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SUPPLEMENTARY STUDIES ON ANT LARVAE:  
MYRMICINAE

BY  
George C. Wheeler  
AND  
Jeanette Wheeler

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## SUPPLEMENTARY STUDIES ON ANT LARVAE: MYRMICINAE

GEORGE C. WHEELER AND JEANETTE WHEELER

*Desert Research Institute  
University of Nevada System  
Reno 89506*

### ABSTRACT

The larvae of six species of ants in the genera *Acanthomyrmex*, *Basiceros*, *Calpomyrmex*, *Cephalotes*, *Cyphomyrmex* and *Goniomma* are described. The genus *Goniomma* is characterized for the first time.

### INTRODUCTION

This treatise, which is supplementary to our 1976 monograph, includes myrmicine larvae that have been added to our collection since the completion of our 1980 supplement. It also includes references to the larvae of myrmicine species found in the literature. Citations to our own publications are by year and page only.

### TRIBE MYRMICINI Genus MYRMICA Latreille **Myrmica rubra** (Linnaeus)

Weir 1959: The workers are apparently incapable of distinguishing the small first instar larvae from the eggs. When the eggs hatch these larvae are left in the egg pile. After a larva has eaten an egg, it molts. The workers then place it in a separate pile.

### **Myrmica ruginodis** Nylander

Mizutani and Yamani 1978: Description and drawings; 3 instars distinguished by hair density and development of maxillary palp and galea.

### Genus POGONOMYRMEX Mayr **Pogonomyrmex barbatus** (F. Smith)

Petralia and Vinson 1979a: Venter — description and SEM.

TRIBE PHEIDOLINI  
Genus APHAENOGASTER Mayr  
**Aphaenogaster subterranea** (Latreille)

Buschinger 1973: The workers place the larvae on their food.

Genus GONIOMMA Emery

Profile pogonomyrmecoid. Body hairs sparse; absent of sides of abdomen; unbranched and with minute denticles. Cranium transversely subelliptical. Antenna small and mounted on a teardrop-shaped base. Head hairs few, flexuous and unbranched, smooth or with minute denticles near tip. Mandible ectatommoid, with a cluster of spinules on medial surface near base.

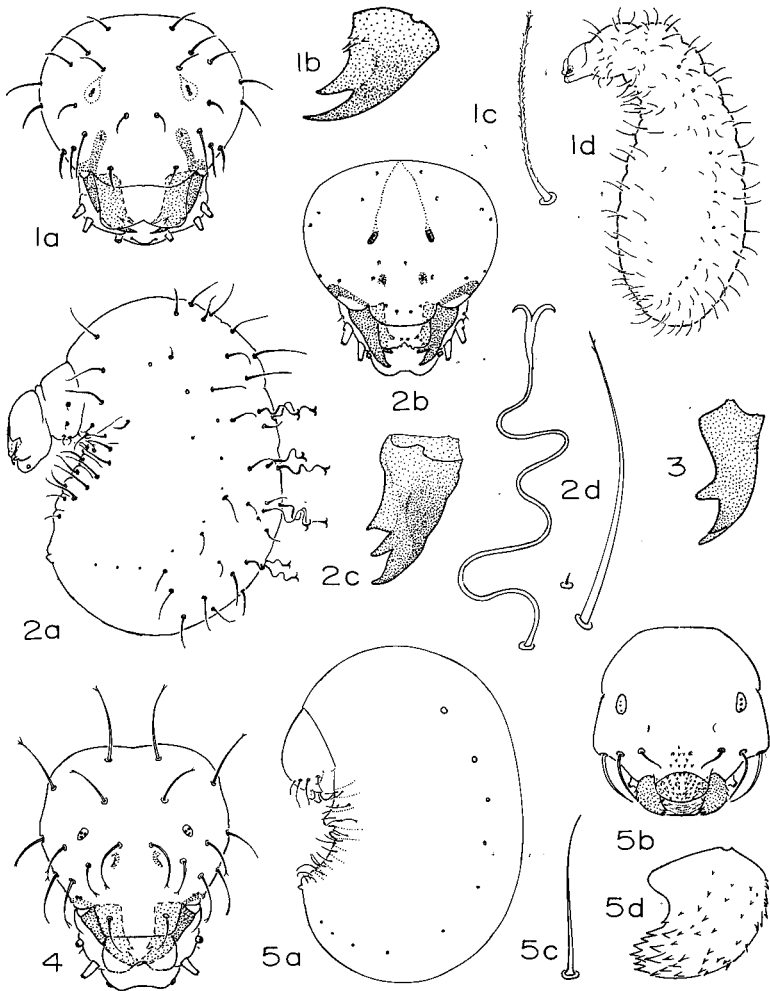
This genus keys to Group I and requires a new rubric "15c. Antenna minute and mounted on a teardrop-shaped base."

The index of specialization is 17.

**Goniomma hispanicum** (E. André)

Fig. 1

Length (through spiracles) about 2.7 mm. Profile pogonomyrmecoid (i.e., diameter greatest near middle of abdomen, decreasing gradually toward anterior end and more rapidly toward posterior end, which is rounded; thorax more slender than abdomen and forming a neck which is curved ventrally). Anus ventral and with a small posterior lip. Wing and leg vestiges present. Diameter of spiracles decreasing posteriorly. About 6 differentiated somites. Integument of midventer of anterior somites sparsely spinulose, the spinules minute and in very short rows. Body hairs sparse, middle of each side of abdomen naked; hairs long (0.08-0.14 mm), unbranched and with minute denticles. Cranium transversely subelliptical in anterior view. Antenna small, on a teardrop-shaped base, with 3 sensilla, each bearing a spinule. Head hairs few (about 25), 0.027-0.06 mm long, flexuous, unbranched, smooth or with minute denticles near tip. Labrum large, bilobed, lateral borders sinuate; each half of anterior surface with 2 sensilla, each bearing a spinule; ventral surface of each half with 3 sensilla, each bearing a spinule; posterior surface with minute spinules in short arcuate rows, the rows forming a reticulate pattern. Mandible small, heavily sclerotized, stout, ectatommoid (i.e., with medial blade and a subapical medial tooth); with a long slender apical tooth, a large subapical medial tooth and a cluster of a few spinules on medial surface near base. Maxilla with apex paraboloidal; palp and galea subequal in length, digitiform; palp with 5 (4 apical and 1 lateral) sensilla; galea with 2 apical sensilla. Labium with minute spinules in short arcuate rows; palp paxilliform with 4 apical and 1 lateral sensilla; opening of sericteries a short transverse slit. Hypopharynx moderately spinulose, the spinules minute and in short arcuate rows, the rows forming a reticulate pattern. (Material studied: numerous larvae from Sarriena, Spain, courtesy of X. Espadaler.)



FIGURES 1-5. 1. *Goniomma hispanicum*. a, Head in anterior view, X86; b, left mandible in anterior view, X500; c, body hair, X400; d, larva in side view, X19. 2. *Acanthomyrmex notabilis*. a, Larva in side view, X50; b, head in anterior view, X133; c, left mandible in anterior view, X300; d, 3 types of body hairs, X340. 3. *Basiceros manni*. Left mandible in anterior view, X387. 4. *Calyptomymex nummuliticus*. Head in anterior view, X170. 5. *Cyphomyrmex hamulatus*. a, larva in side view, X40; b, head in anterior view, X93; c, body hair, X267; d, left mandible in anterior view, X338.

Genus PHEIDOLE Westwood  
**Pheidole bicarinata vinelandica** Forel

D. Wheeler and Nijhout 1981: Life cycle: 3 instars. Internal anatomy: wing discs.

**Pheidole pallidula** (Nylander)

Passera 1976:560. Larvae become infected by *Mermis* sp. at the end of the third instar (length 1.3-1.4 mm).

TRIBE CREMATOGASTRINI  
Genus CREMATOGASTER Lund  
**Crematogaster laeviuscula** Emery

Petralia and Vinson 1979a: Venter — description and SEM.

**Crematogaster (Sphaerocrema) striatula** Emery

Delage-Darchen 1978. Three instars described and differentiated by hairs and diameter of spiracles.

TRIBE SOLENOPSIDINI  
Genus MONOMORIUM Mayr  
**Monomorium minimum** (Buckley)

Van Pelt and Van Pelt 1972. The larvae of *Micordon baliopterus* Loew (Diptera: Syrphidae) fed upon the ant larvae.

**Monomorium pharaonis** (Linnaeus)

Petralia and Vinson 1979a. Venter — description and SEM.

Genus SOLENOPSIS Westwood  
**Solenopsis geminata** (Fabricius)

Jouvenaz et al. 1981:205. This fire ant is parasitized by the microsporidian *Burenella dimorpha* Jouvenaz and Hazard, which appears to be invariably lethal to pupae. Workers cannibalize ruptured pupae and pack the spores into the infrabuccal pocket. The pellets from the pocket are "placed on the praesaepia ('breadbaskets') of the 4th instar larvae. The praesaepium, which bears spines specialized for holding solid food while the larva feeds, is absent from earlier instars, which are fed liquid

only. Because of the method of feeding, the 4th instar larva is the only stage that is vulnerable to infection."

### ***Solenopsis invicta* Buren**

Jouvenaz et al. 1981:205. In Uruguay and Matta Grosso (Brazil) the larvae are parasitized by *Orasema crassa* De Santis and *Orasema* sp. (Chalcidoidea:Eucharitidae). In South America the larvae are parasitized by the larvae of *Apodictia* sp. (Phoridae).

O'Neal and Markin 1973:294: — "Queen and adult workers are very maternal in care and grooming of eggs, larvae and pupae. The only food source for first and early second instar larvae are eggs and liquid regurgitated food provided to late stadium, second, third and fourth instar larvae by a new founding queen. Brood is maintained in separate piles by either the queen or by the workers according to the age of the larvae. Molting larvae, excluding the first instar larvae, are assisted by the nurse workers. Time varies for each instar ecdysis. Workers assist in the removal of the meconium, which is never consumed.

"Food types and food distribution within a new founding colony and a mature colony are presented. The role of brood movement is discussed for the various brood types and worker castes.

"A positive food feedback pattern exists for fire ant larva-worker relationship."

O'Neal and Markin 1975: Larval stages of minor workers 18 days, minors 24 days, majors 28 days and 34 days for sexual forms.

Petralia and Vinson 1978: Workers feed liquid food to larvae of all instars and solid proteinaceous food only to the 4th instar. The 4th instar has ventral hairs (SEM) which hold food.

Petralia and Vinson 1979b: Description and SEM of the 4 instars, which are distinguished by vestiture and mouthparts.

Petralia and Vinson 1980: Internal anatomy.

Petralia, Sorenson and Vinson 1980: Ultrastructure and enzymes of labial gland. The "enzymes include proteases and amylases, which function in extraintestinal digestion of solid food placed on the anteroventral body region of the 4th-instar larvae by adult workers."

### ***Solenopsis molesta* (Say)**

Petralia and Vinson 1979a: Venter — description and SEM.

#### **TRIBE MYRMECININI**

#### **Genus ACANTHOMYRMEX Emery**

The larva of *Acanthomyrmex notabilis* is so different from that of *Acanthomyrmex* sp. (1977:591) that we prefer to eliminate the generic characterization, the specialization index and the key for the genus until more material becomes available.

**Acanthomyrmex notabilis** (F. Smith)

Length (through spiracles) about 3 mm. Profile paedalgoid (i.e., abdomen subspherical, thorax forming a very stout neck, which is arched ventrally). Anus ventral and quite far anterior and with anterior and posterior lips. Leg and wing vestiges present. Spiracles diminishing in diameter posteriorly. Without differentiated somites. Integumentary spinules rather large and isolated on venter of thorax, minute and in short rows posteriorly, larger and in longer rows anteriorly. Body hairs sparse and restricted, lacking on lateral surfaces of abdomen and most of thorax. Of 3 types: (1) unbranched, smooth, 0.027-0.36 mm long on venter of T1-3 and AI-Av and on the dorsum of the thorax and AI-AVI; (2) about 0.5 mm long, anchor-tipped, 4 in a transverse row across dorsum of each AI-AVI; (3) about 0.006 mm long, stout-based on dorsum of AVII-AX. Head large, cranium transversely subelliptical. Antenna small; at the end of a narrow ridge (groove?) which extends to the middle of the occiput; with 3 small sensilla each of which bears a spinule. Head hairs few (21), minute (0.006-0.018 mm), unbranched, smooth and widely scattered. Labrum small, width 3 times length, bilobed; anterior surface of each half with 3 sensilla and with a few spinules, isolated or in short rows near ventral border; ventral surface of each half with 2 projections bearing sensilla; posterior surface spinulose, the spinules in short transverse rows. Mandible ectatommoid (i.e., subtriangular; with a large medial blade arising from the anterior surface and bearing 2 stout medial teeth). Maxilla small, appearing adnate; apex blunt; palp and galea subequal in length and diameter; palp digitiform with 5 (2 apical, 2 subapical and 1 lateral) sensilla, each bearing a spinule; galea digitiform, with 2 apical sensilla, each bearing a spinule. Labium with anterior surface spinulose, the spinules large and in short transverse rows; palp a short skewed peg with 4 apical and 1 lateral sensilla; opening of sericteries a short transverse slit in a shallow depression of the ventral surface. Hypopharynx with a few short rows of spinules dorsally. (Material studied: 1 larva from N. Celebes, courtesy of Dr. W.L. Brown.)

## TRIBE MERANOPLINI

Genus **CALYPTOMYRMEX** Emery**Calyptomyrmex nummuliticus** Santschi

**IMMATURE LARVA.** Length (through spiracles) about 2 mm. Body hairs of 2 types: (1) on all surfaces of all somites, 0.05-0.18 mm long, with short-bifid or short-multifid top; (2) anchor-tipped, 0.12-0.18 mm long. Antenna not in a pit. Head hairs long (0.06-0.13 mm). Labrum with 2 minute hairs on anterior surface and 6-7 minute sensilla on each half of posterior surface. Otherwise similar to mature *Calyptomyrmex cataractae* (1973a:35). (Material studied: 6 larvae from Ivory Coast, courtesy of Dr. W.L. Brown.)

TRIBE LEPTOTHORACINI  
Genus LEPTOTHORAX Mayr  
**Leptothorax nylanderi** (Foerster)

Gabrion et al. reported (1976:408) that the larvae became infected with the larvae of the tapeworm *Anomotaenia brevis*.

TRIBE CRYPTO CERINI  
Genus CEPHALOTES Latreille  
**Cephalotes alfaroi** Emery

IMMATURE SEXUAL LARVA. Length (through spiracles) about 8 mm. Similar to *Cephalotes atratus* (1954:154) except as follows: Body club-shaped, with head on anterior end. Integumentary structures lacking. Head large. Antenna in a cup-like depression. Labral border feebly 4-lobed. Mandible with subapical tooth anterior to apical tooth. Maxilla with lateral boss much larger. (Material studied: 15 larvae from Costa Rica, courtesy of Jack Longino.)

TRIBE BASICROTINI

Changes to be made in two of our earlier papers: — 1960:25. Genus *Rhopalothrix* Mayr to Genus *Eurhopalothrix* Brown and Kempf. *Rhopalothrix amoena* Mann to *Eurhopalothrix bolau*i (Mayr); same changes on p. 10 in "Explanation of Plate II" for fig. 24 and 25.

1973:207. In generic characterization of *Eurhopalothrix* change "myrmeciform" to "pogonomyrmecoid;" hair type (2) should read "uncinate, with or without a terminal bulb;" mandible should be "pogonomyrmecoid."

Genus BASICEROS Schulz  
**Basiceros manni** Brown and Kempf

Length (through spiracles) about 6 mm. Similar to *Basiceros* sp. (1977:599) except as follows: Profile pogonomyrmecoid (i.e., diameter greatest near middle of abdomen, decreasing gradually toward anterior end and more rapidly toward posterior end, which is rounded; thorax more slender than abdomen and forming a neck, which is curved ventrally), with a prominent postanal lip. Body hairs (1) 0.15 mm long; (2) 0.225-0.325 mm long; (3) 0.25-0.43 mm long. Head hairs moderately numerous (52). Mandible with subapical tooth anterior to apical tooth. Labium with short rows of spinules grouped into long transverse rows. (Material studied: six larvae from Costa Rica, courtesy of Jack Longino.)



## TRIBE ATTINI

Weber 1979:98. "The ants are in contact with the mycelium from the moment the eggs are laid. Eggs are placed on the fungus and the larva hatches in a mycelium mesh. The larva is placed by the workers with its head exposed and the nurses place the mycelial strands on the larval mouthparts. Pupation takes place in the same situation, and all stages of the brood are normally coated by the mycelium at all times."

**Genus ATTA Fabricius**  
***Atta sexdens* Forel**

Wilson 1971:45. The colony-founding queen feeds her first larvae with eggs placed in their mouths. After the first workers emerge, they feed their sister larvae with eggs laid by the queen, but these eggs are larger than those that hatch having been formed in the oviduct by 2 or more normal eggs.

***Atta texana* (Buckley)**

Petralia and Vinson 1979a. Venter — description and SEM.

**Genus CYPHOMYRMEX Mayr**

REVISION: Profile attoid. Body hairs restricted to ventral surface. Genal lobes moderately large. Head hairs very few, relatively long and at level of genal lobes. Labrum small and spinulose. Mandible with apical portion strongly curved medially and terminating in several small, sharp teeth; all surfaces sparsely spinulose. Galea represented by 2 sensilla.

***Cyphomyrmex hamulatus* Weber**

Length (through spiracles) about 2.1 mm. Profile attoid (i.e., short, stout, plump, slightly curved, with both ends broadly rounded; anterior end formed by enlarged dorsum of prothorax; head ventral, near anterior end; no neck; somites indistinct); diameter of larva equal to 2 times distance from labium to anus; with a knob on midventer of each AI and AII and a minute knob posterior to postanal lip. Anus ventral. Leg vestiges represented by deep pits. Spiracle on T2 largest, others decreasing in diameter posteriorly. Integument with a few isolated spinules on AX near anus. Body hairs few, restricted to ventral surface, smooth, unbranched, about 0.038 mm long. Head large; cranium slightly longer than broad; subhexagonal; broadest at level of genal lobes; a small cluster of spinules near middle of labrum. Antenna large, with 3 small sensilla, each bearing a spinule. Head hairs few (8) in a row across the bottom of the anterior surface of the cranium; 0.005-0.1 mm long,

simple, flexuous. Labrum small, short, transversely subelliptical; anterior surface with sparse spinules and about 8 minute sensilla; ventral surface densely spinulose; posterior surface spinulose, the spinules minute and in short transverse rows. Mandible moderately sclerotized, attoid (i.e., broad, short and stout, apical portion abruptly turned medially) but with numerous moderately long subequal spinules at apex; all surfaces with isolated rather coarse spinules. Maxilla very small and appearing adnate; palp a very small irregular knob bearing 4 (2 apical and 2 lateral) sensilla; galea represented by 2 contiguous sensilla. Labium with anterior surface densely spinulose, the spinules slender and in short transverse rows; palp represented by a cluster of 4 sensilla. Hypopharynx densely spinulose, the spinules slender and in short transverse rows. (Material studied: 2 larvae from Costa Rica, courtesy of Jack Longino.)

**Genus TRACHYMYRMEX Forel**  
**Trachymyrmex septentrionalis (McCook)**

Petrulia and Vinson 1979a. Venter — description and SEM.

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