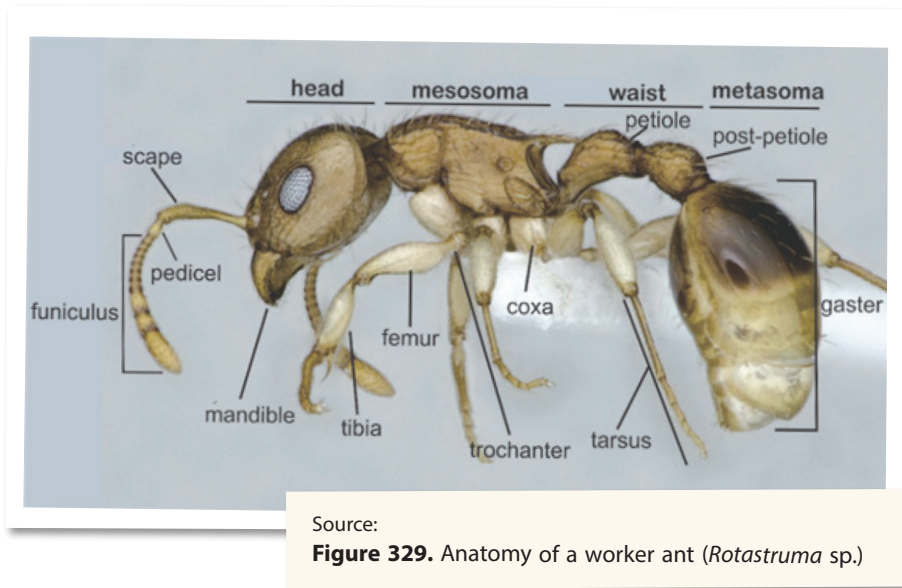
*Myrmoteras* sp.2

Foto: Kamil Stajnak (2021)



# GLOSSARY OF ANT MORPHOLOGY

Adapted from Hashimoto (2003) and Bolton (1994).



## Abdomen

The abdomen consists of 7 segments (A1-A7). The first segment is the propodeum (A1), which is incorporated into the thorax. The second segment is petiole (A2), which is usually reduced and forms a node. The third segment (A3) is the first

gastral segment when it is full-sized, but when reduced it is called post-petiole. The abdominal segments 3 or 4 through 7 are called gaster. The tergite of the last visible abdominal segment is the pygidium, and the last visible sternite is the hypopygium.

## Acidopore

This structure is only present in ants of the subfamily Formicinae. A small hole at the tip of the gaster is formed from the apex of the hypopygium, generally projected as a nozzle fringed with short setae through which formic acid and pheromones are released.

## Anepisternum

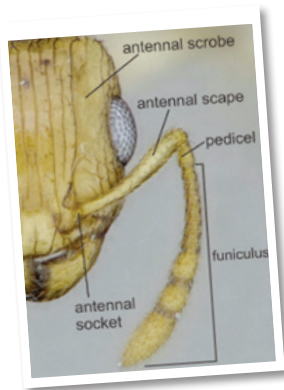
The upper part of the mesopleuron.

## Antenna

A pair of segmented sensory appendages lying anterodorsally on the head between the compound eyes and close to the clypeus. The antenna consists of three parts: scape (the first elongated segment), the pedicel, and the funiculus (= flagellum). The antenna in ants consists of 4-12 segments. The funicular segments may be filiform and the 1-4 last antennal segments are sometimes enlarged to form an antennal club.

## Antennal scape

The elongated basal segment of the antenna.

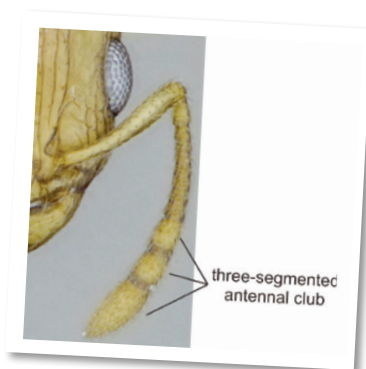


## Antennal scrobe

The groove, located either above or below eye, protects the scape or often the entire antenna when latter is folded.

## Antennal club

The antennal funiculus that is enlarged apically compared to the other segments. The structure is restricted to the ants of subfamily Myrmicinae, and composed of two or three segments.

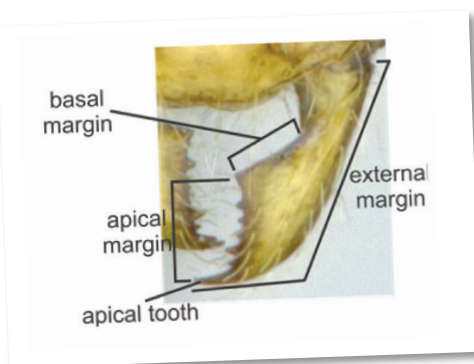


## Antennal socket

A cavity on the head, behind the clypeus, usually overhung and often concealed by the frontal lobe.

## Anterior clypeal margin

The anterior margin of the clypeus which might be strongly emarginated, flat, convex, or in a specialized arrangement.



## Apical tooth

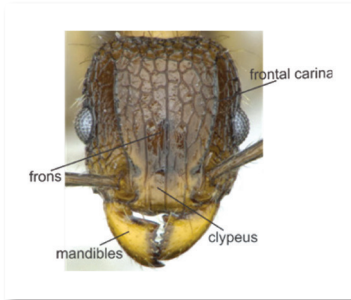
The most distal tooth located on the apical margin of the mandible.

## Arolium

A pad-like median structure between the pre-tarsal claws.



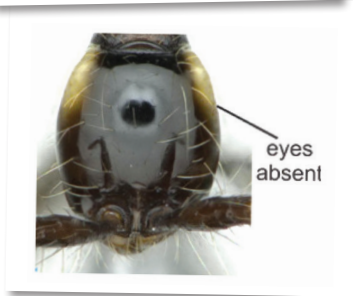
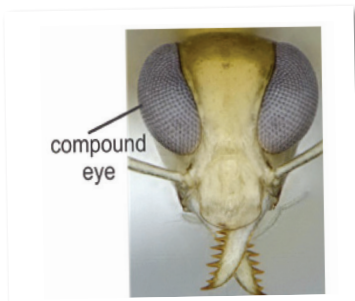
## Clypeus



The anterior clypeal margin usually forms the anterior margin of the head. The posterior clypeal margin usually borders the antennal sockets and frontal carinae or frontal lobes, or may project backwards between them.

## Compound eye

The eye composed of multiple facets or ommatidia. In some ant genus, eyes are absent or reduced to only one facet.



## Frons

The area above the clypeus, in the center of the head. It is sometimes called 'frontal area.'

## Frontal carina

A pair of longitudinal ridges on the frons, located dorsally behind the clypeus and between or often partly covering the antennal sockets. They are often expanded to the anterior of the frontal lobes.

## Frontal lobe

The frontal lobes are commonly enlarged extensions, which entirely or partially conceal the antennal sockets.



## Funiculus

The third part of an antenna or the entire group of antennomeres/flagellomeres (an antennal segment) beyond the scape and pedicel. It is sometimes used as the synonym of flagellum.

## Leg segments

Legs articulate directly with the pleural sclerites of the thorax and consist of six segments: coxa, trochanter (usually long and swollen), femur, tibia, 5-segmented tarsus (singular: tarsomere), and a pair of claws.

## Gaster

The third main body division of the ant body, located immediately beyond the waist and constituted of the abdominal segments 3-7 or the abdominal segments 4-7 when the abdominal segment 3 is differentiated into a postpetiole.

## Head

The first main body division of the ant body, consists of the eyes, antennae, and mouthparts.

## Hypopygium

The sternite of the last abdominal segment.

## Katepisternum

The lower part of the mesopleuron.

## Labial palp

The segmented sensory appendages located anterolaterally on the labium. Each labial palp has 3-4 segments.

## Mandible



triangular to  
subtriangular mandible



elongate  
mandible

The paired, heavily sclerotized anterior appendages of the mouthparts between the labrum and maxilla. Its function is to bite, chew, and hold objects. Mandibles come in a variety of shapes and dentition, and are extremely important in ant taxonomy. The mandibular margins usually form a triangular or subtriangular shape in full-face view, but in some ant taxa there are elongate-triangular and linear mandibles.

## Maxillary palp

The segmented sensory palps attached to the maxillae. Each maxillary palp may have up to six segments, but often less.

## Mesonotum

The second tergite of the mesosoma, which may be separated anteriorly from the pronotum by the promesonotal suture. If the two are fused together, they are referred as the promesonotum.

## Mesopleuron

The lateral and ventral part of the mesothorax. The mesopleuron may be divided into an upper anepisternum and a lower katepisternum.

## Mesosoma

The second tagma of the three main ant body, to which the legs are attached. It is also referred as the alitrunk. The mesosoma is composed of the three segments of the true thorax (pro-, meso-, and metathorax) to which the propodeum (the first abdominal segment) is fused.

## Metanotal groove

The transverse depression which may separate the mesonotum and propodeum. The metanotal groove represents the last vestige of the metanotum.

## Metanotum

The dorsal sclerite of the metathorax.

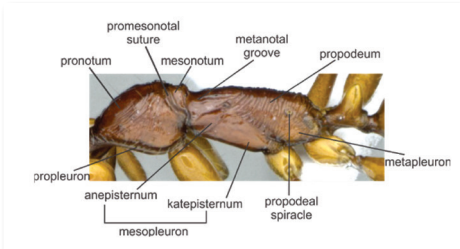
## Metapleural gland

The paired exocrine gland found on the posteroventral side of the mesosoma, above the level of the metacoxa, and below the propodeal spiracle.



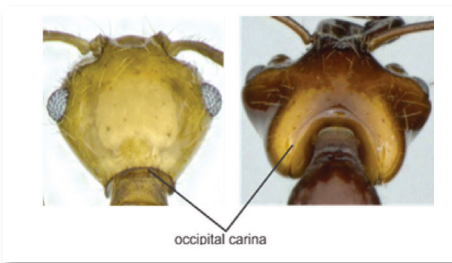
## Metapleuron

The lateral and ventral part of the metathorax. The metapleuron is located posteriorly on the side of the mesosoma, below the level of the propodeum.



## Occipital carina

A ridge on the posterior surface of the head that separated the vertex and gena from the occiput.

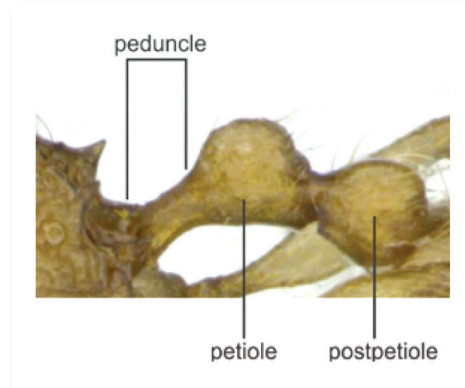


## Palp formula

The number of segments of the maxillary and labial palps. The number of maxillary palp segments is given first, followed by the number of labial palp segments. For instance, "PF 6,4" means that there are six maxillary palp segments and four labial palp segments.

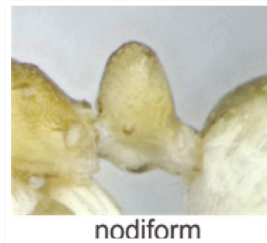
## Peduncle

The relatively narrow anterior section of the petiole. When present, the petiole is termed pedunculated. When absent, the petiole is termed sessile.



## Petiole

The second segment of the abdomen. This segment is usually reduced and always isolated from the mesosoma anteriorly. It is also isolated from the remaining abdominal segments posteriorly. It is the first and often the only waist segment. The shape of the petiole is often an important character for identification, in most genera it is raised to a *nodiform* or *squamiform* shape.



## Postpetiole

Postpetiole is the third abdominal segment when it is reduced and separated from the petiole anteriorly and from the gaster. When present, the postpetiole is the second waist segment. The postpetiole is present in subfamily Myrmicinae, but absent in the subfamily Formicinae, Dolichoderinae, and Ponerinae.

## Preapical teeth

Teeth that precedes the apical teeth of the mandibles, located behind the apical teeth.

## Pronotum

The first tergite of the mesosoma. The pronotum might be separated posteriorly from the mesonotum by the promesonotal suture.

## Propodeal declivity

The sloping posterior surface of the propodeum. It can be convex, flat, or concave.

## Propodeal spine

In some ant genera, it is the pair of spines projecting from the dorsal surface of the propodeum.

## Propodeal spiracle

An orifice located on the propodeum that is used for gas exchange.

## Promesonotal suture

The transverse suture on the dorsum of the mesosoma that separates pronotum from mesonotum. In some ant genera, the promesonotal suture might be weakly impressed or not exist.

## Propodeum

Sometimes referred to as the epinotum. The dorsal posterior plate of the mesosoma. Morphologically, it is the tergite of the first abdominal segment (the sternite has been lost during the Apocrita evolution) fused to the thorax. It may have specializations, such as spines, teeth, or lobes.

## Pygidium

The tergite of the last visible abdominal segment.

## Spine

A pointed and unjointed extension on the cuticle.

## Sting

The sting is located at the tip of the gaster. It can be used to inject toxin, and as a defense against predators or prey.



## Sternite

The lower (ventral) sclerite of abdominal segment.

## Subpetiolar process

The anteroventral cuticular projection on the lower surface of petiole.

## Tergite

The dorsal (upper) sclerite of abdominal segment.



### **Tibial spur**

A socketed spur located on the apex of tibia, often paired and either simple or pectinate. The fore legs have a single pectinate tibial spur, modified into an antennal cleaner (strigil). The middle and hind legs may have two, one, or no tibial spur.

### **Waist**

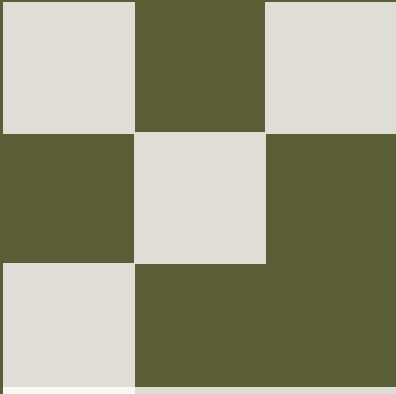
The portion of the body that connects mesosoma to the gaster. Species in the subfamilies Dolichoderinae, Formicinae and Ponerinae have only one waist segment (petiole). Other ant subfamilies, such as the Myrmicinae and the Pseudomyrmecinae, have two waist segments (petiole and postpetiole).



*Cataulacus horridus*

Foto: Kamil Stajnak (2021)





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## AUTHORS' BIOGRAPHY

**RIZKY NAZARRETA** is a postgraduate entomologist at IPB University Bogor, Indonesia. She began her bachelor's education in the Department of Plant Protection, Faculty of Agriculture, IPB University, in 2008, and finished her master's degree in 2017 in the same department. Her research interests are insect diversity, taxonomy, ecology, and myrmecology. R. Nazarreta is involved in the EFForTS project as a research assistant since 2014, and has visited the University of Göttingen, Germany, through EFForTS internships in 2014, 2015 and 2018.

E-mail: rizky.nazarreta@yahoo.com





**DAMAYANTI BUCHORI** is a lecturer at the Department of Plant Protection, IPB University, Bogor, Indonesia. She is also Head of the Biological Control Laboratory at the Department of Plant Protection and Head of Center for Transdisciplinary and Sustainability Sciences (CTSS) at IPB University. D. Buchori began her bachelor's education in the Department of Pest and Plant Diseases, IPB University, Indonesia, in 1984 and received her master's degree from the Entomology Department, University of Illinois, USA in 1989. In 1993, she received her PhD from the Biology Department, Indiana University, USA. She holds a Professor of Entomology and Plant Pests since 2014. Her research interest lies in the interphase of conservation-agricultural issues with special focus on insect diversity and land use change, biological control, pollination ecology, and sustainability sciences. She is also active in work related to science-based policies.

E-mail: [damayanti@apps.ipb.ac.id](mailto:damayanti@apps.ipb.ac.id)

**YOSHIAKI HASHIMOTO** is an Associate Professor at the Institute of Natural and Environmental Sciences, University of Hyogo and Chief curator in Entomology at the Museum of Nature and Human Activities, Hyogo, Japan. He received his PhD from Kobe University, Japan, in 1991, and has been studying the biodiversity of ants in tropical forests of Southeast Asia ever since. From 2002 to 2007, Y. Hashimoto trained scientific staff of the Institute for Tropical Biology and Conservation, University Malaysia Sabah, in general ecology and taxonomy, as part of the Program for Bornean Biodiversity and Ecosystems Conservation of the Japanese International Cooperation Agency. Recently, the Ministry of Environment, Japan, has placed Y. Hashimoto in charge of control studies of alien ants in Japan, especially the Red Imported Fire Ant *Solenopsis invicta*.

E-mail: [yoshiaki@hitohaku.jp](mailto:yoshiaki@hitohaku.jp)





**PURNAMA HIDAYAT** is a lecturer at the Division of Entomology, Department of Plant Protection, IPB University, Indonesia. He is also the Head of Insect Teaching and Research Collection in the department. P. Hidayat received his Bachelor degree from the Department of Plant Protection, IPB University, Indonesia, in 1985. In 1992, he was awarded his master's degree at the Department of Entomology, University of Wisconsin, Madison, USA, where he also earned his Doctorate degree in 1996. P. Hidayat's research interests are insect biodiversity and taxonomy, especially insects relevant to agriculture. He is also interested in integrated management of agricultural pests.

E-mail: [phidayat@apps.ipb.ac.id](mailto:phidayat@apps.ipb.ac.id)



**STEFAN SCHEU** is Professor of Animal Ecology and Head of the Animal Ecology Group, JFB-Institute for Zoology and Anthropology, University of Göttingen, Germany. He earned his Diploma in Biology in 1986 and his PhD in 1989 both at the University of Göttingen. He then continued as Postdoc at the JFB-Institute for Zoology and Anthropology, University of Göttingen and at the University of Calgary, Canada. In 1997 he was appointed as Professor of Zoology and Ecology at Darmstadt University of Technology, Germany. Since 2008, he holds the Chair in Animal Ecology at the University of Göttingen. He is interested in the diversity, ecology and evolution of soil animals, decomposer communities, rhizosphere ecology, and food web ecology.

E-mail: [sscheu@gwdg.de](mailto:sscheu@gwdg.de)

**JOCHEN DRESCHER** is a postdoctoral researcher at the Department of Animal Ecology, University of Göttingen, Germany. He started his studies at the RWTH Aachen, Germany, in 1999, and received his Diploma in Biology from the Department of Animal Ecology and Tropical Biology, Würzburg University, Germany, in 2006. He completed his PhD at the same department in 2011 after extensive field studies on the Yellow Crazy Ant *Anoplolepis gracilipes* in Borneo. After an interim position at the Department of Animal Ecology I, Bayreuth University, Germany, he joined the EFForTS project at the University of Göttingen in 2012. J. Drescher is interested in canopy arthropods in general, and all myrmecological matters in particular.

E-mail: [jdresch@gwdg.de](mailto:jdresch@gwdg.de)





# A GUIDE TO THE ANTS OF JAMBI (SUMATRA, INDONESIA)

Identification Key to Ant Genera and Images  
of the EFForTS collection

Rizky Nazarreta<sup>1</sup>, Damayanti Buchori<sup>1</sup>,  
Yoshiaki Hashimoto<sup>2</sup>, Purnama Hidayat<sup>1</sup>, Stefan Scheu<sup>3</sup>, Jochen Drescher<sup>3</sup>

<sup>1</sup>Department of Plant Protection,  
IPB University, Jalan Kamper Kampus IPB Darmaga, Bogor 16680, Indonesia

<sup>2</sup>Institute of Natural and Environmental Science,  
University of Hyogo/Museum of Nature and Human Activities, Hyogo,  
Yayoigaoka 6, Sanda Hyogo, Japan

<sup>3</sup>Animal Ecology, University of Göttingen, J.-F.-Blumenbach-Institute for  
Zoology and Anthropology, Untere Karspüle 2, 37073 Göttingen, Germany

## Correspondence:

jochen.drescher@biologie.uni-goettingen.de. ORCID ID: 0000-0002-5162-9779

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## Contributions

33 images of ant species traits were added to Hashimoto's *Identification guide to the ant genera of Borneo* (Hashimoto, 2003) by Riko Fardiansah. Unless otherwise stated, all ant images were taken by Rizky Nazarreta, Jochen Drescher, Leonie Schardt, Katherine Angulo Schipper, and Jan Wohler. Ant sorting by Rizky Nazarreta, Herry Marta Saputra and Jan Wohler. Taxonomic checking for selected groups by Doug Booher, Dmitry Dubovikoff, Brian Fisher, Shingo Hosoichi, Weeyawat Jaitrong, Petr Klimes, Dirk Mezger, Wendy Wang, Phil S. Ward, and Seiki Yamane, coordinated by Jochen Drescher. The glossary is based on Barry Bolton's *Identification Guide to the Ant Genera of the World* (Bolton, 1994). Ant images on pages iv, v, viii, ix, x, xi, xii, xiii, xiv, xv, xvi, xvii, 32, 48, 161, 168 and 176 were provided by Kamil Stajnak (<https://ant-photo.eu/en>).









# A GUIDE TO THE ANTS OF JAMBI (SUMATRA, INDONESIA)

## Identification Key to Ant Genera and Images of the EFForTS collection

Ants are tiny creatures that are often overlooked in our everyday lives. Yet, there are more than 15.000 species of ants on Earth, and their total biomass is higher than that of all humans combined. They invented agriculture more than 50 million years ago, turn more soil than earthworms, can lift 5,000 times their body weight, and can form supercolonies that span across continents. With the third largest tropical forest in the world, Indonesia is home to thousands of ant species, many of them unknown to science. This book documents more than 300 ant species that were found in rainforests and agroforestry of Jambi Province, Sumatra, and includes a recently updated Identification Key to the ant genera of Southeast Asia.

Studying this book will bring you closer to our planet's fascinating diversity, and the little things that run our world. This book will be a great starting point for those who want to know more about the ants of Southeast Asia, as well as a valuable resource for scientists and students studying ants this part of the world. All in all, this book is a compendium of the ants of Jambi, Sumatra, and embodies a starting point for further ant research in Indonesia.



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