NOTES ON ANT LARVAE: MYRMICINAE

BY
George C. Wheeler and Jeanette Wheeler

From the Transactions of the American Entomological Society
Volume 114: 319-327 / 988
Issued January 25, 1989 1566

Notes on Ant Larvae: Myrmicinae

GEORGE C. WHEELER AND JEANETTE WHEELER
Research Associates, Florida Department of Agriculture
3358 NE 58th Avenue
Silver Springs, Florida 32688

ABSTRACT

This article describes 10 species of myrmicine larvae that have accumulated since the publication of our 1986 supplement. The genus *Lachnomyrmex* has not been previously described; the other genera are *Acanthomyrmex, Leptothorax, Rogeria* and *Tetramorium.* Also included are references to myrmicine larvae in the literature.

This treatise includes descriptions of larvae accumulated since the completion of our Ten-Year Supplement (1986) to our 1976 Memoir. It includes also references to myrmicine larvae found in the literature. Citations to our own publications are by year only. The terms used below for describing profiles and mandible shapes are defined in our 1976 Memoir and 1986 Ten-Year Supplement.

TRIBE SOLENOPSIDINI

Genus **MONOMORIUM** Mayr

Monomorium pharaonis (Linnaeus)

Brendt and Kramer 1986. The external anatomy of the larvae is described in great detail. Three larval stages (worker and queen) are differentiated by width of head, head hairs and diameter of the "1th thoracal spiracule." The illustrations (4 line drawings and 7 SEM) are mostly of poor quality.

Genus **SOLENOPSIS** Westwood

Solenpsis invicta Buren

O'Neal and Markin 1975:141. "The mandible, labrum, labium, maxillary palp and galea are good characters for differentiating the instars but not the castes." Four instars are described and illustrated.

TRIBE MYRMECININI

Genus **Acanthomyrmex** Emery

Mandible ectatommoid. Maxilla small; appearing adnate; apex blunt; palp and galea digitiform and subequal in size.

In 1977 we described *A. ferox* (called *A.* sp.) and in 1983 *A. notabilis.* We said the latter was so different from the former that we preferred to eliminate the generic characterization until more material became available.

In his recent revision Moffett (1985) divided the genus into 2 species groups; *ferox* is in the *lucida* species-group and *notabilis* in the *notabilis* species-group. The larvae of these two species (*ferox* and *notabilis*) are at least generically different and could easily be placed in different tribes. Hence we must characterize them separately.

lucida species-group

Profile pogonomyrmecoid. Body hairs sparse; medium to long. Of 3 types: (1) stout, with a few minute to long denticles; (2) simple, slender, flexuous, on ventral and lateral surfaces; (3) long, anchor-tipped, with flexuous shaft, 4 in a row on dorsum of each AI-AVI. Cranium subovoidal, slightly broader than long. Antennae minute. Head hairs few; with stout base and with fine denticles on apical half. Mandible ectatommoid, with blade extending onto apical tooth; all teeth stout. Maxilla small; palp and galea digitiform and subequal in size. (1977:591.)

notabilis species-group

Profile paedalgoid. Body hairs sparse and restricted: lacking on lateral surfaces of abdomen and most of thorax. Of 3 types: (1) unbranched, smooth, moderately long, on venter of thorax and AI-AV and on dorsum of thorax; (2) minute, stout-based, on dorsum of AVII-AX; (3) anchor-tipped, 4 in a transverse row across dorsum of each AI-AVI. Cranium transversely subelliptical. Antennae small, each at the end of a narrow ridge (groove?) which extends to middle of occiput. Head hairs few, minute, unbranched, smooth and widely scattered.

Acanthomyrmex notabilis F. Smith

Moffett 1985: "Pupae and large larvae were held while still resting on the ground, and smaller immatures, including clusters of eggs and microlarvae, were often held raised from the ground" (p. 170). "Only minors were observed to allogroom and to lick brood. Larvae fed on regurgitated food from minor workers." (P. 171.)

TRIBE LEPTOTHORACINI

Genus **INDOMYRMA** Brown

Indomyrma dasypyx Brown

Brown 1985:38. "Larvae: similar to that of *Dacetinops* (allowing for instar differences and small sample size of the material available)."

Genus **LACHNOMYRMEX** Wheeler

Profile pheidoloid (i.e., abdomen short, stout and straight; head ventral, near anterior end, mounted on a short neck which is the prothorax; ends rounded). Body hairs sparse and long, of 4 types: smooth with frayed tip; flexuous shaft and a small bulb tip; smooth shaft and uncinate tip; flexuous shaft with anchor-tip. Head hairs sparse, long, smooth, with curved shaft. Mandible ectatommoid (i.e., subtriangular,

with a medial blade arising from anterior surface, with 2 medial teeth; apex curved medially to form a tooth).

In our 1976 key *Lachnomyrmex* should be added to 9a under Profile 2.

The specialization index is 14 which makes it the most generalized genus which we have studied in the tribe Leptothoracini, which now has a specialization index of 21.

Lachnomyrmex scrobiculatus Wheeler

Mature Larvae. — Fig. 1. Length (through spiracles) 2.4 - 2.6 mm. Profile pheidoloid, with few distinct somites. Spiracles small, decreasing slightly posteriorly. Integument on venter of T1 - T3 and AI - AIII with a few minute spinules, AVII - AX more spinulose. Body hairs very sparse, long, generally distributed. Of 4 types: (1) 0.06 - 0.18 mm long, with slightly curved shaft and short frayed tip, on ventral half of body; (2) 0.125 - 0.3 mm long, with curved shaft and small apical bulb, on dorsal half of body; (3) about 0.016 mm long, few, smooth, with flexuous shaft and uncinate tip; (4) 0.19 - 0.22 mm long, with flexuous shaft, anchor-tipped, 4 in a row across dorsum of AI - AIII and AV, 6 on AIV. Cranium subhexagonal, slightly wider than long, dorsal border feebly concave. Antennae at midlength of cranium, large, 3 closely spaced sensilla on a sclerotized slight elevation on a feebly stained large raised teardrop-shaped base. Head hairs 0.038 - 0.125 mm long, few (about 25), shaft curved and smooth. Labrum small, bilobed, anterior surface with 12 sensilla on and near the ventral surface; ventral surface with minute spinules in the impression; posterior surface spinulose, the spinules coarse and isolated, with about 20 sensilla. Mandible ectatommoid, heavily sclerotized laterally and apically, blade less sclerotized; apical tooth narrow and curved medially; blade with a rather stout-based apical tooth and a smaller subapical tooth and with a few denticles near teeth. Maxilla small with abruptly narrowed apex; palp and galea subequal in height; palp subcylindrical with 5 (2 apical with a spinule each, 2 large subapical and encapsulated, 1 lateral and with a rather long spinule) sensilla; galea subconical with 2 apical sensilla. Anterior surface of labrum with short transverse rows of rather long spinules; palp short paxilliform, with 5 sensilla similar to maxillary sensilla; opening of sericteries a short transverse slit in a slight depression. Hypopharynx with a few short transverse rows of minute spinules dorsally.

Young Larvae. — Fig. 2. Length (through spiracles) 1.3 - 1.5 mm. Similar to mature larva except as follows. Integument on venter of T1 and T2 with minute isolated spinules, T3 and AI with spinules in short rows. Body hairs (1) on all surfaces of all somites; (2) fewer; (3) similar; (4) 4 in a row across dorsum of AI - AIV.

Material studied. — 7 larvae and 3 semipupae from Venezuela: "Tachira, Carretera San Cristobal-La Florida, Cano Seco, 1125 m. 9-XII-1985; J. Lattka (No. 727) and W.L. Brown, leg."

Genus **LEPTOTHORAX** Mayr

Leptothorax diversipilosus M.R. Smith

Length (through spiracles) 2.7 mm. Very similar to *L. muscorum* (1955:21) except as follows. Body hairs (1) 0.006–0.025 mm long; (2) 0.025–0.125 mm long, tip short

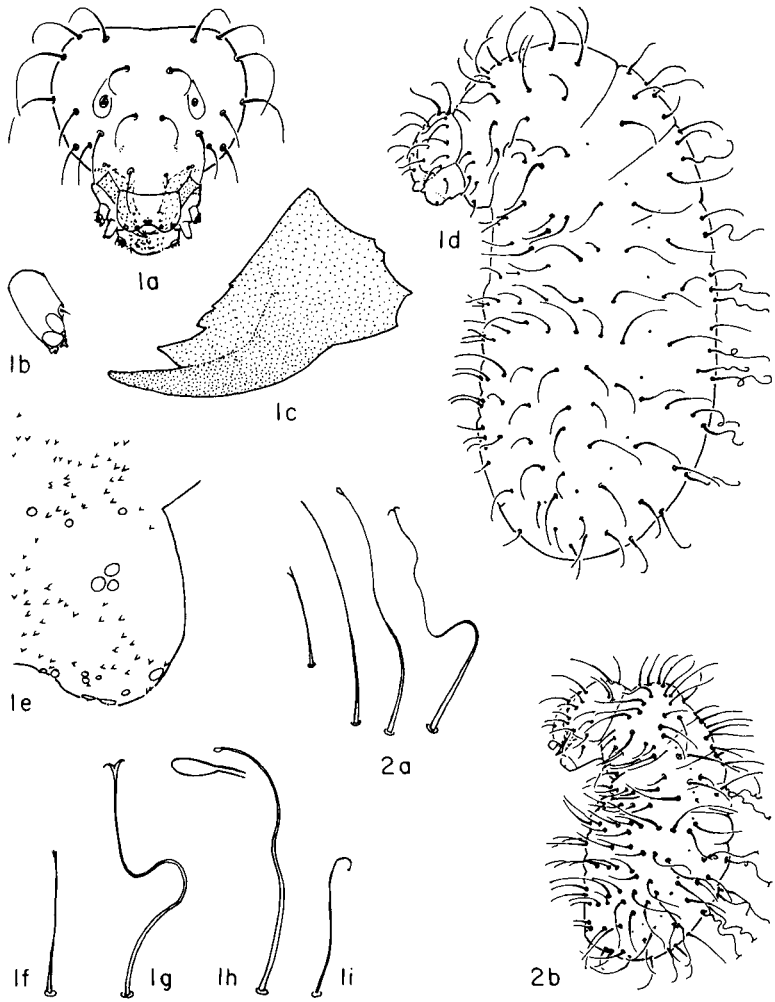

FIGURE 1 – 2. *Lachnomyrmex scrobiculatus* Fig. 1. Mature larva. **a**, Head in anterior view, x100; **b**, left maxillary palp in anterior view, x435; **c**, left mandible in anterior view, x435; **d**, larva in side view, x42; **e**, right half of posterior surface of labrum, x600; **f**, type 1 body hair, x200; **g**, type 4 body hair, x200; **h**, type 2 body hair, x200, and tip enlarged, x1424; **i**, type 3 body hair, x200. Fig. 2. Young larva. **a**, 4 types of body hairs, x200; **b**, larva in side view, x42.

bifid-branching; (3) 6 in a row across each AI-AVI. Head subtrapezoidal, narrowed ventrally. Mandible with sharp-pointed teeth. Maxillary palp a short frustum with 5 sensilla; galea a short peg. Labial palp a slight elevation with 5 sensilla. (Material studied: several larvae from Washington, coll. G.D. Alpert, courtesy of A. Francoeur.)

Leptothorax longispinosus Roger

Length (through spiracles) 2.2 mm. Similar to *L. ambiguus* (1955:22) except as follows. Body hairs: (1) 0.005 - 0.015 mm long, straight; (2) 0.025 - 0.15 mm long, tip multifid; (3) about 0.2 mm long. Integument of middle of anterior surface of head with rows (ridges? rows of minute spinules?) forming a reticulate pattern. Head hairs longer (0.004-0.125 mm long) and moderately numerous (62). Medial blade extending length of mandible (as in *L. muscorum*), tips of medial teeth erose. Maxillary and labial palps with 5 sensilla each. (Material studied: 7 larvae from Ontario, courtesy of R.S. Stuart.)

Leptothorax provancheri Emery

Young Larva. — Length (through spiracles) about 2.7 mm. Similar to mature (1973:73) except as follows. Body hairs: (1) grading from 0.013 mm long and bifid to 0.125 mm long and multifid; (2) about 0.013 mm long, simple, most numerous on venter of T1, less numerous dorsally and posteriorly; (3) about 0.3 mm long, anchor-tipped, 4 in a row across dorsum of each AI-AV. Cranium with cheeks slightly concave. Head hairs slightly longer (0.005-0.025 mm long). Labrum subtrapezoidal, narrowed ventrally; anterior surface with about 4 sensilla ventrally. Mandible pogonomyrmecoid, apical and medial teeth straight. Maxilla with apex paraboloidal; galea a slight elevation with 2 sensilla. Labium hemispherical; palp represented by a contiguous cluster of 5 sensilla; an isolated sensillum adjacent to each palp. (Material studied: 10 larvae from Quebec, courtesy of A. Francoeur.)

Letothorax quebecensis (Francoeur)

Mature (?) Larva. — Length (through spiracles) about 3 mm. Similar to mature *L. provancheri* (1973:73) except as follows. A small midventral boss on each T1 - T3 only. Body hairs of types 1 and 2 less numerous and shorter: (1) 0.025 - 0.17 mm long; (2) 0.013 - 0.025 mm long. Head hairs abundant (104) and longer (0.008 - 0.025 mm long). Anterior surface of labrum with 6 hairs; ventral surface with 4 isolated and 2 or 3 clusters of 2 sensilla each; posterior surface with 10 isolated sensilla middorsally. Medial teeth of mandible smaller. Maxillary and labial palps each represented by 5 contiguous sensilla. (Material studied: 3 larvae from Quebec, courtesy of A. Francoeur.)

Leptothorax wheeleri M.R. Smith

Mature (?) Larva. Length (through spiracles) 3.4 mm. Similar to *L. ambiguus* (1955:22) except as follows. No spinules on integument. Body hairs slightly more numerous, more evenly distributed: (1) a few on each somite; (2) with multifid tip

and stout base, most numerous on T1 and AX, largely confined to dorsal and ventral surfaces elsewhere; (3) with stouter anchor-tip. Antenna larger (but still small); at midlength of cranium. Head hairs moderately numerous (52) and bifid to multifid. Labrum feebly trilobed; middle lobe bearing 2 isolated and 2 pairs of contiguous sensilla. Mandible ectatommoid, blade narrow and extending from small subapical tooth to base of mandible. Labial palp a slight elevation with 5 sensilla.

Young Larva. — Length (through spiracles) 1.4 mm. Similar to mature larva except as follows. Sac-like with head on anterior end. Four feebly differentiated somites. Integument on all surfaces of AX spinulose, spinules minute and isolated or in short rows, elsewhere confined to dorsum and less numerous anteriorly. Body hairs of only 2 types (type 1 lacking). Labrum feebly bilobed. Mandible with 2 medial teeth.

Material studied. — 2 semipupae and 4 larvae from Florida, courtesy of J.C. Trager.

THE LEPTOTHORAX MESS

Brown (1973) considered the names of 12 alleged genera to be possible synonyms of *Leptothorax*. Most (if not all) these taxa are inqulines in the nests of a species of *Leptothorax*. Then there are species of *Leptothorax* that are inqulines with congeneric species. The relationships are mostly unknown, but they probably range from mutualism to predatism or parasitism.

Dr. André Francoeur, who has undertaken the Augean task of revising the tribe Leptothoracini, has expressed to us the hope that the larvae might afford some clues concerning the taxonomic relationship between inquline and host. We replied that if we were ever to learn anything about the problem we would need to have undoubted and comparable material: we would require in a vial mature worker larvae, prepupae (or pupae) and workers of the inquline species *only* and in a separate vial the same stages of the host species *only*. A similar requirement sent to Dr. Alfred Buschinger brought us the following comment in a letter: "Very difficult, if not impossible, to provide them."

Genus **ROGERIA** Emery

Rogeria belti Mann

Length (through spiracles) 1.7 - 2.4 mm. Similar to *R. scandens* (1986:493) except as follows. Integumentary spinules extending to a few rows on AI. Body hairs of type 2 0.025 mm long, nearly straight near anus, elsewhere 0.025 - 0.075 mm long and with curved shaft; (3) about 0.15 mm long, 4 in a row across dorsum of T2 - AIII. Each half of anterior surface of labrum with only 2 hairs about 0.006 mm long, anteroventral and ventral surfaces with rather coarse isolated spinules or short rows of minute spinules; entire posterior surface with spinules confined to lateral and ventral areas. Maxillary palp with 5 (1 apical and encapsulated, 3 apical and with a spinule each and 1 subapical with a longer spinule) sensilla. (Material studied: 12 larvae from Costa Rica, courtesy of J.T. Longino.)

Rogeria blanda F. Smith

[Integuments torn] Shape probably similar to *R. procera* (1973:74). Head hairs 0.025 - 0.063 mm long. Spinules on posterior of labrum confined to lateral thirds. Mandible with longer, more pointed teeth and denticles. Maxillary palp and galea taller. Labium wider, palp a distinct knob with 5 sensilla. (Material studied: 12 larvae from Peru, courtesy of C. Kugler.)

TRIBE TETRAMORIINI

Genus **TETRAMORIUM** Mayr

Tetramorium blochmani Forel

Length (through spiracles) 3 - 4.7 mm. Profile pogonomyrmecoid. Similar to *T. caespitum* (1954:445) except as follows. Anus with small posterior lip. With about 6 distinct somites. Integument without spinules. Body hairs of 2 types: (1) 0.025 - 0.75 mm long, bifid (rare) or multifid; (2) about 0.25 mm long, 4 in a row across dorsum of each AI - AIV. Dorsal border of cranium rounded. Head hairs 2- to 4-branched. Labial palp slightly elevated. (Material studied: 8 larvae and 1 semipupa from South Africa and 6 larvae and 16 semipupae from Zambia, courtesy of R.E.

Tetramorium lobulicorne Santschi

Length (through spiracles) 2.4 - 2.8 mm. Profile pogonomyrmecoid. Similar to *T. caespitum* (1954:445) except as follows. Anus with a small posterior lip. Integument sparsely spinulose, with short rows of spinules on venter of T2 and T3 (none on venter of T1), isolated elsewhere. Body hairs: (1) 0.025 - 0.075 mm long, with curved shaft and short multifid tip, generally distributed; (2) 0.09 - 0.175 mm long, with nearly straight shaft and bifid-branching tip, in a narrow band around T1 and T2, elsewhere on dorsal and dorsolateral surfaces; (3) 0.3 - 0.375 mm long, 4 in a row across dorsum of AI - AIV. Dorsal outline of head rounded. Head hairs 0.015 - 0.063 mm long, with bifid tip. (Material studied: 3 larvae from South Africa, courtesy of R.E. Gregg).

TRIBE CATAULACINI

Genus **CATAULACUS** F. Smith

Bolton (1974:9) uses our 1960 characterization in his definition of the genus. At the bottom of p. 9 he refers to our detailed larval descriptions (1954:149 - 151) "for the species *egenus, horridus* (now a synonym of *insularis*) and *taprobanae.*" This last he said "is not *taprobanae,* which is restricted to India and Ceylon, but most probably either *catuvolcus* or *chapmani;* species related to *taprobanae,* from the Philippines."

TRIBE BASICEROTINI

Genus **BASICEROS** Schulz

Basiceros manni Brown and Kempf

Wilson and Holldobler 1986. "The prey are fed directly to the larvae."

Genus **EURHOPALPTHRIX** Brown and Kempf

Wilson and Brown 1984:423. "The larvae were transported in a distinctive manner reminiscent of prey retrieval. That is, the workers did not usually grasp the bodies of the larvae directly in their sharp teeth but instead gripped one or more of the abundant hairs that project from all sides of the body. They then either lifted the larvae off the ground and carried them in a forward walking movement, or else—in the case of some of the larger larvae—dragged them while walking backward. The ants were relatively indifferent to the exact position of the hairs they seized, although in most cases they utilized hairs on the back or sides of the larva. Thus in a series of 60 episodes recorded, involving quarter- to full-grown larvae, the hairs gripped by transporting workers were on the dorsum 22 times, on one side or the other 31 times, and on the venter 7 times. The position of the hairs utilized also ranged widely, from behind the head to the tip of the abdomen. In 5 cases some part of the body itself was held during transport.

"The morphology of *Eurhopalothrix* larvae suits them very well for this atypical form of transport. As noted by WHEELER and WHEELER (1954, 1960), their bodies are densely covered by erect hairs, many of which are relatively long and curved at the tip. In case of *E. bolaui,* some of the hairs have swollen tips. It is quite easy for workers to get a firm grip from almost any direction.

"The *E. heliscata* workers fed the larvae by placing entire prey or fragments of prey directly on top of them or next to them. The larvae were very active, in a manner reminiscent of those of *Myrmecia* and many ponerines. They turned and stretched the anterior parts of their body frequently and sometimes for considerable distances, changing the position of their heads by as much as half their full body lengths. These manuevers enabled them to reach and feed on many prey items placed next to them that otherwise would have been unattainable. Occasionally larvae convulsed the entire length of their bodies, causing them to roll completely over."

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