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THE ANTS OF PUERTO RICO

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For approximately one year, from July 1935 to early June 1936, the writer was stationed in Puerto Rico in connection with investigations of insect pests of Puerto Rico conducted with special funds available to the Bureau of Entomology and Plant Quarantine. His particular assignment was to investigate insects attacking coffee, especially with reference to the relationship between ants and certain mealybugs and scale insects attacking coffee. In connection with the ant phase of the coffee insect problem in Puerto Rico, opportunity was given for travel over the island and, incidental to these investigations relating to coffee insects, the writer made a rather extensive collection of the ants that are found in Puerto Rico and observations concerning their occurrence. The first series of specimens of each species is deposited in the collection of the U. S. National Museum, and duplicates will be deposited in other collections.

Very little was known about the ant fauna of Puerto Rico until March 1908. During that month, Dr. W. M. Wheeler of Harvard University visited the island and made a collection and study of the ants. Although collections were made on the main island and several of the smaller, adjacent islands, no visits were made to Vieques or to the rich tropical forest of the highest mountain on the island, El Yunque. The thoroughness of Wheeler's work and the accuracy of his observations are more apparent perhaps to one like myself who has attempted to study the ants in the same localities studied by Wheeler 28 years ago. My collections and studies for the most part have been made on the western end of the island, principally in the región centering around Mayagüez where the rainfall is ap-

proximately 80 to 100 inches each year and altitudes range from sea level to about 3,000 feet (one of the peaks in the Maricao Insular Forest). I did not visit any of the smaller islands nor have I collected on El Yunque. At first thought it might appear foolish for one to collect and study ants in a region that has already been rather adequately covered. However, I spent one year on the island, whereas Wheeler had only a few weeks in which to make his observations. As a result of my longer stay on the island I was able to collect more information on the distribution, biology, and economic importance of the ants than was permitted Wheeler.

As Wheeler has previously and aptly stated, one would not expect to find as many ants on an island as on a continental area of similar size; furthermore, with an island so densely populated as Puerto Rico (465 inhabitants to the square mile) and practically all of the land in cultivation, few areas of virgin forest are left and these only on the highest mountains. My collecting in the Maricao Insular Forest, however, around altitudes of 3,000 feet has been rather disappointing. Here I found only about ten species and these included only one new form although I have searched this area for ants at least a half dozen times.

The ants that are most apt to attract the casual observer's attention in Puerto Rico are such species as the "hormiga brava", *Solenopsis geminata* Fabr.; the "hormiga loca", *Prenolepis longicornis* Latr.; the "albaricoque", *Tapinoma melanocephalum* Fabr.; and *Pheidole fallax jelskii* var. *antillensis* Forel. The habits of these ants are discussed rather fully elsewhere in this article, so the species need not be considered further here.

In 1908 Wheeler listed 51 species of ants for the island, if we omit *Neoponera villosa* Fabr., which I feel quite positive does not occur in Puerto Rico. Wolcott, in listing the ants of the Island in his *Insectae Portoricensis* (1923), records 55 species. I have failed, however, to include in this article 3 of the species mentioned by Wolcott, namely, *Pseudomyrma flavidula* var. *delicatula* Forel, *Monomorium minutum* Mayr, and *Camponotus cuneiscapus* Emery, there being some doubt in my mind that two of these species, at least, occur in Puerto Rico. Even with these exceptions the article includes 66 species. Of

this number 20 species (or 30.3 percent) have been described from Puerto Rico. The species referred to are as follows:

1. *Cerapachys (S.) seini* Mann
2. *Odontomachus haematoda* var. *notata* Mann
3. *Cardiocondyla venustula* Whlr.
4. *Solenopsis globularia* var. *borinquenensis* Whlr.
5. *Solenopsis globularia* var. *desecheoensis* Mann
6. *Solenopsis azteca* var. *pallida* Whlr.
7. *Pheidole subarmata* var. *borinquenensis* Whlr.
8. *Pheidole moerens* Whlr.
9. *Macromischa isabellae* Whlr.
10. *Macromischa isabellae mutica* subsp. nov.
11. *Macromischa albispina* Whlr.
12. *Macromischa albispina* subsp. *pallipes* Mann
13. *Strumigenys louisianae* var. *obscuriventris* Whlr.
14. *Myrmicocrypta brittoni* Whlr.
15. *Mycocepurus smithi* var. *borinquenensis* Whlr.
16. *Iridomyrmex melleus* Whlr.
17. *Iridomyrmex melleus* var. *fuscescens* Whlr.
19. *Myrmelachista ramulorum* Whlr.
19. *Myrmelachista ramulorum* subsp. *fortior* Whlr.
20. *Prenolepis (Nylanderia) microps* sp. nov.

Eight species (or 12.1 percent) are introduced forms. These are:

1. *Monomorium pharaonis* Linn. "Pharaoh's ant"
2. *Monomorium destructor* Jerdon
3. *Monomorium floricola* Jerdon
4. *Pheidole megacephala* Fabr.
5. *Tetramorium guineense* Fabr.
6. *Tetramorium simillimum* Nyl.
7. *Prenolepis (Nylanderia) longicornis* Latr., "crazy ant"
8. *Tapinoma melanocephalum* Fabr., "albaricoque"

The rarest ant that has been found on the Island is *Cerapachys seini*, a species representing one of the most primitive of the subfamilies of ants and not known from any other island of the West Indies than Puerto Rico. The absence of any of the

species of the subfamily *Dorylinae* is also worth remarking about. These ants are apparently very rare in the West Indies, having been collected to date only from the Islands nearest South America, namely, St. Vincent, Grenada, and Trinidad. A number of genera in Puerto Rico have only one or so species in them, such genera being *Crematogaster*, *Pseudomyrma*, *Camponotus*, *Tapinoma*, *Iridomyrmex*, etc. Some of the tropical genera like *Cryptocerus*, *Dolichoderus*, *Azteca*, and *Eciton* are devoid of any representatives at all.

In preparing this article I have drawn freely on Wheeler's bulletin, "The Ants of Puerto Rico and the Virgin Islands", and the list of ants in Wolcott's "Insectae Portoricensis". In addition to this, various colleagues have very kindly turned over to me their records which pertain to the distribution or habits of the ants as well as their associations with other economic insects. To conserve space in the following article the names of these are given by initials. The men referred to are as follows: George N. Wolcott, Francisco Sein, Jr., W. M. Wheeler, W. M. Mann, F. E. Lutz, D. L. Van Dine, H. L. Dozier, A. H. Madden, J. W. Balock, T. H. Jones, F. M. Wadley, L. C. Fife, J. D. Moore, R. H. Van Zwaluwenberg, H. K. Plank, José Sepulveda, and the writer.

KEY TO THE SUBFAMILIES

(for the identification of workers)

- | | | | |
|----|--|--|---|
| 1. | Cloacal orifice round, terminal, surrounded by a fringe of hairs ----- | <i>Formicinae</i> | 2 |
| | Cloacal orifice ventral, slit-shaped ----- | | |
| 2. | Petiole 1 - segmented ----- | | 3 |
| | Petiole 2-segmented ----- | | 4 |
| 3. | No definite constriction between the first and second gastric segments; body soft and flexible; anal glands present which often produce a very characteristic odor ----- | <i>Dolichoderinae</i> | |
| | A definite constriction between the first and second gastric segments; body wall firm ----- | <i>Ponerinae</i> and
<i>Cerapachyinae</i> | |
| 4. | Clypeus not prolonged back between the frontal carinae; median spurs of middle and hind legs pectinate; eyes excessively large; elongate, rather slender ants ----- | <i>Pseudomyrminae</i> | |
| | Clypeus almost always prolonged back between the frontal carinae, if not, then the spurs of the middle and hind tibiae are simple or absent. . . | <i>Myrmicinae</i> | |

SUBFAMILY CERAPACHYINAE

1. *Cerapachys* (S) *seini* Mann

Jour. Wash. Acad. Sci., Vol. 21, pp. 440-441, 1931. *Worker*
Río Piedras (F. S.)

This rare ant was found by Francisco Sein in a sugar cane field at Río Piedras, where Mr. Sein observed the larvae of the ant feeding on the larva of the sugar cane root caterpillar, *Perforadix sacchari* Sein. No other species of this rare genus has been found in any of the West Indian Islands, which thus makes the record a very unique one. It is presumed that this ant may have been imported into Puerto Rico through sugar cane introductions.

The worker of this species can be partly distinguished by its 9-segmented antenna and the lateral carina on each side which separates it from the cheek. The antennal insertions are exposed, and the frontal carinae are distinct from each other.

KEY TO THE SPECIES OF THE SUBFAMILY PONERINAE

(for the identification of workers)

1. Mandibles linear, inserted close together at the middle of the oral border; petiole terminating in a spine or point above ----- 2
Mandibles inserted at the corners of the head; petiole rounded or flattened above ----- 6
2. No oblique swellings starting from the eyes to border the antennal fossae; the latter not confluent ---- 3
On each side of the face an oblique swelling extending out from the eye and bordering the antennal fossae ----- 4
3. Mandibles short, broadened in their distal part and narrowed just before the preapical tooth -----
Anochetus (A.) *mayri* Emery
Mandibles long, not broadened in their distal part, denticulate along the entire inner margin -----
Anochetus (S.) *emarginatus* subsp. *testaceus* Forel
4. Body deep black throughout; large and robust ants --
Odontomachus haematoda Linn.
5. Body of variable color ----- 5
Dorsal surface of the epinotum, the petiole, and the femora brownish-red; large and robust ants -----
Odontomachus haematoda var. *notata* Mann
Head paler; petiole with a shorter and less acuminate spine; size smaller --- *Odontomachus haematoda* var. *ruginodis* Whlr.

6. Insertions of the antennae remote; clypeus flat; claws pectinate ----- *Platythyrea punctata* F. Smith 7
 Insertions of the antennae approximated; claws simple
7. Middle and hind tibiae with two spurs each -----
Euponera (T.) stigma Fabr. 8
 Middle and hind tibiae with a single spur each -----
8. Body very glabrous ----- *Ponera ergatandria* Forel 9
 Body opaque or subopaque -----
9. Head with numerous punctures which give the general surface a subopaque effect ----- 10
 Head with fewer punctures which give the general surface a more glabrous appearance -- *Ponera trigona* var. *opacior* Forel
10. Petiole viewed from the side distinctly rectangular shaped, almost as wide dorsally as ventrally -----
Ponera opaciceps Mayr
 Petiole viewed from the side very distinctly narrower dorsally than ventrally ----- *Ponera opaciceps* var. *jamaicensis* Aguayo

SUBFAMILY PONERINAE

2. *Platythyrea punctata* F. Smith.

Cat. Hymen. Brit. Mus., Vol. 6, p. 108, 1858. *Worker, Male*
 Between Arecibo and Utuado (W. M. W.); Mayagüez (M. R. S.)

This ant, which is common throughout the West Indies, seems to prefer to nest in well-shaded locations. I have found it nesting in stumps and logs in colonies of only a hundred or two hundred individuals. The highly predacious workers forage singly on the ground or even up the trunks of trees. When alarmed they run with considerable speed.

The worker, although black, has such a dense coat of pubescence on its body that the latter imparts a pruinose or metallic effect. As the name indicates, the body is covered with numerous and conspicuous punctures.

3. *Euponera (T.) stigma* Fabr.

Syst. Piez., p. 400, 1804. *Queen*
 Culebra (W. M. W.); Utuado (W. M. W.); Mayagüez, Maricao Insular Forest (M. R. S.)

This species nests by preference in well-rotted stumps and logs, or in the soil beneath stones in shaded areas. These ants

seem to like abundant moisture and are most often found near the bases of stumps. The colonies comprise only a few hundred individuals. Cocoons are light yellowish or sulphur colored. Specimens have been taken at altitudes as high as 3,500 feet. Workers, although predacious, are not commonly seen foraging openly in the woods like some of the *Odontomachus* and other ants. The workers are also slower of movement than some of the other Ponerine ants. On October 1 and November 20 both winged males and winged females were noted in a nest. The former are exceedingly active.

The worker is very deep brown or blackish with lighter appendages. The meso- and metapleuræ are longitudinally straited, and the epinotum is laterally compressed.

4. *Ponera ergatandria* Forel.

Trans. Ent. Soc. London, p. 365, 1893. *All castes.*

Utua do (W. M. W.); Guayama, Sabana Grande, Lajas (H. L. D.); Ensenada, Mayagüez (M. R. S.)

This species appears capable of living in both very arid and moist habitats. I have found colonies nesting in the soil and in decaying logs and stumps, and Dozier has collected workers from cow dung on numerous occasions. Like the Ponerine ants previously mentioned, the workers are predacious and the colonies small. As the specific name indicates, this species has males in which both worker and male characters occur in the same individual.

P. ergatandria seems to be a common species in the islands of the West Indies.

The worker is characterized by its very short antennal scapes, which lack considerably of reaching the posterior border of the head, its small size (2.5-2.7 mm.), its glabrous appearance, and peculiarly shaped petiole.

5. *Ponera opaciceps* Mayr.

Verh. Zool. Bot. Ges. Wien., Vol. 7, p. 536, 1887. *Worker, Male.*

Culebra (W. M. W.); Utua do, Monte Morales, Monte Man-

dios, and Coamo Springs (W. M. W.); Sabana Grande, Lajas (H. L. D.); Mayagüez, Ensenada (M. R. S.)

This is probably the commonest species of *Ponera* in Puerto Rico. Its habits are similar to those of the preceding species. Specimens have also been collected from beneath cow dung at frequent intervals.

The worker, which is from 3 to 3.2 mm. in length, is black with light brown appendages; its head is opaque, and the petiole when viewed from the side is rectangular shaped, that is, not shorter dorsally than ventrally.

6. *Ponera opaciceps* var. *jamaicensis* Aguayo.

Bull. Bklyn. Ent. Soc., Vol. 27, pp. 216-217, 1932. *Worker* Ensenada (H. L. D.); 18 kilometers north of Yauco (M. R. S.)

I have referred to this variety a number of specimens collected in the above-mentioned localities. These differ from typical specimens of *opaciceps* in the following characters: (1) shorter antennal scape, (2) narrower petiolar border, (3) more glabrous body surface, etc. Workers have been collected from the same type of habitats and under the same conditions as those of the species.

7. *Ponera trigona* var. *opacior* Forel

Trans. Ent. Soc. Lond., Pt. A, pp. 363-364, 1893. *Worker, Queen.*

14 kilometers east of Mayagüez (M. R. S.)

This species has habits similar to those of *opaciceps* and *ergatandria*. The ants are recorded from Cuba, Jamaica, and the Dominican Republic in the West Indies.

The worker of *opacior* can be distinguished from the worker of *opaciceps* by the shape of its petiole and the sculpturing of the head, and from the worker of *ergatandria* it is distinguished by its longer antennal scapes, less glabrous body, and rounder epinotal declivity.

8. *Anochetus mayri* Emery

Ann. Mus. Civ. Genova, Vol. 21, p. 378, 1884. *Worker*

Utuaado, Vega Baja, Monte Morales, Monte Mandios, Coamo Springs, San Juan, Adjuntas, Arecibo (W. M. W.); Mayagüez, Maricao, Arecibo, Maricao Insular Forest (M. R. S.)

This ant seems to be the most common species of the genus in the West Indies. Colonies are exceedingly small, comprising only a few individuals. Although the ants seems to nest by preference in shaded areas, I have also found them colonized in the open. Their colonies may be found either in the soil or in the decaying wood of stumps and logs. The workers, which are slow of movement, forage singly. Cocoons are light yellowish, with a black spot at one end. Several winged queens were noted in a nest on August 10.

The characters given in the key to the species clearly distinguish this species from the following one.

9. *Anochetus emarginatus* subsp. *testaceus* Forel.

Trans. Ent. Soc. Lond., p. 356, 1893. *Worker, Male*
Culebra (W. M. W.)

I have not encountered this ant on the western end of the Island of Puerto Rico where I have done most of my collecting. This species may occur, however, on the eastern end of the Island.

Wheeler states that he found "several colonies nesting under stones in the shade of trees along the dry arroyos on the higher part of the Island of Culebra." He also states that the colonies are small, numbering only from about thirty to a hundred individuals.

10. *Odontomachus haematoda* Linn.

Syst. Natur., Ed. Vol. 10, p. 582, 1758 *Worker*

Arecibo, Utuaado, Monte Morales, Monte Mandios, Adjuntas, Vega Baja, Aibonito, Coamo Springs (W. M. W.); San Germán, Mayagüez, 10 kilometers northwest of Ponce, 18 kilometers north of Yauco (M. R. S.)

This species nests by preference in shaded areas. It is very common in the coffee groves of the hills and mountains. Colonies may be found in the soil or in the well-rotted wood of

logs and stumps. Most of the nests appear to contain several hundred individuals. The workers have foraging habits similar to the species mentioned above. A large number of winged queens were found in a nest on March 20 and males on April 5. The workers can leap several inches by closing their widely opened mandibles suddenly, thus making a clicking sound in doing so. Their sting, although slightly painful, does not last long.

The typical worker of this species is large and robust, and of a deep blackish color, with slightly lighter appendages.

11. *Odontomachus haematoda* var. *notata* Mann.
Bull. Amer. Mus. Nat. Hist., Vol. 42, p. 404, 1920. *Worker*
Monte Mandios (W. M. W.)

I have not encountered any specimens which I could positively refer to this variety. This form is only a color variation of the species and was collected by Wheeler from a high peak.

The characters given in the key to the species will serve to distinguish this ant from the typical *haematoda*.

12. *Odontomachus haematoda* var. *ruginodis* Whlr.
Bull. Amer. Mus. Nat. Hist., Vol. 21, p. 82, 1905. *Worker,*

Queen

Utuado, Adjuntas, Coamo Springs (W. M. W.); Guánica (D. L. Van D.); Rio Piedras (G. N. W.); Vieques Island (collector?)

This variety is not as common as *haematoda*. The ants differs from the latter by preferring for nesting sites open, sunny areas, especially river bottoms.

Characters given in the key will aid in distinguishing this species.

SUBFAMILY PSEUDOMYRMINAE

13. *Pseudomyrma flavidula* F. Smith.

Catalog. Hymen. Brit. Mus., Vol. 6, p. 157, 1858. *Worker*
Tallaboa (W. M. W.); Lajas (H. L. D.); Las Marías, Mayagüez,, and Mani Beach, 4 miles north of Mayagüez (M. R. S.)

This species usually nests in the branches and twigs of trees, the stems of plants, or occasionally in crevices beneath

bark. Colonies are not large, consisting of only a few dozen to several hundred individuals. The workers diligently run over plants in search of honey-dew excreting insects. They have been commonly noted attending the green and hemispherical scales on coffee. Undoubtedly the ants are also highly predacious.

The worker of this species can be recognized by its narrow, elongate body, exceedingly large eyes, general yellow color, and on the gaster the presence of a pair of prominent black spots near the base.

KEY TO THE SPECIES OF THE SUBFAMILY MYRMICINAE

(for the identification of workers and soldiers)

- | | | |
|----|--|---|
| 1. | Antennae 4-6 segmented ----- | 2 |
| | Antennae with more than 6 segments ----- | 6 |
| 2. | Antennae with 4 segments ----- <i>Epitritus emmae</i>
Emery | |
| | Antennae with 6 segments ----- | 3 |
| 3. | Mandibles long and slender, close together at their in-
sertions, with only two borders, an internal and
an external, usually parallel or subparallel and
overlapped by the clypeus only at their bases----- | 4 |
| | Mandibles shorter, some distance apart at their in-
sertions, with three borders, i. e., with the inter-
nal border differentiated into a basal and a more
apical (masticatory) border, and overlapped for a
considerable distance by the anterior border of the
clypeus ----- <i>Strumigenys membranifera</i>
subsp. <i>simillima</i> Emery | |
| 4. | Inner borders of mandibles without teeth but with a
series of minute denticles --- <i>Strumigenys eggersi</i>
Emery | |
| | Inner borders of mandibles with teeth----- | 5 |
| 5. | Inner border of mandibles with a single subapical
tooth ----- <i>Strumigenys louisianae</i> var.
<i>obscuriventris</i> Whlr. | |
| | Inner border of mandibles with two long, and approx-
imated teeth near the apex----- <i>Strumigenys</i>
<i>rogeri</i> Emery | |
| 6. | Postpetiole articulated to the dorsal surface of the
gaster, which is flattened dorsally, more convex
ventrally and acutely pointed----- <i>Crematogaster</i>
<i>steinheili</i> Forel | |
| | Not as above ----- | 7 |
| 7. | Workers strongly dimorphic, that is, without inter-
mediates connecting the extreme forms; antennal | |

- club 3-segmented ----- 8
- Workers monomorphic; or else polymorphic, that is,
with mediae intermediate between the major and
minor forms ----- 13
8. Head very strikingly elongate and with subparallel
sides; all parts of body except appendages smooth
and shining ----- *Pheidole subarmata* var.
borinquenensis Whlr. 9
- Not as above ----- 9
9. Clypeus carinate, also transversely rugulose -----
Pheidole fallax jelskii var. *antillensis* Forel 10
- Not as above ----- 10
10. Entire head sculptured, opaque, except the region im-
mediately surrounding the occipital foramen,
which is smooth and shining ----- *Pheidole*
flavens subsp. *sculptior* Forel 11
- Only anterior three-fourths of the head sculptured,
and opaque ----- 11
11. Antennal scrobe of the head well defined and with a
distinct lateral carina ----- *Pheidole flavens*
subsp. *exigua* Mayr. 12
- Not as above ----- 12
12. Anterior border of gula with two distinct teeth -----
Pheidole moerens Whlr. 14
- Anterior border of gula without teeth ----- *Pheidole*
megacephala Fabr. 19
13. Antennae with 10 segments, the last two segments
forming a distinct club ----- 14
- Antennae with more than 10 segments ----- 19
14. Workers polymorphic, i. e., with major, intermediate,
and minor forms ----- *Solenopsis geminata* Fabr. 15
- Workers monomorphic ----- 15
15. Postpetiole exceedingly large; transversely elliptical
in shape and distinctly broader than long ----- 16
- Not as above ----- 17
16. Body jet black, with lighter appendages ----- *Solenopsis*
globularia var. *desecheoensis* Mann. 18
- Only the posterior portion of the head, the pronotum,
and the whole, or nearly the whole of the first
gastric segment dark brown, in some specimens
almost black ----- *Solenopsis globularia* var.
borinquenensis Whlr. 18
17. Entire body black and shining ----- *Solenopsis picea* Emery 18
- Not as above ----- 18
18. Clypeal border without teeth; body yellow excepting
the posterior portion of the head and the first gas-
tric segment which are slightly infuscated -----
Solenopsis azteca var. *pallida* Whlr.

- Clypeal border with teeth; color arrangement not as above ----- *Solenopsis corticalis* Forel
19. Epinotum unarmed ----- 20
Epinotum armed ----- 24
20. Hairs of the body appressed, scale-like; antennal foveae prolonged to the corners of the head -----
Cyphomyrmex rimosus subsp. *minutus* Mayr. 21
Not as above ----- 21
21. Workers polymorphic; head, though shining, with well scattered, prominent punctures -----
Monomorium destructor Jerdon 22
Workers monomorphic ----- 22
22. Body uniformly deep brownish black to jet black ---
Monomorium carbonarium subsp. *ebeninum* Forel 23
Body of a different coloration ----- 23
23. Only the head and gaster dark brown or blackish ----
Monomorium floricola Jerdon
Entire body yellow, excepting for a slight infuscation at the base of the gaster ----- *Monomorium pharaonis* Linn.
24. Body with spines or tubercles ----- 25
Body without spines or tubercles ----- 26
25. Frontal carinae very close to each other, and dilated at the anterior extremity; clypeus not distinctly prolonged back between them ---- *Myrmicocrypta brittoni* Whlr.
Frontal carinae separated, embracing the posterior extremity of the clypeus ----- *Trachymyrmex jamaicensis* André
26. Clypeus armed with only two longitudinal ridges ----
Rogeria curvipubens Emery
Clypeus not as above ----- 27
27. Antennal scrobes bordered below by a carina of the cheek ----- *Wasmannia auropunctata* Roger
Antennal scrobes not bordered below by a carina of the cheeks ----- 28
28. Posterior margin of the clypeus elevated in the form of a welt or ridge bordering the antennal fossa in front ----- 29
Not as above ----- 31
29. Body black ----- *Tetramorium lucayanum* Whlr.
Body not black ----- 30
30. Head, thorax, petiole and postpetiole coarsely rugose-reticulate; hairs on thorax simple -----
Tetramorium guineense Fabr.
Sculpture finer; hairs on thorax short and clavate ---
Tetramorium simillimum F. Smith

31. Antennae 11-segmented, frontal carinae close to each other and dilated at the anterior extremity-----
Mycocepurus smithi var. *borinquenensis* Whlr.
 Antennae 12 segmented; frontal carinae neither closely approximated nor dilated anteriorly -----
32. Middle and hind tibiae without spurs; petiole with long cylindrical peduncle and a broad oval node; post-petiole unusually large; body hairs simple----- 33
 Not presenting all the above characters; either the spurs present, or the body hairs clavate ----- 34
33. Size 2.2 to 2.5 mm.; head black----- *Cardiocondyla venustula* Whlr.
 Size smaller; head light reddish brown; antennal scapes infuscated toward the tips. *Cardiocondyla emeryi* Forel
34. General body color blue-black -----
 Only the head, coxae, femora, and gaster blue-black--
35. Legs only slightly darker (fuscous) than the remainder of the body; size 2 to 2.5 mm.--- *Macromischa albispina* Whlr.
 Legs much paler (yellowish white); size 1.5 mm.-----
Macromischa albispina subsp. *pallipes* Mann
36. Epinotum spined ----- *Macromischa isabellae* Whlr.
 Epinotum unarmed ----- *Macromischa isabellae mutica* subsp. nov.

SUBFAMILY MYRMICINAE

14. *Monomorium carbonarium* subsp. *ebeninum* Forel.

Mitth. Munch. Entom. Ver., Vol. 5, p. 8, 1881. *Worker*
 Culebra (W. M. W.); Santurce, Utuado, Coamo Springs, Aibonito, Adjuntas, Arecibo, Vega Baja (W. M. W.); Guánica, San Sebastián (G. N. W.); Mayaguez, Lares, Las Marías (M. R. S.)

This is one of the most common ants of the West Indies. It occupies the same status in these Islands that *M. minimum* Buckley does in the United States. It forms populous colonies, which are characterized by having many reproductive queens to a colony. Their great adaptability is indicated by the fact that the species nests in both soil and wood, back of the leaf sheaths or corn and bananas, in cabbage heads, Tillandsias, and in the fruits of *Hibiscus sabdariffa*. The workers are exceedingly fond of honeydew. They have been noted attending such insects as *Saissetia hemispherica* Targ., *Coccus viridis* Green, the aphid *Sipha flava* Forbes, etc. The ants are also highly predacious

Although they have not been observed infesting houses, there is little doubt that they would do so if given the opportunity.

The worker is easily recognized by its shining black or deep brownish color, 3-segmented antennal club, lack of epinotal spines, and cuboidal shaped epinotum.

15. *Monomorium destructor* Jerdon.

Madras Jour. Lit. and Sci., Vol. 17, p. 105, 1851. *Worker* Tallaboa (W. M. W.); Guayama, Sabana Grande, Ponce (H. L. D.); Mayaguez and Ensenada (M. R. S.)

The indications are that this species is an imported ant. Should an intensive search be made for it, the ants would probably be found in many of the seaport towns, if not elsewhere. At Mayagüez the species was found nesting in a bakery where the ants made numerous trails on the walls and floors, composed of enormous numbers of workers. Dealated queens have been seen moving along in the trails with the workers. The colonies of *destructor* must be composed of thousands of individuals if one is to judge from the number and size of their trails. Like *M. ebeninum*, they are polygynous. An inmate of the bakery said the ants were fond of sweets and meats, but did not seem to care for flour or lard. In a very dry and arid pasture at Ensenada the ants were found nesting in the soil at the base of trees and also in the soil under rocks. Workers have frequently been noted attending soft scales, psyllids, and other honeydew-excreting insects. They are also highly predacious.

Workers can be recognized by their yellowish color, their shining bodies, and by the fact that they are highly polymorphic.

16. *Monomorium floricola* Jerdon.

Madras Journ. Lit. and Sci., Vol. 17, p. 107, 1851. *Worker* Culebra (W. M. W.); Vega Baja, Coamo Springs, Tallaboa (W. M. W.); Lares, Peñuelas, Sabana Grande, San Germán, Humacao, Caguas (G. N. W.); Mayaguez, Ceiba Baja (M. R. S.)

This ant, unlike the two preceding species, seems to prefer wood for nesting purposes. Moderate-sized colonies have been noted in the twigs of trees, beneath the bark of trees, etc., and in Tillandsias. Like the other species of this genus *floricola* has many reproductive queens per colony. This species is also

noted for producing ergatoid females, that is, females which were apparently never meant to be winged. The workers are exceedingly fond of honeydew as well as organisms. I have commonly seen the ants attending the green and hemispherical scales on coffee. The workers of this species made themselves quite objectionable by stealing insects for food from our insectary.

The worker of *M. floricola* is quite easy to distinguish by its 3-segmented antennal club; lack of epinotal spines; dark head and gaster, with light-colored thorax; and its general glabrous appearance.

✓ 17. *Monomorium pharaonis* Linn.

Syst. Natur., Ed. 10, p. 580, 1758. *Worker*.

Culebra (W. M. W.); San Juan, Arecibo (W. M. W.); Mayagüez, (M. R. S.)

This imported species, which is rapidly becoming disseminated over the entire world, has not yet been recorded many times from the Islands of the West Indies. This may be due to lack of a sufficient search for it. The ant, which is commonly known as "Pharaoh's" ant, is highly adapted for living in urban areas, where its very populous colonies nest in the woodwork and masonry work of dwellings, stores, etc. Like other species of *Monomorium*, its colonies are polygynous. The ants are practically omnivorous in their feeding habits. In a country with as mild a climate as Puerto Rico this ant should be capable of living outdoors as well as inside dwellings.

The worker, which is of a pale yellowish color, is characterized by its lack of epinotal spines, presence of a 3-segmented antennal club, and punctate and subopaque appearing body. The gaster is distinctly infuscated near the base.

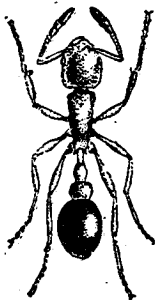


Fig. 1. *Cardiocondyla emeryi* Forel (After Wheeler.)

18. *Cardiocondyla emeryi* Forel

Mit. Munch. Entom. Ver., Vol. 5, p. 5, 1881. *Worker*

Vieques (Busck); Culebra (W. M. W.); San Juan, Santurce, Utuado, Adjuntas, Coamo Springs (W. M. W.); Sabana Grande, Lajas (H. L. D.); Tres Hermanos, Mani Beach, Mayagüez, Guánica, Ensenada (M. R. S.)

This is a very common species of ant in the West Indies, as numerous records indicate. It is also recorded from India, Palestine, Madagascar, Florida, etc. Due to the extremely small size of the worker and its habit of commonly foraging alone, the species is easily overlooked by the collector. Wheeler states that "the colonies of this ant are small and occur in sandy places, especially in river or creek bottoms and on sea beaches." While it is true that they are commonly found in such habitats the species in Puerto Rico is by no means confined to such areas, for I have found them nesting in clay soils considerably removed from stream beds. Their nest entrances are extremely small and may easily be overlooked. On a number of occasions workers have been collected from cow dung. Undoubtedly the ant is highly predacious, but it is also given to attending honeydew-excreting insects to some extent.

The worker is recognized by its distinctive coloration, all of the body being light reddish brown except the gaster and the antennal club. The worker differs from that of *C. venustula* in its more angular thoracic humeri, more slender petiole, difference in coloration, size, etc.

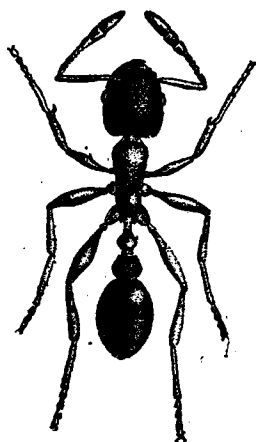


Fig. 2. *Cardiocondyla venustula* Wheeler. (After Wheeler.)

19. *Cardiocondyla venustula* Whlr.

Bull. Amer. Mus. Nat. Hist. Vol. 24, pp. 128-130, 1908.

Worker, Queen.

Culebra (W. M. W.); Coamo Springs (W. M. W.); Ponce, Guayama, Coamo (H. L. D.); Mayagüez (M. R. S.)

This species is apparently not so common as the preceding in Puerto Rico or in any of the other West Indian Islands.

Wheeler, who described *venustula* from Puerto Rican specimens in 1908, remarks that the ant "is not uncommon in sand and gravelly places, especially on the sea-beaches, where it lives in small colonies, comprising a single dealated queen and a few dozen workers, in shallow nests like those of some species of *Leptothorax*." He noted winged females on March 23.

Dozier collected workers on several occasions from dry cow dung in very arid pasture areas at both Ponce and Coamo. Nothing is known concerning the food of these ants but they are thought to be mainly predacious.

The worker of *venustula* may be distinguished from that of *C. emeryi* by its larger size (2.0-2.5 mm.), rounder thoracic humeri, broader petiole, and darker and more opaque appearance.

20. *Solenopsis azteca* var. *pallida* Whlr.

Bull. Amer. Mus. Nat. Hist., Vol. 24, p. 131, 1908. *Worker* Coamo Springs (W. M. W.); 14 kilometers east of Mayagüez (M. R. S.)

Wheeler found this ant nesting in the soil beneath a boulder in a dry stream bed. The specimens which I have referred to this species were quite common in stumps and logs in a coffee grove. They were usually found just beneath the bark. Winged queens were noted on December 13.

My specimens agree with Wheeler's brief characterization of the workers as having a yellowish body, with the vertex of the head and the first gastric segment slightly infuscated, and the presence of two well-developed clypeal carinae, but no teeth on the clypeal border.

21. *Solenopsis corticalis* Forel.

Mitth. Munch. Entom. Ver., Vol. 1, p. 13, 1881. *Worker, Queen.*

Utuaado (W. M. W.); 16 kilometers east of Mayagüez, Lajas (M. R. S.)

This species is recorded by Wheeler as having been found nesting in the stem of a bamboo. I have referred to *corticalis* specimens collected from clay soil at an altitude of 650 feet. Workers have also been noted attending the pineapple mealybug. The species is not recorded from any of the other West Indian Islands except St. Thomas.

Very little is known concerning the biology of the ant.

22. *Solenopsis picea* Emery.

Bull. Soc. Ent. Ital., Vol. 28, p. 1896. *Worker Queen.*

Utuaado (W. M. W.)

This ant is recorded only from Cuba and Puerto Rico. A single colony was found by Wheeler nesting under the bark of a rotting log.

As the name indicates, the worker is very dark, and glabrous, differing thus from the other monomorphic forms mentioned in this paper, with which it might be confused.

I have no information on the biology of the species.

23. *Solenopsis geminata* Fabr.Syst. Piez. No. 6, p. 423, 1804. *Worker*.

Culebra (W. M. W.); Arecibo, Adjuntas, San Juan, San
 turce, Vega Baja, Utuado, Monte Morales, Monte Mandios, Coable
 mo Springs, Ponce, Tallaboa (W. M. W.); Guánica, Lajas, Pon
 ce, Ensenada (H. L. D.); Mayagüez, Juana Díaz, Tres Herma
 nos, Maricao Insular Forest, etc. (M. R. S.)

The "hormiga brava" is not only one of the most common
 ants in Puerto Rico, but also of the entire West Indies. It is
 perhaps better known by the natives than any other ant. Their
 encounters with this vicious and aggressive ant have not only
 resulted in their respecting it but also in giving it the name
 "brave ant". I have seen colonies of this ant from sea level to
 altitude of approximately 3,000 feet. Although this ant pre
 to nest in open sunny places, its nests on some occasions are
 found in lightly shaded woods. The typical nest is a mound of
 loose earth with several entrances leading into it, but the ants
 may nest in the soil beneath cow dung or in other places. Their
 colonies are composed of thousands of individuals. Fertile
 dealated queens are capable of starting colonies unaided.

This is one of the most versatile ants known. The worke
 are noted for their predaciousness, as well as for their love
 seeds, the juices or sap of plants, and honeydew. To one w
 has lived in Puerto Rico it would seem that there are very few
 plant lice, soft scales, mealybugs, etc., that these ants do not
 attend. The fostering attitude shown by the worker toward
 the pineapple mealybug (*Pseudococcus brevipes* Cockll.) makes
 it a very serious problem in combating the latter insect. Th
 "hormiga brava" is without doubt the most important ant pes
 in the island for the following reasons: (1) its vicious stinging
 habit, (2) the stealing of small seeds from seed beds, (3) the
 attendance on and fostering care exhibited toward honey-dew
 excreting insects, (4) its habit of gnawing into plants, fruits,
 and trees. It is also presumed that the ants may gnaw holes in
 clothing, kill young poultry or birds as these emerge from the
 egg, and invade houses as does the fire ant (*Solenopsis xyloni*
 McC.) in the southern part of the United States.

Several specimens of a phorid fly, *Pseudaceton antiguense* Wfd., were captured around the nest of a colony of this ant at a locality 17 kilometers east of Mayagüez.

The worker of the fire ant is polymorphic, is highly variable in color, ranging from reddish brown to black, glabrous, possesses a 2-segmented antennal club, and has no epinotal spines.

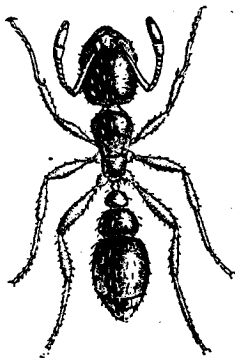


Fig. 3. *Solenopsis globularia* var. *borinquenensis* Whlr.
(After Wheeler.)

24. *Solenopsis globularia* var. *borinquenensis* Whlr.

Bull Amer. Mus. Nat. Hist., Vol. 24, p. 131, 1908. Worker Culebra (W. M. W.); El Morro at San Juan (W. M. W.)

Wheeler, who described this variety from specimens gathered at the above-named localities, states that it "nests in the white sand of the sea beaches just above the high water mark." Although I have collected ants on numerous occasions in such places, these specimens have apparently been too dark for me to refer them to *borinquenensis*, so I have assigned them to the following species instead.

This ant has been recorded from Santo Domingo as well as Haiti.

The worker is distinguished from that of the typical species in that the posterior portion of the head, the pronotum, and the whole or nearly the whole of the first gastric segment are dark brown, in some specimens almost black.

25. *Solenopsis globularia* var. *desecheoensis* Mann.

Bull. Amer. Mus. Nat. Hist., Vol. 42, p. 428, 1920. *Worker*
 Desecheo Island (W. M. W.); Ensenada, Lajas, Lake Guá-
 nica, Coamo (H. L. D.); Mayagüez (M. R. S.)

This species was described by Mann from specimens collected on Desecheo Island, with no remarks given as to their nesting habits or biology.

Many specimens have been taken by Dozier from cow dung in dry, arid cattle pastures at the above-named localities. I have also taken workers on several occasions along the sandy beach at Mayagüez, only 10 feet or so from the Caribbean Sea. These were thought to be nesting in the soil, but I was unable to locate their nests definitely. One would judge that their colonies are not very populous, comprising perhaps only a few hundred individuals. The ants are undoubtedly largely predacious. The workers crawl very slowly and usually forage singly.

Mann states that the worker of this variety differs from that of *globularia* in having a jet black body and (yellowish brown) appendages.

26. *Pheidole fallax jelskii* var. *antillensis* Forel.

Mitth. Munch. Ent. Ver., Vol. 1, p. 4, 1881. *Worker*.

Culebra (W. M. W.); Utuado, Monte Morales, Monte Mandios, El Morro at San Juan, Santurce, Coamo Springs, Vega Baja (W. M. W.); Tres Hermanos, Mayagüez, Hormigueros, Ensenada, Maricao Insular Forest, Juana Díaz (M. R. S.); Toa Baja, Yauco, Río Piedras (G. N. W.); Lajas, Sabana Grande, Ponce, Coamo, Humacao (H. L. D.)

This is not only one of the most common ants in Puerto Rico but also in the entire West Indies. I have seen colonies in Puerto Rico from sea level to approximately 3,000 feet altitude. The fairly populous colonies are usually found in open, sunny areas regardless of whether these be bare or grassy. The nest can be easily recognized by the peculiar elongate, slit-shaped entrance holes. The ants are so versatile that they even nest in the cracks of pavement, the crannies of masonry work, etc. The rather large, slender workers of this species can be observed bringing into the nest literally hundreds of insects and other

organisms. Their food is largely flesh, and so strongly does this predominate that the ants have a distinct fecal odor. Workers have been collected very frequently from dung, and it is believed that the ants live to a large extent on the insects that inhabit this material. I have noted the workers on several occasions attending the green and hemispherical scales, the aphid, *Pentalonia nigronervosa* Coquerel on bananas, etc., thus indicating that the diet of this ant is not entirely flesh. A. H. Madden found both workers and soldiers in the stomach of the Surinam toad, *Bufo marinus*.

On August 14 queen pupae were noted in a colony, and on December 18 winged males and winged queens.

The soldier of *Ph. antillensis* is easily distinguished from the soldiers of other Puerto Rican species of *Pheidole* by its large size and reddish-brown body. The head of the soldier is very coarsely rugulose-reticulate and subopaque.

27. *Pheidole flavens* subsp. *exigua* Mayr

Horae Soc. Entom. Ross., Vol. 18, p. 36, 1884. *Soldier*

Utua do, Monte Mandios, Coamo Springs (W. M. W.); 14 kilometers east of Mayagüez, (M. R. S.); Cayey (G. N. W.)

This species is apparently not so common in Puerto Rico as some of the other forms of the genus. So far it has not been recorded from any of the other West Indian Islands. Wheeler found colonies of this ant nesting in the soil beneath stones and logs in coffee groves. I have noted the ants on two occasions in a similar habitat nesting in rotten stumps and also in the ground at the base of a stump. The colonies appear to be very small, being composed of only a few hundred individuals. The ants are without doubt principally flesh feeders.

The soldier of *exigua*, as its specific name indicates, is easily recognized by its distinct antennal scrobe, which is set off from the remainder of the head by a well-defined lateral carina. The anterior three-fourths of the head is subopaque; the color of the head, thorax, and pedicel is pale reddish brown. The queen is unusually small and dark colored.

28. *Pheidole flavens* subsp. *sculptior* Forel

Trans. Ent. Soc. Lond., p. 414, 1893. *Soldier, Worker, Queen*

Coamo Springs (W. M. W.); 4 miles east of Mayagüez, 6 miles southeast of Mayagüez (M. R. S.)

Small colonies of this ant have been found on a number of occasions in rotten stumps in coffee groves. A colony was also collected from the sandy soil of the beach beneath a coconut husk. The food habits of this ant are probably the same as those of the preceding species. Winged queens were found in colonies on August 23, September 20, and October 4. Winged males were noted in similar circumstances on August 14 and October 14.

The characters mentioned in the key to the species will serve to distinguish the soldier of this ant from that of the soldier of other species of *Pheidole*.

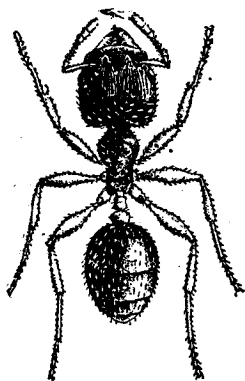


Fig. 4. *Pheidole moerens* Wheeler: soldier. (After Wheeler.)



Fig. 5. *Pheidole moerens* Wheeler: worker. (After Wheeler.)

29. *Pheidole moerens* Whlr.

Bul. Amer. Mus. Nat. Hist., Vol. 24, p. 136-137, 1908. *Soldier, Worker*

Culebra (W. M. W.); Utuado, Monte Morales, Monte Mandios (W. M. W.); Ponce, Coamo (H. L. D.); Yauco, Mayagüez, Maricao Insular Forest (M. R. S.)

Although this is one of the commonest species of *Pheidole* in Puerto Rico, it has not yet been recorded from any of the other West Indian Islands. I have found it especially abundant in the hills and mountains, particularly in coffee groves. The species has been taken at altitudes as high as 3,000 feet. The small colonies of *moerens* may be found in the soil beneath stones or logs, or in the wood of logs and stumps. Often the ants nest in the very soft, moist wood. None of the soldiers and workers have been observed attending scales and plant lice, hence it is inferred that the ants are principally if not exclusively flesh feeders. Winged males were seen in a colony on November 21, and both winged males and winged queens on March 24.

The soldier can be recognized by the posterior fourth of the head being smooth and shining, the gula having two prominent teeth, the prothorax transversely rugulose, and the dorsal surface of the postpetiole glabrous.

30. *Pheidole megacephala* Fabr.

Ent. Syst. Vol. 2, p. 361, 1793. *Soldier*

Culebra (W. M. W.); Aibonito, Arecibo, Mayagüez (W. M. W.); Río Piedras, Cayey (G. N. W.); Mayagüez (M. R. S.)

This imported species, so far as I know, is confined to the towns in Puerto Rico. Undoubtedly the ants occur in many more localities than are mentioned above. The species is also well scattered throughout the West Indian Islands. I found the ants in my back yard nesting in the soil beneath stones and in cracks beneath the concrete walks. On numerous occasions they were noted foraging in the kitchen. On the roots of the grass *Eleusine indica* they were noted attending the pineapple mealybug (*Pseudococcus brevipes*). The ants are fond of honeydew in spite of their love for flesh. A colony has numerous fertile queens in it, thus accounting for its populousness. *P. megacephala* is apparently a mortal enemy of the "hormiga brava", as these two species have been seen fighting on numerous occasions.

On January 28 many winged males were noted in a colony.

The soldier is recognized by its exceedingly large head, almost the entire posterior half of which is smooth and shining,

the gula has no teeth, the epinotal spines are acute, and the postpetiole is sharply conulate on the sides; the color is a deep brown, with the apical section of the gaster darker.



Fig. 6. *Pheidole subarmata* var. *borinquenensis* Wheeler: soldier. (After Wheeler.)

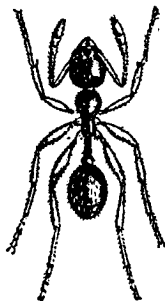
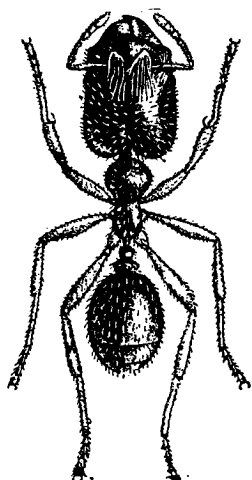


Fig. 7. *Pheidole subarmata* var. *borinquenensis* Wheeler: soldier. (After Wheeler.)

Fig. 8. *Pheidole subarmata* var. *borinquenensis* Wheeler: worker. (After Wheeler.)

31. *Pheidole subarmata* var. *borinquenensis* Whlr.

Bull. Amer. Mus. Nat. Hist., Vol. 24, p. 133-134, 1908.

Soldier, Worker.

El Morro at San Juan, Santurce, Utuado (W. M. W.); Hattillo, Lajas, Sabana Grande (H. L. D.); Mayagüez, Juana Diaz, Tres Hermanos, Lares (M. R. S.)

This rather common species of Puerto Rican ant has not yet been recorded from any of the other West Indian Islands. Wheeler states that the formicaries "are small craters thrown up in sandy, sunny places like roads and creek bottoms." He

also remarks that there are only a few soldiers and workers in a colony. I have found the ants nesting in both clay and sandy soils. Madden noted the soldiers and workers feeding on the eggs and nymphs of the mole cricket *Scapteriscus vicinus*. Latr. He also took these ants from the stomach of the Surinam toad. Dozier found the soldiers and workers quite common in cow dung. I have noted the ants attending the pineapple mealybug, the aphid *Pentalonia nigronervosa* on plantain, the green and the hemispherical scales, etc.

The soldier of this species is very easily distinguished by its very elongate head, the borders of which are subparallel; the considerably elevated frontal carinae and the smooth, glabrous surface of the body.

32. *Crematogaster steinheili* Forel

Mitth. Munch. Entom. Ver., Vol. 1, p. 15, 1881. *Worker*

Culebra (W. M. W.); Coamo Springs, Vega Baja, Aibonito (W. M. W.); Guayama (J. D. M.); Fajardo (G. N. W.); Ensenada, Mayagüez, San Germán, Lajas, Guánica (M. R. S.)

C. steinheili is the only species of *Crematogaster* that has been taken in Puerto Rico to date. It is not only a fairly common ant in Puerto Rico but it is also common in many of the other West Indian Islands. Colonies which are moderately populous and contain many fertile queens are found in rotten wood, in cavities in twigs of plants, under the bark of trees, at the base of and between the leaf sheaths of Tillandsias, etc. On one occasion a nest was found in the soil beneath a rock. I have found the ants in some of the driest areas of the island as well as some of the most moist, hence am led to conclude that it is a highly adaptable species.

The workers are exceedingly fond of honey-dew. They have been noted on numerous occasions attending mealybugs, soft scales, and plant lice. It is a very common custom with this species to built a carton like covering over the insects which they are attending. Many of the honey-dew excreting forms attended are economic species, such as a *Aphis gossypii* Glov., *Pseudococcus nipae* Mask., *Ps. brevipes*, and *Toxoptera aurantiae* Koch. The ants are probably flesh feeders also. When alarmed the worker has the habit of turning up the posterior portion of its gaster, like many of the other ants of the genus.

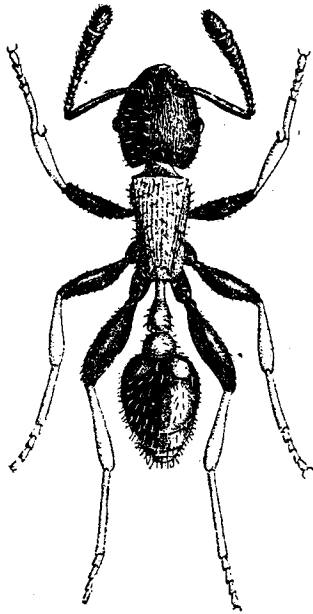


Fig. 9. *Macromischa isabellae* Wheeler (After Wheeler.)

33. *Macromischa isabellae* Whlr.

Bull. Amer. Mus. Nat. Hist., Vol. 24, pp. 138-139, 1908.
All castes.

Monte Morales, Monte Mandios (W. M. W.) ; Lares, Yauco, (F. Sein) ; Las Mesas near Mayagüez (M. R. S.)

This beautiful species is one of the few members of the genus found in Puerto Rico, although the ants are very common in other West Indian Islands, especially Cuba. There seems to be little doubt that *M. isabellae* prefers high elevations for its nesting sites and thrives best in rather densely wooded areas. The ants have been noted at altitudes ranging from about 800 to 3,000 feet. Wheeler found the colonies very small and the ants nesting in a hollow twig and under the roots of an epiphytic orchid. Wolcott records them as nesting in an old stump. I found a colony comprising perhaps 75 to 100 individuals nesting in a branch of a tree in galleries and chambers that may have been previously constructed by some wood-boring beetle. The workers have a habit at times of bending the gaster down-

ward and forward between the legs in a very peculiar manner. When one sees such an ant it immediately gives the false impression that the ant has been unfortunate enough to lose its gaster. Nothing is known concerning the food of the ant, although the species is an arboreal type. Careful examinations of workers from a single colony show that the length of the epinotal spines of this species is highly variable, a point that has much taxonomic significance in reference to the status of several subgenera which have been created for these taxonomically perplexing ants.

Sein took winged males of this ant at Yauco on August 24. I have seen both winged males and male pupae in a nest near Mayagüez on March 15.

The peculiar and beautiful color markings of the worker of this species easily distinguishes it from any other Puerto Rican ant.

34. *Macromischa isabellae mutica* subsp. nov.

Maricao Insular Forest.

Worker: Length 3.5 to 3.7 mm.

Head rectangular, distinctly longer than broad, sides subparallel, posterior border very faintly emarginate, and eyes slightly in front of the middle. Mandibles 5-toothed. Antennal scapes extending a slight distance beyond the posterior angles of the head; segments 3 to 7 of the funiculus apparently broader than long, the terminal segment as long as the two preceding segments taken together. Thorax considerably less than three times as long as broad; broader in front than behind, and with a straight, transverse carina on the pronotum ending on each side in the angular humerus. In lateral profile the thorax is without sutures and terminates posteriorly in a well-arched epinotum that is devoid of any trace of spines. Petiole from above not more than twice as long as broad, pedunculate, gradually broadening behind; in profile the anterior surface of the node is slightly concave, the posterior surface slightly convex, and the node well rounded and high. Postpetiole, from above, very distinctly broader than long, nearly as broad in front as behind. Gaster small. Legs long, femora incrassated and increasing in size from the first to the third pair.

Opaque; gaster glabrous. Mandibles with coarse longitudinal striations. Clypeus, head, thorax, petiole, and postpetiole very finely and densely punctate, thus giving these parts a velvety appearance. Clypeus, head, and thorax with faint longitudinal rugae, the rugae on the thorax farther apart than those on the head.

Hairs whitish; sparse, more prominent on the head, thorax, petiole, postpetiole, and gaster, more slender and appressed on the appendages.

Head, antennae, coxae, femora, and gaster blue-black. Thorax, petiole, and postpetiole dull orange red; tips of mandibles, tibiae, tarsi, and two elliptical spots at the base of the first gastric segment yellow.

Described from 19 workers collected at the Maricao Insular Forest on August 18, 1935, at an altitude of 3,000 feet. Cotypes in the collections of the United States National Museum and the writer.

The worker of this new subspecies can be distinguished from that of *isabellae* by the following characters:

- (1) absence of epinotal spines, hence the specific name, *mutica*,
- (2) head with a faintly emarginate posterior border,
- (3) petiole not more than twice as long as broad,
- (4) thorax lacking considerably of being three times as long as broad, and
- (5) petiole with a faint ventral tooth anteriorly.

This new subspecies is of more than ordinary interest in that it sheds considerable light on the taxonomic status of several subgenera formerly proposed for this perplexing group of ants. Roger recognized the variable characters of these ants when he erected the genus *Macromischa* for them, thus indicating by the name of the genus that the species included under it were very diverse, or a large mixture of variable forms.

In 1920 Mann made a very creditable attempt to clarify the situation by taking all the known forms of *Macromischa* and dividing them into three subgenera: (1) those with unarmed epinota and elongated petiolar peduncles, subgenus *Croesomyrmex*, (2) those with rectangular heads and short

peduncles to the petiole, subgenus *Antillaemyrmex*, and (3) those remaining, subgenus *Macromischa* sensu strictu. Wheeler in 1931 went so far as to elevate the subgenera *Croesomyrmex* and *Antillaemyrmex* to distinct genera, although he states that the status of the two is perhaps doubtful "because at least one species of *Macromischa* sensu str., namely *pastinifera* Emery, is terricolous, according to Creighton, and one species of *Antillaemyrmex* (*floridanus*) lives in twigs, and because the species *melanocephala* is very much like an *Antillaemyrmex*, except in the shape of the petiole."

Thus, the finding of the new subspecies *mutica* described above again complicates the situation regarding the forms of *Macromischa* and would seem to indicate that the characters suggested for these subgenera or genera (according to whether one considers Mann's interpretation or that of Wheeler's) are too highly variable and elusive, and it is better, once again, to consider all species of *Macromischa* as belonging to a single genus.

My examinations of many specimens of *M. isabellae* collected from a single colony in Puerto Rico show that the amount of development of the epinotal spines is highly variable among these specimens. The finding of *mutica*, however, shows the absolute futility of retaining the subgenera *Macromischa* and *Croesomyrmex*, since worker specimens of Wheeler's *isabellae* would fall, because of their spined epinotum and slender pedicel, into the subgenus *Macromischa*, and the worker of *mutica*, because of their unarmed epinotum, into the subgenus *Croesomyrmex*. This condition could never exist, since we have here the peculiar anomaly of having the primary form (*isabellae*) falling into one subgenus and that of its variant or derivative (*mutica*) into another subgenus. For these reasons I would propose that all subgenera of *Macromischa* be dropped and all the species in it retained in an undivided genus until a better classification can be provided.

The habits of this new form are so similar to those of the preceding species that they need not to be discussed in detail here. On several occasions the ants have been collected in the Maricao Insular Forest at an altitude of approximately 3,000 ft. Here workers were collected from the surface of the ground and from the trunks of trees as they were foraging singly. Not only do the workers have the same habit of tucking the gaster

beneath the body as with *M. isabellae*, but also when disturbed they crouch down on a surface and remain very quiescent. A small colony was found in the soil beneath a stone. Callows in this nest were noted to carry immature stages around in their mouths, exactly like the fully developed workers.

Nothing is known concerning the feeding habits of these ants.

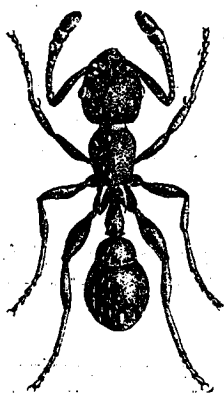


Fig. 10. *Macromischa albispina* Wheeler (After Wheeler.)

35. *Macromischa albispina* Whlr.

Bull. Amer. Mus. Nat. Hist., Vol. 24, pp. 139-140, 1908.
Worker, Queen.

Culebra (W. M. W.)

This species has been taken only once in the West Indian Islands, and that time from Culebra, a small Island off the southeast coast of Puerto Rico. It was described in 1908 by Wheeler from specimens taken nesting "in a small cavity in the ground in the shade of a thicket, where some of the workers were moving about slowly over dead leaves and twigs."

Very little is known of biology of this ant, except that the colonies are small and inhabit the soil. It is inferred that the workers are flesh feeders.

The worker is characterized by a general blue-black body color and very distinctly white epinotal spines. The color of the latter suggested the very typical specific name *albispina*.

36. *Macromischa albispina* subsp. *pallipes* Mann.
Bull. Amer. Mus. Hist., Vol. 42, p. 424, 1920. *Worker, Queen*
Mona Island (Mann)

First described by Mann from Mona Island of the coast of Puerto Rico as a variety of *M. albispina*, this ant was later raised to subspecific status by Wheeler. The latter states that the worker and queen of *pallipes* are smaller than those castes of the species. He also remarks that the worker of *pallipes* has the legs, antennal scapes, and mandibles yellowish white, and petiolar node distinctly smooth and shining. The antennal funiculi are slightly brownish.

The biology of *pallipes* is very probably similar to that of the species.

37. *Rogeria curvipubens* Emery.

Bull. Ent. Soc. Ital., Vol. 26., p. 54, 1894. *Worker Queen*.
Ensenada (M. R. S.)

I have referred to this species a single specimen that was captured from the soil beneath a rock in a dry pasture of one of the most arid areas of the Island. Although I hunted assiduously for other specimens, none could be found.

R. curvipubens has also been collected in the Bahamas, Cuba, and the Virgin Islands. It is apparently a rare ant on the western end of the Island of Puerto Rico.

Nothing is known of the biology of this ant, but it is believed that it forms very small colonies, is subterranean in habits, and is largely a flesh feeder.

The worker, which is less than 2 mm. in length, is of a dark reddish-brown color. The antennae are 12-segmented, the clypeus carinate, the eyes extremely small, the epinotum bispinose. I could not detect any spurs on the hind tibiae. The affinities of this ant seem to lean strongly to those of *Stenammas*.

38. *Tetramorium guineense* Fabr.

Entom. Syst., Vol. 2, p. 357, 1793. *Worker*.

Culebra (W. M. W.); Hatillo, Humacao (H. L. D.); Yabucoa (G. N. W.); Mayagüez, Mani Beach near Mayagüez (M. R. S.)

This introduced species is undoubtedly much more widely distributed in Puerto Rico than the above records would indicate. One would expect to find the ants most commonly in the towns, especially those that are seaports. *T. guineense* is also very widely distributed throughout many of the other West Indian Islands. Several colonies of this species became established in one of our insectaries and gave considerable trouble by feeding on the larvae and pupae of the West Indian fruit fly, as well as some of the other insects. I found a colony of this ant nesting in a rotten coconut log near the beach. Winged males were noted in this nest on September 17. Colonies of this ant apparently do not number over several hundred individuals. The workers feed on flesh as well as on honeydew. On a number of occasions they have been taken from cow dung. Although this species has not been noted infesting houses in Puerto Rico, there is little doubt that it would if the opportunity were given. Wheeler records it as feeding on a broken papaya.

The very coarse, rugose-reticulate sculpturing of the head, thorax, petiole, and postpetiole of the worker, and its larger size, help to distinguish it from the worker of the following species of *Tetramorium*.

39. *Tetramorium lucayanum* Whlr.

Bull. Amer. Mus. Nat. Hist., Vol. 21, pp. 100-101, 1905.

Worker.

Mayagüez, 4 miles from Mayagüez (M. R. S.)

This species, first described by Wheeler from specimens taken in the Bahamas, has since been taken from Cuba and Haiti and will probably be found to occur in many of the other West Indian Islands.

Mann records this species as nesting in the soil in small colonies beneath stones. I found a colony of *lucayanum* nesting beneath the bark of an old guaba stump very near the base, in a coffee grove, only a few miles from Mayagüez. Specimens of this ant have also been collected from a crack in the concrete floor of a barn on the Puerto Rico Agricultural Experiment Station grounds. *T. lucayanum* is probably the only species of the genus that is native to the island. Almost nothing is known of the biology of this ant. It is believed that the workers feed mainly on flesh.

The worker is distinguished from those of the other members of the genus here mentioned by its very characteristic, quadrangular (when viewed in lateral profile) petiole, its black, shining body, and its size (2.25-2.5 mm.).

40. *Tetramorium simillimum* Nylander

List Brit. Animals, Brit. Mus., part 6, p. 118, 1851. *Worker* Culebra (W. M. W.); Coamo Springs (W. M. W.); Lajas, Guayama, Ponce, Sabana Grande (H. L. D.); Tres Hermanos, Mayaguez, Ensenada (M. R. S.)

This introduced species is very commonly distributed throughout many of the West Indian Islands and is perhaps much more widely distributed in Puerto Rico than the above records would indicate. Workers have been collected on a number of occasions from cow dung in pastures in the very dry areas of the Island, also on sandy beaches in the more moist areas. The ants are capable of nesting in the soil or in wood. The workers are thought to be highly predacious, although they attend honeydew-excreting insects to some extent.

The worker can be distinguished from that of the other members of the genus by its very small size, and by the short, distinctly clavate hairs on the thorax, the very short epinotal spines, and the feebler sculpturing of the body.

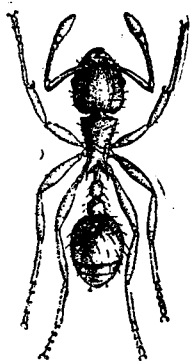


Fig. 11. *Wasmannia auropunctata* Roger (After Wheeler.)

41. *Wasmannia auropunctata* Roger.Berl. Ent. Zeitschr. Vol. 7, p. 182, 1863. *All castes*

Culebra (W. M. W.); Utuado, Monte Morales, Monte Mandios, Adjuntas, Coamo Springs, El Morro at San Juan, Vega Baja (W. M. W.); Ciales (Van Z.); Quebradillas (G. N. W.); Guánica (H. L. D.); Río Piedras (J. D. M.); 14 kilometers northeast of Ponce, Lajas, Lares, San Sebastian, Arecibo, Juana Díaz (M. R. S.)

This ant, which is known as the "albayalde" by the natives, is one of the most common of all the Puerto Rican ants. It is also very generally distributed throughout the West Indies. The natives claim that the sting is dreaded by them even more than that of the "hormiga brava" because it is much more lasting. Also, owing to the small size of the workers, the ants can conceal themselves in one's clothing and not be so easily detected. Colonies are very populous and may be found either in the soil or in rotten logs and stumps. Although the "albayalde" is one of the most common ants in densely shaded areas such as coffee groves, it also occurs in open pastures, sandy beaches, etc., and lives in the very arid regions of the Island as well as in the more moist areas.

As an attendant on honeydew-excreting insects the ant is scarcely surpassed, unless it be by the "hormiga brava." Workers have been noted on numerous occasions attending the green and hemispherical scales; the mealybugs *Pseudococcus brevipes*, *Ps. sacchari* Ckll., and *Ps. virgatus* Ckll.; and the aphids *Toxoptera aurantiae*, *Sipha flava*, and *Pentalonia nigronervosa*. Their food probably consists of a great deal of flesh also. Van Zwaluwenberg is the authority for the statement that this ant often kills out and displaces colonies of the "hormiguilla" *Myrmelachista ramulorum* Whlr., in coffee groves. On March 18, male and queen pupae were found in a colony.

The small worker is recognized by its prominent antennal scrobe which not only extends to the posterior border of the head but is bordered laterally just above the eyes by a carina; the very prominent, angular, thoracic humeri; and by the elongate, acute, epinotal spines; as well as by its general light yellowish-brown color.

42. *Strumigenys eggersi* Emery.

Bull. Soc. Ital., Vol. 22, p. 32, 1890. *Worker, Queen.*

Juana Díaz (J. W. Balock); Mayagüez, Maricao Insular Forest (M. R. S.)

S. eggersi does not seem to be as common a species in Puerto Rico as *S. rogeri* or *S. louisianae* var. *obscuriventris*. The species is also recorded from Cuba and the Island of St. Thomas.

A dealated queen was taken from the soil beneath a rock in the Maricao Insular Forest at an altitude of 3,000 feet. Balock found a colony comprising about 30 individuals in a pod beneath cow dung in a dry pasture area at Juana Diaz. A winged queen was noted in this nest on January 31. The colonies of *S. eggersi* are very small, consisting of only a few dozen individuals. Absolutely nothing is known concerning the feeding habits of the ants. Kennedy, who made a study of the mouth parts of one species of *Strumigenys* in the United States, was led to infer that their food might be fungi.

The small worker (1.25-1.3 mm.) of this species is easily recognized by its elongate, slender, subparallel mandibles which have 6 to 7 minute denticles on their inner apical borders; and also by the very broad postpetiole, which is several times as broad as long.

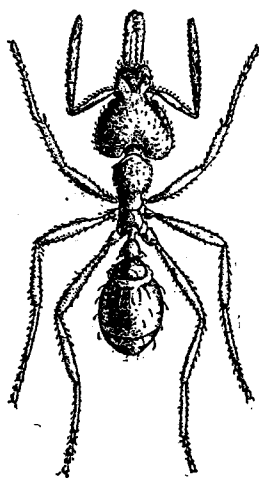


Fig. 12. *Strumigenys rogeri* Emery (After Wheeler.)

43. *Strumigenys rogeri* Emery.

Berl. Ent. Zeitschr., Vol. 7, pp. 253-254, 1862. *Worker*
Coamo Springs (W. M. W.); Arecibo, Mayagüez (M. R. S.)

This is apparently one of the most common species of *Strumigenys* in Puerto Rico and the other West Indian Islands.

Wheeler found this ant nesting in the soil under stones in a nearly dry stream bottom. I have collected the ants from colonies in a stump in a rather densely shaded coffee grove, from the soil at the base of a tree in a coffee grove, and from the soil beneath a stone near a small stream. What has been said about *S. eggersi* with regard to the size of colonies and possible food may also be applied to this species.

The worker of *rogeri*, which is 1.6 mm. in length, can be distinguished from the workers of other members of this genus by its cordate, deeply emarginate head; elongate mandibles, with two prominent subapical teeth on the inner border of each mandible before the apical teeth, and by the erect infra-spinal laminae on the epinotum of the thorax.

44. *Strumigenys membranifera* subsp. *simillima* Emery.

Bull. Soc. Entom. Ital., Vol. 22, p. 69, 1890. *Worker*
Lajas (H. L. D.)

A single specimen of this ant, a worker, was collected by Dozier from a clump of rather dry cow dung in a dry, arid pasture. The species has not been recorded from any of the other West Indian Islands except St. Thomas, from which it was originally described. Recently the species was recorded by me from Mississippi, this being the first time that it was noted in the United States. In Mississippi the species commonly nests in the soil beneath stones, wood, or debris. Colonies consist of only a few dozen individuals. Nothing is known about the food preferences of the ants.

The worker, which is 1.5 mm. in length, is characterized by the peculiar shape of its head which is distinctly rectangular anteriorly, by the coarse punctate sculpturing of the head, the small, triangular shaped mandibles, etc.

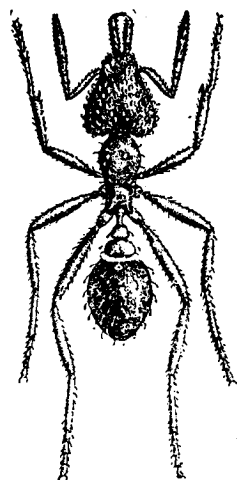


Fig. 13. *Strumigenys louisianae obscuriventris* Wheeler
(After Wheeler.)

45. *Strumigenys louisianae* var. *obscuriventris* Whlr.

Bull. Amer. Mus. Nat. Hist., Vol. 24, p. 145, 1908 *Worker*
Utuado, Coamo Springs (W. M. W.); Ensenada, Mayagüez
(M. R. S.)

Colonies of this ant have been found nesting in the soil beneath stones. At Ensenada the ants were collected from a dry pasture in one of the most arid sections of the island. Isolated workers have also been collected from rather densely shaded moist areas. Undoubtedly the species is highly adaptable to conditions of varying moisture and temperature. What has been said about the biology of the preceding species will also apply to this variety.

Wheeler, who described the variety *obscuriventris* from Puerto Rican specimens, states that it differs from the typical species "in having the gaster, except at the base, dark brown or black, and the ferruginous tint of the body in general darker." The worker is recognized by its elongate mandibles, the inner preapical border of which has a single tooth just before the apical teeth, and by the very distinctly squamiform hairs of the head, as well as by its size (2.25 mm.)

46. *Epitritus emmae* EmeryBull. Soc. Ent. Ital., Vol. 22, p. 33, 1890. *Worker*

Arecibo, Ensenada (M. R. S.)

Originally described from St. Thomas, this species has not been recorded from any of the other West Indian Islands except Puerto Rico and Cuba.

On one occasion two workers of this species were found nesting in the soil beneath a stone in an open pasture in one of the most arid areas of the Island. At Arecibo a single specimen, a worker, was found in the soil beneath a clump of Bermuda grass at the edge of a pineapple field. The colonies are undoubtedly very small, like those of *Strumigenys*. Nothing is known of the food habits of this species.

The worker is characterized by its 4-segmented antennae, the rectangular-shaped anterior section of its head, the squami-form hairs on the head, and its small size (1.25 mm.)

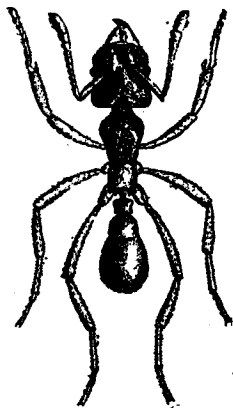


Fig. 14. *Myrmicocrypta brittoni* Wheeler. (After Wheeler.)

47. *Myrmicocrypta brittoni* Whlr.

Bull. Amer. Mus. Nat. Hist., Vol. 23, pp. 728-729, 1907.

Worker.

Santurce (W. M. W.)

This species of fungus ant was described from specimens taken in Puerto Rico and has not yet been recorded from any of

the other West Indian Islands. I have not been fortunate enough to collect the species, hence know nothing concerning the nesting habits and biology of the ant.

The worker of this species, which is monomorphic, has the frontal carinae very close to each other and dilated at the anterior extremity, the clypeus not distinctly prolonged between them; and the integument bristling with tubercules and spines, with hooked and scale like hairs.

48. *Cyphomyrmex rimosus* subsp. *minutus* Mayr.

Verh. Zool. Bot. Ges. Wien., Vol. 12, p. 691, 1862. *Worker*

Culebra (W. M. W.); Arcibo, Adjuntas, Utuado, Monte Mandios, Monte Morales, Coamo Springs (W. M. W.); Hatillo, San German (H. L. D.); Rio Piedras, Cayey (G. N. W.); Ponce, Lajas, Mayaguez, Juana Díaz (M. R. S.)

This small fungus ant is not only a common species in Puerto Rico but it is abundantly distributed throughout many of the other West Indian Islands. I have found colonies of *minutus* nesting in rotten stumps and logs and in the soil beneath stones. Apparently the species is adapted to living in both arid and moist regions of the island. The colonies are very small, comprising only a few dozen individuals. Dozier on a number of occasions has collected the workers from cow dung. The worker of this ant, because of its small size and resemblance in color to the soil, is not always easy to see, and furthermore the ants have the habit of feigning death. Their food consists of yellowish, pear-shaped bodies of fungus. They may also eat flesh.

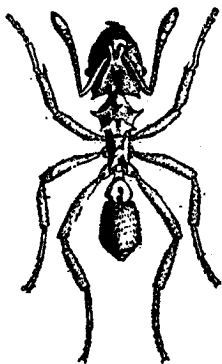


Fig. 15. *Mycocepurus smithi* Wheeler (After Wheeler.)

Madden found workers which he thought were feeding on nymphs of the mole cricket, *Scapteriscus vicinus*.

The monomorphic worker is distinguished by its prominent antennal foveae, scale-like hairs of the body, well-separated frontal carinae, etc.

49. *Mycocepurus smithi* var. *borinquenensis* Whlr.

Bull. Amer. Mus. Nat. Hist., Vol. 23, p. 718, 1907. *Worker* Vega Baja, Arecibo, Utuado, Monte Mandios, Coamo Springs (W. M. W.); Mayaguez, San Sebastian (M. R. S.)

This variety of fungus ant, which was described from Puerto Rican specimens, has not yet been recorded from any of the other West Indian Islands except Cuba. The colonies, which are very small, nest in the soil. The entrance hole to their nest is small and more or less obscured by the earth thrown over and around it. The workers superficially bear a resemblance in size, color, and opaqueness to those of certain species of *Pheidole* of the *flavens* group. The ants are not uncommon in the western end of the island and have especially been noted in red clay soil, but may occur in other types of earth.

The worker is characterized by having the frontal carinae close to each other and dilated anteriorly, the petiole with four teeth dorsally, the postpetiole with a deep impression dorsally, and the gaster bordered on each side by a carina.

50. *Trachymyrmex jamaicensis* André.

Rev. d'Entom., p. 149, 1893. *Worker* Culebra (W. M. W.)

This fungus ant has also been recorded from Cuba and Haiti. I have not been fortunate enough to collect it in the main island. Mann, who studied the habits of this species in Haiti, states that the colonies are rather large. He found them nesting in the plain as well as in other localities which were more humid. In every case the nest was shaded. According to him the workers are diurnal but prefer the late afternoon for foraging. The food of these ants consists of a fungus which grows from a substratum made of leaves, buds, and other vegetable substances.

KEY TO THE SPECIES OF THE FAMILY DOLICHODERINAE.

(for the identification of workers)

- | | | |
|----|--|---|
| 1. | Scale of petiole either vestigial or absent ----- | 2 |
| | Scale of petiole more or less inclined, but well developed | 3 |
| 2. | Antennal scapes surpassing the posterior border of the head; head and thorax dark, gaster light-----
<i>Tapinoma melanocephalum</i> Fabr. | |
| | Antennal scapes not reaching the posterior border of the head ----- <i>Tapinoma littorale</i> Whlr. | |
| 3. | Epinotum with a sharp and pointed conical elevation--
<i>Dorymyrmex pyramicus</i> var. <i>niger</i> Perg. | |
| | Epinotum without a conical elevation, but with a gibbous protuberance dorsally ----- | 4 |
| 4. | Head and thorax honey-yellow ----- <i>Iridomyrmex melleus</i> Whlr. | |
| | Head and thorax fuscous ----- <i>Iridomyrmex melleus</i> var. <i>fuscescens</i> Whlr. | |

SUBFAMILY DOLICHODERINAE

51. *Tapinoma melanocephalum* Fabr.

Entom. System., Vol. 2, p. 353, 1793. *Worker*

Culebra (W. M. W.); Arecibo, Utuado, Ponce, Taliaboa (W. M. W.); Río Piedras (J. D. M.); Mayagüez, Guánica, Lajas, Tres Hermanos, Lares (M. R. S.)

This ant is not only common in Puerto Rico but is widely distributed throughout the Islands of the West Indies. It is quite versatile in its nesting habits, colonies occurring in the soil beneath stones, under the bark of trees, in hollow twigs, cavities, etc., of plants or trees, and also in rotten logs and stumps. Colonies are sometimes found nesting between the leaves of Tillandsias. Colonies appear to be moderately populous. There are many queens to a nest. The workers are highly predacious as well as lovers of honeydew. They have been noted attending the pineapple mealybug, the green scale, etc. The workers have given repeated trouble by invading insectaries and stealing the insects being reared therein. The ant is an inveterate house-attending form, sometimes even nesting in the house. The very small workers run along at a very rapid, erratic pace. When against a dark surface they give the appearance of a large mite. Workers have the peculiar "Tapinoma odor" characteristic of this group of ants. In Puerto Rico the

ant is commonly known as the "albaricoque", and in Cuba as the "hormiga boticaria", both names of which apply to the peculiar odor of this insect.

The worker is distinguished from that of the other species of *Tapinoma* here mentioned by its long antennal scapes, which exceed the posterior margin of the head, and by its distinctive color, the head and thorax being dark brown and the gaster whitish.

52. *Tapinoma littorale* Whlr.

Bull. Amer. Mus. Nat. Hist., Vol. 21, p. 109, 1905. *All castes.*

Monte Morales, Monte Mandios (W. M. W.); Doña Juana (H. L. D.); Maricao, Maricao Insular Forest, 14 kilometers east of Mayagüez (M. R. S.)

This species is apparently not so common as the preceding one, having been recorded to date only from the Bahamas, Cuba, and Santo Domingo. Wheeler's name *littorale* has not proved very distinctive for this species in Puerto Rico as neither he nor I have been able to find it elsewhere than away from the beaches, usually on mountains or hillsides. In every instance so far, the colonies of this ant have been collected from plants or trees where they have been nesting in hollow twigs or stems, in crevices between leaves, etc., indicating that the species is mainly if not altogether arboreal. In Puerto Rico the species has been taken most commonly at high altitudes of 3,000 feet or more. Little is known of the food habits of the ants, but it is inferred that they are probably given largely to attending honeydew-excreting insects. Dozier found workers attending a flat, black scale (*Lecanine*) on a palm at an altitude of 3,000 feet. When running over plants outdoors the species is very apt to be mistaken for *Brachymyrmex heeri*, which it closely resembles in size and color.

The small size of the worker (1.25-1.5mm.), its short antennal scapes (not attaining the posterior border of the head), and its generally pale-yellow color, with occasionally an infuscation dorsally, serve to distinguish the worker of *littorale* from that of *melanocephalum*.

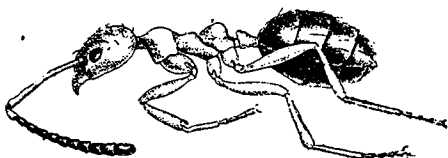


Fig. 16. *Iridomyrmex melleus*
Wheeler. (After Wheeler.)

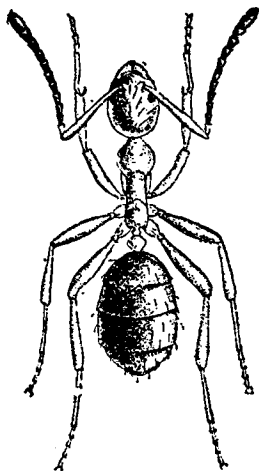


Fig. 17. *Iridomyrmex melleus*
Wheeler. (After Wheeler.)

53. *Iridomyrmex melleus* Whlr.

Bull. Amer. Mus. Nat. Hist., Vol. 24, pp. 151-153, 1908. *All Castes.*

Arecibo, Utuado, Monte Morales, Monte Mandios, Coamo Springs, Vega Baja (W. M. W.); Guayama (J. D. M.); Corazal, Aibonito (G. N. W.); Yauco, Las Marías, Mayagüez, San Germán, Maricao Insular Forest (M. R. S.)

This species, which was described from Puerto Rican specimens, has not yet been collected from any of the other West Indian Islands. This ant is extremely common and is apparently almost entirely confined to the mountains and hills; generally the species is found nesting in hollow twigs of trees or in crevices under the bark, between the leaves of *Tillandsias*, in rotten logs or stumps, in cocoons of the moth *Megalopyge krugii* Dewitz, and sometimes constructing a carton-like material over its nest on leaves. On one occasion, which was a very exceptional one, a colony was found nesting in the soil beneath a stone. The colonies are moderately populous. The workers are *arborescens* in habit and given to attending honeydew-excreting insects. They have been noted attending a mealybug, *Pseudococcus* sp., on *Tillandsias*, the green and hemispherical scales on coffee, and the plant louse *Toxoptera asrantiae*. When

alarmed the workers can run very rapidly. I have not been able to detect any odor about the workers as with some of the other species of *Iridomyrmex*. Winged males and queen pupae were noted in a nest on August 1.

The worker, which is from 2.0 to 2.25 mm. in length, is distinguished by its slender, graceful appearance; general honey-yellow colored body, with infuscated gaster. All of the antennae, except the scape and first segment, are infuscated.

54. *Iridomyrmex melleus* var. *fuscescens* Whlr.

Bull. Amer. Mus. Nat. Hist., Vol. 24, p. 153. 1908. *Worker*
Monte Morales, Monte Mandios (W. M. W.); Maricao
Insular Forest (M. R. S.)

In the Maricao Insular Forest I found this species very common at an altitude of approximately 3,000 foot where colonies were noted quite frequently back of where the axil of the leaf sheath attaches to the trunk of the Sierra Palm, *Euterpe globosa* Gaertn. Other colonies were found nesting under the same conditions as the species. Apparently the habits of the two forms are too similar to warrant further remarks.

The worker bears a striking superficial resemblance to that of the Argentine ant, *Iridomyrmex humilis* Mayr, in both size and color, and in its habit of running around very rapidly.

The worker of *fuscescens* is distinguished from that of *melleus* by its more fuscous body and appendages, with black gaster, yellowish mandibles, and whitish tarsi.

55. *Dorymyrmex pyramicus* var. *niger* Perg.

Proc. Cal. Acad. Sci., Vol. 5, p. 871, 1895. *Worker*

Santurce, Arecibo, Utuado, Adjuntas, Ponce, Aibonito, Coamo Springs, Vega Baja (W. M. W.); Boqueron (H. L. D.); San Germán, Tres Hermanos, Ensenada (M. R. S.)

This dark variety of the so-called "lion ant" has been recorded from the Bahamas, Cuba, Jamaica, Haiti, and Santo Domingo. Its nests are crater-shaped affairs constructed in rather open, sunny places. I have noted the ants in some of the driest areas of the island as well as in the more moist localities. Wheeler states that the ants nest in sandy areas, which

is true, but the species also nests in clay soils. Colonies are not very populous, usually containing only a few hundred individuals. Workers feed on both flesh and honeydew. Workers have the peculiar "Tapinoma odor" characteristic of this ant and some of the other Dolichoderine ants.

The worker can be distinguished from other closely related forms by its very distinctive cone-shaped epinotum, its long maxillary palpi, and very dark color.

KEY TO THE SPECIES OF THE SUBFAMILY FORMICINAE (for the identification of the workers)

- | | | |
|----|--|----|
| 1. | Antennae with 9 segments ----- | 2 |
| | Antennae with more than 9 segments ----- | 5 |
| 2. | Last segments of the antennae forming a differentiated club; arboreal species ----- | 3 |
| | Not as above ----- | 4 |
| 3. | Length 1.75 to 2.3 mm.; second funicular segment broader than long--- <i>Myrmelachista ramulorum</i> Whlr. | |
| | Length 2.3 to 2.6 mm.; larger and stouter; second funicular segment longer than broad-----
<i>Myrmelachista ramulorum</i> var. <i>fortior</i> Whlr. | |
| 4. | General body color yellowish, or yellowish brown----
<i>Brachymyrmex heeri</i> Forel | |
| | General body color brownish black --- <i>Brachymyrmex heeri</i> var. <i>obscurior</i> Forel | |
| 5. | Workers monomorphic ----- | 6 |
| | Workers polymorphic ----- | 10 |
| 6. | Antennal scapes very greatly surpassing the posterior border of the head, apparently twice the length of the head or more; body slender and graceful-----
<i>Paratrechina longicornis</i> Latr. | |
| | Characters not as above ----- | 7 |
| 7. | Eyes extremely small, with apparently only 7 or 8 ommatidia; color pale yellowish brown----- <i>Prenolepis</i> (<i>Nylanderia</i>) <i>microps</i> , sp. nov. | |
| | Eyes much larger, with many more ommatidia; color darker ----- | 8 |
| 8. | Mesopleurae opaque, due to the dense pubescence covering it----- <i>Prenolepis</i> (<i>Nylanderia</i>) <i>fulva</i> Mayr. | |
| | Mesopleurae smooth and shining----- | 9 |
| 9. | Mesonotum with four macrochetæ; all the body and appendages reddish brown, gaster darker -----
<i>Prenolepis</i> (<i>Nylanderia</i>) <i>steinheili</i> Forel | |
| | Not as above- <i>Prenolepis</i> (<i>Nylanderia</i>) <i>vividula</i> Mayr. | |

10. Head of major worker light red anteriorly; with pale spots often on first and third as well the second gastric segment; minor worker usually with spots only on the second segment. Head, thorax, and gaster of both major and minor workers dark brown, smooth and shining--*Camponotus sexguttatus* Fabr.

Color light yellowish brown, with the head and segments of the gaster often infuscated -----
Camponotus ustus Forel.

SUBFAMILY FORMICINAE

56. *Brachymyrmex heeri* Forel

Denkschr. Schweiz. Ges. Naturw., Vol. 26, p. 91, 1874.
Worker.

Culebra (W. M. W.); Santurce, Utuado (W. M. W.); Maricao Insular Forest, Mayagüez, Lajas, Las Marías, Juana Díaz (M. R. S.)

This minute species appears to live by preference in such habitats as coffee and citrus groves or well-shaded woods, although the ants are sometimes noted in open areas. The very small colonies, comprising only a very few hundred individuals, are found in the soil beneath objects or also even in rotting logs and stumps. The workers are exceedingly fond of honeydew and have commonly been observed attending the green and hemispherical scales, mealybugs on guaba believed to be *Pseudococcus virgatus* Ckll., the pineapple mealybug, and the aphids *Pentalonia nigronervosa* and *Aphis spiraecola* Patch. I have seen them attending the hemispherical scale along with workers of *Wasmannia auropunctata*. Winged queens were noted in a colony on February 14.

The worker is easily distinguished by its small size, its 9-segmented antennae, and its yellowish to yellowish-brown color.

57. *Brachymyrmex heeri* var. *obscurior* Forel

Trans. Ent. Soc. Lond., p. 345, 1895. *All castes.*

Santurce, San Juan (W. M. W.); Hatillo, San Germán (H. L. D.); Arecibo, Juana Díaz, Lajas, Ensenada, Mayagüez, Hormigueros, Tres Hermanos (M. R. S.)

This dark variety of *B. heeri* is not only a very common

ant in Puerto Rico but it is widely distributed throughout the West Indies. The ants form rather small colonies in the soil or in rotting logs and stumps, nesting by preference in more open areas than the preceding species. The ants if anything, apparently exceed *B. heeri* workers in their love for honeydew. They have been observed attending such economic insects as the green and hemispherical scales, and the aphids *Sipha flava* on sugar cane, *Pentalonia nigronervosa* on bananas and plantains, and *Aphis spiraeicola* on citrus. As an attendant on the pineapple mealybug in Puerto Rico this ant is only excelled by the "hormiga brava". The workers must feed largely, if not almost exclusively, on honeydew. I have actually seen workers of this species with apparently uninjured and healthy pineapple mealybugs in their mouths.

The worker is recognized by its short, robust form, its 9-segmented antennae, and its very dark brown color.

58. *Prenolepis (Nylanderia) fulva* Mayr.

Verh. Zool. Bot. Ges. Wien., Vol. 12, p. 698, 1862. *Worker, Queen.*

Humacao (Van Z.); Isabella (L. C. F.); Arecibo (M. R. S.)

This species has been recorded from Cuba, Haiti, and Santo Domingo. Apparently the species prefers to nest in more open areas than in the woods or well-shaded spots. Workers are exceedingly fond of honeydew and have been noted attending the following important economic insects; *Pseudococcus sacchari* on sugar cane, *Aphis gossypii* on cotton, and the pineapple mealybug on pineapple. A worker was noted transporting a pineapple mealybug in its mouth at Arecibo. Other workers had greatly distended gasters, indicating that they had just fed on large quantities of honeydew. On the western end of the Island *P. fulva* does not appear to be as common or as widely distributed as some of the other species of *Prenolepis*. The ants are believed to nest principally in the soil in moderately small colonies. Workers when alarmed are able to run very fast.

The worker of this species is distinguished from those of other *Prenolepis* by its larger size, robust appearance, the deep brownish color and opaqueness of the body, as well as its very

long and large pilosity. There are more macrochetæ on the mesonotum than with the species *steinheili* and *antillana*.

59. *Prenolepis* (*Nylanderia*) *vividula* Nyl.

Acta. Soc. Fennica, Vol. 2, p. 900, 1846. *All castes*.

Culebra (W. M. W.); Monte Mandios, Monte Morales Utuado (W. M. W.); Maricao (G. N. W.)

I have not taken any specimens of *Prenolepis* which could definitely refer to this species. The variety *antillana* is very commonly distributed throughout the West Indies. One would expect to find the ants nesting in small colonies in the soil beneath objects and also in logs and stumps. Wolcott records the ants as nesting in the stem of a banana plant at Maricao.

Not having seen specimens which I am positive belong to this species, it is impossible for me to characterize it.

60. *Prenolepis* (*Nylanderia*) *steinheili* Forel

Trans. Ent. Soc. London, p. 324, 1893. *Worker*

Adjuntas, Santurce (W. M. W.); Lajas, Mayagüez, Maricao Insular Forest (M. R. S.)

Specimens of what I believe to be this species were collected from a colony in rich, mucky soil beneath a stone at the top of the Maricao Insular Forest at an altitude of 3,000 feet. The ants form small colonies in the soil or in rotting wood such as logs and stumps. Workers very probably feed on flesh as well as on honeydew. This appears to be one of the most common species of *Prenolepis* in Puerto Rico. It is also recorded from many of the other West Indian Islands.

The worker is characterized by having four large macrochetæ on its mesonotum and the rest of the body is reddish-brown except the gaster, which is a little darker.

61. *Prenolepis* (*Nylanderia*) *microps* sp. nov.

14 kilometers east of Mayagüez (M. R. S.)

Worker: Length, 2 mm.

Head distinctly longer than broad, with very faintly emarginate border, and well-rounded sides and posterior angles.

the West Indies. From the towns into which it was first imported the ants have later been disseminated into the rural areas, until now the species is so abundant as to give one the impression that it is a native ant. This distribution is not yet uniform even though one often encounters the ants in wooded areas and coffee groves considerably removed from habitations. The workers of this species are known by the native name of "horriga loco" or ("crazy ant") because of the habit the workers have of often speeding around very swiftly helter skelter without any definite sense of direction. I have encountered the species on the sandy beaches, in pastures in the driest areas of the island, as well as in moist and densely shaded areas. The workers are exceedingly fond of honeydew and have been observed on numerous occasions attending aphids, scales and mealybugs. They are known to attend the cotton aphid (*Aphis gossypii*), the green scale (*Coccus viridis*), the pineapple mealybug, (*Pseudococcus brevipes*), etc. This is one of the most important house-infesting ants in the island. Workers have been reported digging up lettuce seed and carrying tobacco seeds away from seed beds. Their fairly populous colonies may be found in the soil or in rotting wood.

The worker is easily recognized by its slender, graceful form, black color, and exceedingly long legs and antennae. The specific name, *longicornis*, well applies to the extremely long antennae of this species.

63. *Camponotus sexguttatus* Fabr.

Entom. Syst., Vol. 2, p. 354, 1793. *Worker*.

Culebra (W. M. W.); Fajardo, Morro at San Juan, Coamo Springs (W. M. W.); Loiza Aldea (H. K. P.); Mayagüez (J. S.); Coamo (G. N. W.); Naguabo (F. S.)

The genus *Camponotus* is very poorly represented in Puerto Rico. One of the largest and most beautiful species of this group in the island, however, is the species *C. sexguttatus*. It is apparently not so common on the western end of the island as on the east. Wheeler states that "it lives either in hollow twigs of trees and bushes, in bark, or in nests of coarse, loose carton, which it builds around the stems of grasses in savannahs by agglutinating the thread-like particles of grass and other

Mandibles with 6 distinct teeth, of which the apical, the fourth and the basal teeth are the largest. Antennal scapes very long, exceeding the posterior border of the head by at least one-third their length; first funicular segment small, not very much longer than broad; all the other segments of the antennae very noticeably longer than broad. Eyes extremely small for a *Prenolepis*, oval, with 7 to 8 ommatidia. Thorax strongly depressed in the region of the meso-epinotal region where there is a pair of prominent spiracles. Base of epinotum rounded and apparently only one-third to one-fourth the length of the declivity. Petiole rather thick on its superior border, inclined forward. Legs long and slender.

Extremely smooth and shining, with dark, erect hairs rather abundant over all parts of the body, but especially on the head and gaster. The mesonotum with 8 large macrosetae. Color pale yellowish brown.

Described from 4 workers collected from the soil beneath a stone in a rather dense woods and not far from the edge of a stream. Cotypes in the collections of the United States National Museum and the writer.

The worker of this species differs from that of Mann's *myops*, to which it is closely related, by the following characters: (1) Difference in the number of mandibular teeth (*myops* has four), and (2) the sides of the head are distinctly convex and not straight.

These ants appear to be strictly subterranean, as is indicated by their pale color, and extremely small eyes. Nothing is known of the ant's biology.

62. *Prenolepis (Nylanderia) longicornis* Latr.

Hist. Nat. Fourmis, p. 113, 1802. *Worker*

Culebra (W. M. W.); San Juan, Santurce, Arecibo, Utuado, Adjuntas, Ponce, Tallaboa, Coamo Springs (W. M. W.); Yauco, Caguas, Mameys (T. H. J.); Lajas, Ensenada, Manáguéz, Guánica, Tres Hermanos, Lares, Sabana Grande (M. S.)

This introduced ant is not only one of the most common ants in Puerto Rico but it is also widely distributed through

debris." The carton-like material is also used by the ants for plugging the open holes of twigs, or cavities in plants in the interior of which they nest. Plank found a colony nesting inside the dried fruits of the *Frescora* tree.

They were also collected by Sepulveda from the rotten roots of a mango tree in which they were nesting. Colonies are not thought to be very populous, probably consisting of only a few hundred individuals. Nothing is known of the ant's food habits. Owing to the variability of the spots in the color markings of these ants, they have been described many times under diverse names.

The characters mentioned in the key to the species will serve to distinguish *sexguttatus* from any other species with which it might be confused.

64. *Camponotus ustus* Forel.
 in Bull. Soc. Vaud. Sci. Nat. (2), Vol. 16, p. 75, 1879. *All castes*.
 Culebra (W. M. W.); El Morro at San Juan, Utuado, Mon-
 torales (W. M. W.); San Sebastián, Ciales, Lares (G. N.
); Mayagüez, Maricao Insular Forest, Ensenada (M. R. S.)

This species, which is rather common in Puerto Rico, has also been recorded from Haiti and the Virgin Islands.

Wheeler found the ants "nesting in the hollow twigs of the sea grape, *Coccoloba uvifera*." In Culebra he noted them nesting in the ground beneath a block of coral. Wolcott records *C. ustus* as being colonized in an old stump, and also in dead twigs of *Inga vera*.

On numerous occasions I have taken the species in the vicinity of Mayagüez, where they were found nesting in stumps, posts, dead branches of trees, etc., in colonies of only a few hundred individuals each. The smaller workers are very fast of foot and secretive. The soldiers can bite rather painfully when cornered.

At Ensenada a colony of the ants was found nesting in a dead branch of a tree in one of the driest and most arid areas of the island. When workers and soldiers were dropped on the

hot ground in full exposure to the sun they ran around frantically for several minutes and then expired. It is believed from this that the ants are crepuscular or night-working forms which do not forage during the daytime.

The amount of infuscation on the head as well as the general color of the body seems to be quite variable.

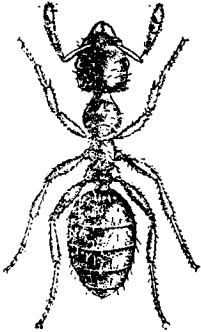


Fig. 18. *Myrmelachista ramulorum* Wheeler (After Wheeler.)

Fig. 19. *Myrmelachista ramulorum* Wheeler (After Wheeler.)

65. *Myrmelachista ramulorum* Whlr.

Bull. Amer. Mus. Nat. Hist., Voi 24, pp. 155-156, 1908.
All castes.

Culebra (W. M. W.); Arecibo, Utuado (W. M. W.); Lares, Yauco, Cayey, and Ciales Valley south of Manati (G. N. W.); Mayagüez, 15 kilometers northeast of Yauco, San Sebastian, Maricao (M. R. S.)

This ant, which is known by the local name of the "hormiguilla", was described by Wheeler from Puerto Rican specimens. Since that time the species has been taken in Santo Domingo and the Virgin Islands. Wolcott states that he has observed the species nesting at sea level, and Tulloch has collected specimens from El Yunque at an altitude of 4,000 feet. The distribution of the ant is closely affiliated with that of the plantings of coffee, since the typical Puerto Rican coffee (*Coffea arabica*) is also dependent on much shade and perhaps a high degree of moisture, like the hormiguilla. The hormiguilla

forms numerous colonies in the coffee shade trees, there being few trees that the ants do not nest in. Most of the individuals are to be found in the guama and guaba trees, one reason being that these are two of the most common kinds of shade trees in a coffee grove. On a moderate sized guaba tree I estimated there were 37,100 workers, 89 fertile or mother queens, and 60 winged males, or an average of 415 workers per queen. Since the ants nest inside of the twigs and galls of trees, one has little appreciation of the many, many thousands that may occur in a coffee grove. In one badly infested cuerda I estimated that there were over 5,000,000 ants. Inside of the galls and twigs of guama and guaba especially, and of a few other shade trees, the ants obtain much honeydew from the scale *Cryptostigma inquilina* Newstead, but this is also supplemented by honeydew obtained from such scales as *Coccus viridis* and *Saissetia hemispherica*, the plant louse *Toxoptera aurantiae*, and the mealybug *Pseudococcus nipae* and *P. citri*. In old, badly neglected coffee groves, especially where the guama and guaba trees are allowed to get very large, these ants migrate over into coffee and injure it by tunneling in the branches or trunk, by girdling the tree, or by causing large and unsightly galls. At picking time or during hurricanes the trees are badly injured through breakage resulting from the initial attack of these ants. Males have been seen at lights on numerous occasions, but no winged queens. It is believed that the males fertilize the queens on or in trees without these winged forms having to take the ordinary nuptial flight. Only on one occasion were winged queens and queen pupae encountered in a nest and this on December 13.

The worker is recognized by its 9-segmented antennae, its dark head and gaster with yellowish-red thorax, and its yellowish appendages.

66. *Myrmelachista ramulorum* subsp. *fortior* Whlr.

Bull. Bus. Comp. Zool. Harvard, Vol. 77, pp. 189-190, 1934.
Worker.

Mona Island (F. E. L.); Puerto Rico (W. M. W.)

This subspecies differs from specimens of the typical *ramulorum*, according to Wheeler, in the following respects,

"in being decidedly larger and more robust; the head larger and broader; joints two to five of the funiculi decidedly longer, the second distinctly longer than broad, the third and fourth as long as broad. Petiolar scale as in the typical form, with entire or very feebly and broadly sinuate superior border. In profile this border is decidedly thicker and blunter; the posterior pedunculate extension of the petiole well-developed as in the typical form. Erect hairs on the body, scapes and tibiae even more numerous and longer. Coloration more vivid, the mandibles and head being deep red, the latter blackish behind, the thorax and appendages of a more reddish-yellow tint than in the typical *ramulorum*." Nothing is mentioned by Wheeler concerning the biology of this form.

In my studies of the hormiguilla in the coffee groves I have noted on frequent occasions considerable difference in the size of workers in various colonies, those in incipient or weak colonies being strikingly small. This I attributed, however, to unfavorable conditions.

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