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GEORGE C. WHEELER

and

JEANETTE WHEELER

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The Ant Larvae of the Myrmicine Tribes Meranoplini, Ochetomyrmicini and Tetramoriini

George C. and Jeanette Wheeler
University of North Dakota, Grand Forks

Tribe MERANOPLINI Emery

This is a little-known tribe of about 70 species in eight genera. *Meranoplus* is the largest, with 40 species (mostly in Australia); *Calyptomyrmex* musters 14; the remaining genera contain only a single rare species each. Many species of *Meranoplus* are harvesters; their workers move very slowly and "feign death" readily when disturbed. The Meranoplini occur only in the Old World Tropics.

Genus MERANOPLUS F. Smith

Body hairs moderately numerous and of one type: simple and flexible. Cranium subrectangular in anterior view, slightly longer than broad. Head hairs moderately numerous and simple. Antennae small. Labrum small and feebly bilobed; posterior surface sparsely spinulose. Mandible subtriangular in anterior view; apex slightly turned medially and forming a sharp-pointed tooth; middle half of the anterior surface of inner border blade-like, furnished with a few ridges (or grooves?) and sometimes bearing one or more small denticles. Maxillary palp a low knob bearing five sensilla. Labial palps each represented by a cluster of five sensilla; an isolated sensillum between each palp and the opening of the sericteries. Hypopharynx sparsely spinulose, the spinules minute and in a few long subtransverse rows.

MERANOPLUS OCEANICUS F. Smith

Pl. I, figs. 16-18

Leg, wing and gonopod vestiges present. Body hairs moderately numerous, simple and flexible, 0.054-0.245 mm long. Cranium subrectangular in anterior view, slightly longer than broad. Head hairs moderately numerous, simple, slightly curved, minute to long (0.018-0.14 mm). Antennae small; each with three sensilla, each of which bears a minute spinule. Labrum small, breadth 2× length, feebly bilobed due to a median impression of the ventral border; slightly narrowed dorsally; anterior surface of each lobe with 5-7 minute (about 0.009 mm) hairs and/or spinulose sensilla; ventral border of each lobe with a cluster of two or three sensilla; posterior surface with a few subtransverse rows of rather sparse minute spinules; posterior surface of each half with a cluster of two or three sensilla and three isolated sensilla. Mandibles moderately sclerotized; subtriangular in anterior view, apex slightly turned medially and forming a sharp-pointed tooth; middle half of anterior surface of inner border blade-like and furnished with a few ridges (or grooves?), sometimes bearing one or more small denticles. Maxillae with the apex paraboloidal; palp a low knob with five sensilla, four of which bear a spinule each; galea a frustum with two apical sensilla. Labial palps each represented by a cluster of five sensilla, four of which bear a spinule each; an isolated sensillum between each palp and the opening of the sericteries; the latter a short transverse slit. Hypopharynx sparsely spinulose, the spinules minute and arranged in a few long subtransverse rows. (*Material studied:* seven tattered integuments from New South Wales.)

Tribe OCHETOMYRMICINI Emery

This is a small Neotropical tribe of ten species—two in *Ochetomyrmex* and eight in *Wasmannia*. *W. auropunctata* "has recently become established in southern Florida. It is not surprising that this insect should have made its appearance there, since it has been carried all over the tropics in both the Old and New World. Moreover, *auropunctata* appears to be an exceedingly adaptable species as far as the type of nest site is concerned. M. R. Smith (1936) has pointed out that it will tolerate all sort of nesting conditions from heavy shade to areas of extreme dryness and intense illumination. On the other hand, *auropunctata* shows no such adaptability in the matter of mean yearly temperature. It

requires tropical or subtropical conditions and apparently cannot tolerate the climatic conditions which occur along the Gulf coast. The severity of the sting of this little ant is out of all proportion to its small size. Coupled with its practice of tending various aphids this makes *auropunctata* a rather undesirable addition to our ant fauna."[1]

Genus WASMANNIA Forel

Body subcylindrical and rather stout; diameter greatest at the mesothorax, decreasing slightly to the second abdominal somite, increasing slightly to abdominal somite IV, and then decreasing somewhat more rapidly to the posterior end, which is narrowly rounded; prothorax forming a stout and very short neck which is at right angles to the rest of the body. Body hairs sparse, short to long, with the apical portion denticulate. Head hairs few, short to long, with the apical portion denticulate. Antennae small. Labrum small, short and trilobed. Mandibles narrowly subtriangular in anterior view; slightly curved medially; apex forming a rather short acute tooth; a smaller acute subapical tooth; several rather long and sharp-pointed denticles on the inner surface near the base. Maxillary palp a low knob bearing five sensilla. Labial palp a cluster of five sensilla; an isolated sensillum between each palp and the opening of the sericteries. Hypopharynx apparently without spinules but with a few longitudinal ridges near the pharynx.

WASMANNIA AUROPUNCTATA (Roger)

Pl. I, figs. 19-26

Worker larva.—Length about 1.4 mm. Body subcylindrical and rather stout; diameter greatest at the mesothorax, decreasing slightly to the second abdominal somite, increasing slightly to abdominal somite IV and then decreasing somewhat more rapidly to the posterior end, which is narrowly rounded; prothorax forming a stout and very short neck which is at right angles to the rest of the body; anterior end broadly rounded and formed from the dorsa of the prothorax and mesothorax. Anus posteroventral. Leg, wing and gonopod vestiges present. Segmentation indistinct. Mesothoracic spiracle noticeably larger than the others. Body hairs sparse, short to long (0.018-0.135 mm), with the apical portion denticulate. Head moderately large. Cranium transversely subelliptical in anterior view, slightly broader than long, with marked occipitolateral angles. Head hairs few, short to long (0.02-0.088 mm), with the apical portion denticulate. Antennae small; each with three sensilla, each of which bears a rather long spinule. Labrum small and short (breadth 2.7× length), trilobed; anterior surface of each lateral lobe with three isolated sensilla; ventral border of each lateral lobe with one isolated and two contiguous sensilla and a few minute spinules; posterior surface of each lateral lobe with three or four isolated sensilla; entire posterior surface spinulose, the spinules minute and in subtransverse rows. Mandibles moderately sclerotized; narrowly subtriangular in anterior view; slightly curved medially; apex forming a rather short acute tooth; a smaller acute subapical tooth on the inner border; several rather long and sharp-pointed denticles on the inner surface near the base. Maxillae with the apex paraboloidal; palp a low knob with five sensilla, three of which bear a spinule each; galea subcylindrical and slightly curved, with two apical sensilla. Labial palp a slightly elevated cluster of five sensilla, three of which bear a spinule each; an isolated sensillum between each palp and the opening of the sericteries; the latter a short transverse slit. Hypopharynx with a few longitudinal ridges near the pharynx. (*Material studied:* several larvae from Costa Rica, Panama Canal Zone and Puerto Rico.)

Queen larva.—Similar to the worker except in the following details: Length 3.5 mm. Much plumper. Diameter greatest near the posterior end (which is broadly rounded), decreasing anteriorly. No neck, head applied to the ventral surface near the anterior end. Body hairs of two types: (1) on the ventral surface, 0.054-0.108 mm long, with the apical portion denticulate; (2) generally distributed, simple, 0.18-0.216 mm long, flexible. Mandibular teeth vestigial. (*Material studied:* a single larva from Puerto Rico.)

Mann[2] has collected *Orasema minutissima* Howard in a hollow twig with a colony of this ant. Presumably the eucharid larvae had parasitized the ant larvae.

Tribe TETRAMORIINI Emery

This is a large tribe of some 200 species in 13 genera. The largest and best known

1 W. S. Creighton. Bull. Mus. Comp. Zool. Harvard 104:294-295. 1950.
2 W. M. Mann. Psyche 25:106. 1918.

genus is *Tetramorium,* with 90 species. It occurs native in all faunal realms except the Neotropical, but several tramp species have spread throughout the tropics of both hemispheres. This genus is perhaps best known because of *T. caepitum,* which is host to parasitic ants of the genera *Anergates* and *Strongylognathus.* This same species has occasionally been reported as a pest destroying the living parts of cultivated plants. Several species are harvesters and a few are house and ship pests in the tropics.

The second largest genus is *Xiphomyrmex* with 47 species and the third *Triglyphothrix* with 31 species. *T. striatidens* is a tropicopolitan tramp which has become established in the southeastern United States. The remaining ten genera are small and rare.

Genus TETRAMORIUM Mayr

Stout, paunchy and rather short; diameter greatest at abdominal somite IV; attenuated somewhat toward either end; prothorax turned ventrally to about 90° and forming a short stout neck; posterior end narrowly rounded; anus ventral. Body hairs moderately numerous. Of two or three types: (1) short, with the tip simple to multifid, the most abundant type; (2) moderately long, with the tip short-branched or denticulate, few or none; (3) long, anchor-tipped, with tortuous shaft, four in a row across the dorsum of each of the anterior four, five or six abdominal somites. Head hairs few, minute to long, with the tip denticulate or bifid. Labrum feebly bilobed; breadth twice the length; posterior surface densely spinulose. Mandibles subtriangular in anterior view; body of mandible terminating in a rather long round-pointed apical tooth; anterior surface projecting inward as a blade, which forms two large teeth. Maxillae bearing a few short rows of minute spinules; apex paraboloidal. Labium with the anterior surface spinulose; palps lateral, each represented by a cluster of five sensilla; an isolated sensillum between each palp and the opening of the sericteries. Hypopharynx densely spinulose, the spinules rather long and arranged in rows; dorsally the rows form a reticulate pattern; ventrally the rows are subtransverse.

TETRAMORIUM CAESPITUM (Linnaeus)

Pl. I, figs. 1-11

Mature worker larva.—Length about 2.7 mm. Stout, paunchy and rather short; diameter greatest at abdominal somite IV; attenuated somewhat toward either end; prothorax turned ventrally to about 90° and forming a short stout neck; posterior end narrowly rounded. Anus ventral. Leg, wing and gonopod vestiges present. Segmentation indistinct. Spiracles small; the mesothoracic the largest; the size decreasing posteriorly. Integument of ventral surface of anterior somites and dorsal surface of posterior somites spinulose, the spinules minute and in short transverse rows. Body hairs moderately numerous but sparse on the ventral surface of the abdomen. Of three types: (1) on the dorsal and dorsolateral surfaces, short (0.027-0.036 mm), with multifid flattened tip, the most abundant type; (2) a few on each somite, moderately long (0.045-0.18 mm), the tip branched; (3) anchor-tipped, with tortuous shaft, long (about 0.3 mm), four in a row across the dorsum of each abdominal somite I-V. Cranium subhexagonal (in anterior view), with the corners rounded. Head hairs few, short to long (0.009-0.08 mm), with the tip flattened and denticulate. Antennae slightly elevated, each with three sensilla, each of which bears a spinule. Labrum twice as broad as long, feebly bilobed, somewhat narrowed dorsally; anterior surface of each half bearing five sensilla; ventral and lateral borders may show a few spinules in short rows; ventral border with two contiguous sensilla on each half; posterior surface densely spinulose, the spinules minute and in short rows; posterior surface of each half with three or four sensilla in an oblique row slanting upward and outward. Mandibles heavily sclerotized, subtriangular in anterior view; body of mandible terminating in a rather long round-pointed apical tooth; anterior surface projecting inward as a blade which forms two large teeth; sometimes a smaller additional tooth is present on the posterior surface. Maxillae with the apex paraboloidal; with a few short rows of minute spinules; palp a skewed peg with five sensilla, three of which are larger and bear a spinule each; galea a taller frustrum with two apical sensilla. Labium with the anterior surface spinulose, the spinules minute and in short transverse rows; palps lateral, each represented by a cluster of five sensilla, three of which bear a spinule each; an isolated sensillum between each palp and the opening of the sericteries; the latter a short transverse slit. Hypopharynx densely spinulose, the spinules rather long and arranged in rows; dorsally the rows form a reticulate pattern, ventrally the rows are subtransverse. (*Material studied:* numerous larvae from New York and Turkestan.)

Queen larva.—Generally similar to the worker larva but differing in the following details: Body hairs of three types: (1) dendritic (with long trunk), short (0.018-0.09 mm), the most abundant type: (2) very few, long (0.225-0.45 mm), simple or with the tip branched, (3) anchor-tipped, very long (about 0.45 mm), with sinuous shaft. Head hairs dendritic (with long trunk), 0.027-0.045 mm. Spinules on antennal sensilla rather long. Mandibular teeth longer. Hypopharynx with the spinules not arranged in a reticulate pattern. (*Material studied:* seven damaged integuments from New Jersey.)

Young larva.—Length about 2.1 mm. Generally similar to the mature worker larva, but differing in the following details: Neck slenderer; abdomen more swollen. Anus with a prominent posterior lip. Segmentation more distinct. Antennae frequently with only two sensilla each. (*Material studied:* a few specimens from New York.)

Adlerz, 1886; "The hairy covering on the ventral surface of the larvae is similar to that of the *Anergates* larvae, although the hairs are clearly weaker and less branched; they are also sparser and at times are lacking on some segments. The hairs on the dorsal surface are similar to those on the ventral surface; but scattered in between are to be found a few long hairs which are branched at the ends and also occasionally anchor-tipped hairs" (p. 272). (Translation from the Swedish by Professor Edith E. Larson.) Pl. VII, Fig. 4, two branched hairs; Fig. 4*a*, anchor-tipped. Internal anatomy is mentioned briefly on page 58.

André, 1881-6, Pl. V, Fig. 5: larva in side view.

DeGeer, 1778, Pl. XLIII, Fig. 18: larva in side view, probably of this species.

Donisthorpe, 1927*a*: "Yellowish white; whiter and more hairy when young; similar to that of *Anergates,* the head, however, is furnished with short hairs, the short branching hairs scattered over the whole body are not so densely nor compactly branching, and the longer hairs are not serrate. Long anchor-tipped hairs are situated on the dorsal surface of the second to the sixth abdominal segments" (p. 192 = 1915, p. 172). Pl. II (= 1915, Pl. II) includes photographs of large and small larvae in side view.

Donisthorpe (1927*b*, p. 98) stated that the proctotrupid *Tetramopria donisthorpei* Kief. is probably parasitic on the larvae of this ant.

Escherich refigured (1906, Fig. 32 = 1917, Fig. 38E) Adlerz's drawing of an anchor-tipped hair.

Gösswald (1934/35, p. 125) listed this ant as a mermithid host. Presumably the nematode larvae had been parasitic in the ant larvae.

Hölldobler, 1928, p. 142: "Eine *Anergates-Tetramorium-cespitum* Kolonie nahm den Keulen-Käfer (*Claviger testaceus*) auch gerne auf, aber hier zeigte er sich als verheerender Bruträuber, der alle Tage eine Larve oder Puppe auffrass."

Janet, 1897, pp. 11-12: "J'ai vu, de la façon la plus nette, une larve d'ouvrière sucer une petite larve jaune de Coléoptère. La larve de Tetramorium n'était pas très éloignée d'avoir atteint sa taille définitive. Elle était suspendue par ses poils d'accrochage contre la paroi du nid, immédiatement sous le plafond en verre. Elle était placée horizontalement, le dos en haut, mais un peu de côté. Au-dessous d'elle, placée tête-bêche, parallèlement à son corps et soutenue en partie par les poils d'accrochage de l'abdomen du Tetramorium, se trouvait la petite larve jaune vermiforme, ayant ½ millimètre de diamètre et 2 millimètres ½ de longueur. Cette larve jaune avait certainement été placé là par une ouvrière, car pendant l'emménagement, j'en avais vu une qui introduisait une larve semblable dans le nid. La larve de Tetramorium avait sa tête infléchie et appliquée contre la larve jaune. Elle laissait voir, très nettement, sa bouche et ses pièces buccales. Grâce à ces circonstances exceptionnellement favorables j'ai pu examiner, avec une forte loupe, ce qui s'est passé, et cela pendant plus d'un quart d'heure. J'ai d'abord constaté le mouvement incessant de la bouche et vu nettement l'absorption du liquide transparent qui sortait de la plaie. Libre dans sa partie moyenne, la petite larve jaune était soutenue dans sa région céphalique par les poils d'accrochage de l'abdomen du Tetramorium. Ce dernier maintenait, au moyen de ses mandibules crochues, l'extrémité anale de sa proie, et cette extrémité était animée d'un mouvement rhythmé de balancement résultant des mouvements de succion. Pendant ce repas, et sans que la larve du Tetramorium parut en être dérangée, une ouvrière est venue la lécher. Cette ouvrière est allée, ensuite, dégorger de la nourriture contre la bouche d'une larve voisine. Au bout d'un quart d'heure j'ai dû interrompre l'observation parce qu'une ouvrière est venue, malencontreusement, intercaler une nymphe entre la larve observée et le verre. J'ai alors pris la larve avec un pinceau et une petite

cuiller et j'ai constaté qu'elle avait ramené sa bouche contre son corps, et que le repas était interrompu. Quant à la petite larve jaune dont j'avais vu le corps bien gonflé au commencement de l'observation, elle était, maintenant, surtout dans la région sucée, flasque et en partie vidée."

Janet, 1904, p. 33: "Les poils à double crochet des jeunes larves de Tetramorium caespitum sont pourvus de nombreuses sinuosités qui leur donnent beaucoup d'élasticité. Dans les nids artificiels de cette espèce, j'ai vu fréquemment un grand nombre de petites larves accrochées sur les parois verticales des chambres d'habitation. En examinant, à la loupe, celles des larves, ainsi suspendues, qui sont placées à peu de distance au dessous du verre, on voit, entre leur corps et la paroi du nid, un petit intervalle proportionné à la longueur de leurs poils d'accrochage. Les ancres de ces poils pénètrent dans les aspérités de la paroi du nid."

Karawaiew (1906, Fig. 12 on p. 373) showed the salivary glands in an outline of the larva. Repeated by Forel (1923, Fig. 11A = 1928, Vol. II, Fig. 133) and by Wheeler (1910, Fig. 124C on p. 222). Referred to by Karawaiew, 1929.

Latreille, 1802, Pl. X, Fig. 63: a crude figure of a larva.

Marlatt, 1898, Fig. 3 on p. 3: *e*, larva in side view; *f*, head in anterior view and head hair enlarged. Fig. 3*e* was repeated by Howard, 1901, Fig. 23.

Mayr, 1855, p. 283: "Im Allgemeinen lässt sich sagen, dass die Larven der Arbeiter die kleinsten, die der Männchen etwas grösser und die der Weibchen gewöhnlich am grössten sind, und die Abweichung in der Grösse ist bei manchen Arten, wie z. B. bei *Tetramorium caespitum* eine sehr beträchtliche."

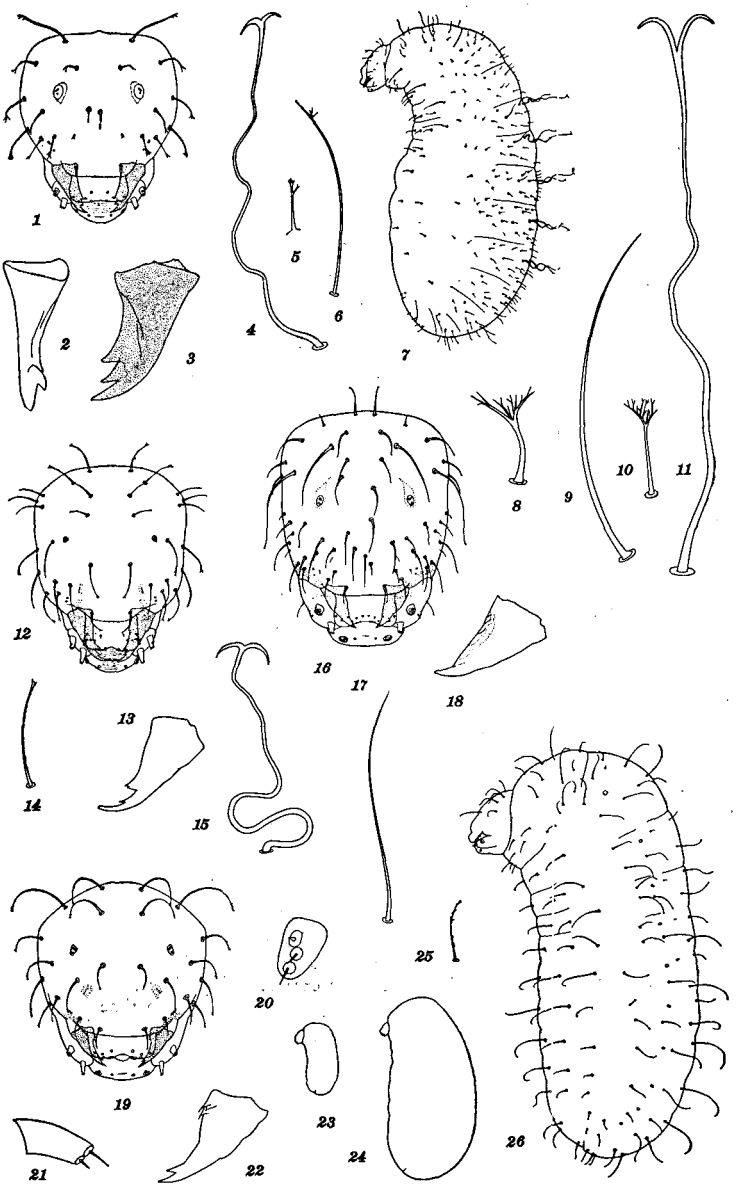
Réumur, 1742(?). See Wheeler, 1926.

Stärcke, 1939: Internal anatomy of the antenna.

Stärcke, 1948, p. 29-30: "♀. Head wide 0.33, high 0.17 mm. Oncochaeta very long, 255 Micron, Achroch, 91, Microch. 37, i.e. much shorter than with *Myrmica*. The hairs on the head on the contrary are longer, nearly uniformly 201 Micron. Some of them are forked for about one third of their length, the Acroch. on the body mostly have plumose tops. The labium protrudes more and the mandibulae are more massive."

Wheeler (1909) described the larva as "gleaming white" (p. 181), with "pairs of long anchor-tipped dorsal hairs" and also shorter hairs which are branched at the tip. "The anchor-tipped hairs with sigmoid basal flexure are used . . . for fastening the larvae to the lower surfaces of stones, the roots of plants and the walls of the galleries and chambers of the nest" (p. 183). Fig. 2B on p. 182 includes a larva in side view and the two types of hairs enlarged.

Wheeler (1926, pp. 113-114) has reproduced the original French of Réamur (1742?); his translation (pp. 202-203) follows: "Their larvae are of the kind that I have elsewhere described as bagpipe-shaped, or, if one wishes, they may be said somewhat to resemble a bird without wings, without legs and without feathers. I would only say that their anterior portion forms a kind of birds' neck at the end of which there is a head that might be regarded as terminating in a beak. The body of the larvae is always moist and even sticky. Is this due to the matter which it transpires or does it not rather derive the liquid in which it is bathed from the nurses that care for it? It is certain that they lick the larvae continually. There are sometimes four or five at the same time occupied with licking those which are to become winged ants and which are huge masses in comparison with those of the worker ants. It is more natural to suppose that the ants that lick the larvae endeavour to keep them covered with a liquid that is advantageous to them, than to suppose that they endeavour to withdraw a superfluous liquid from them, that is, to dry them. . . . Besides the advantages accruing to the larvae, this liquid with which their bodies are moistened is convenient for the nurses. Its effects prove that it is viscid. The workers sometimes unite the larvae into a cluster, in which they are all held together by the liquid. I observed the effect of this sticky substance on one occasion of which I shall have to speak. I sometimes saw the greater part of the larvae very far out of the earth and attached to the walls of the beaker. Not only did the viscosity of the substance resist the whole weight of a larva, but often two or three other larvae were glued to it without touching the walls of the beaker at any point." In footnote 116 on page 256 Wheeler commented as follows: "The larvae of *Tetramorium caespitum* are furnished with characteristic hooked and bifurcated hairs, . . . and it is these, and not exclusively the sticky coating noticed by Réaumur, that hold them together in packets."



EXPLANATION OF PLATE I

Tetramorium caespitum (Linnaeus), Figs. 1-11.—1, head in anterior view, ×95; 2, left mandible in medial view, ×216; 3, left mandible in anterior view (shaded to show thickness), ×216; 4-6, three types of body hairs, ×185; 7, worker larva in side view, ×24; 8, head hair of queen larva, ×340; 9-11, three types of body hairs of queen larva, ×185.

Xiphomyrmex turneri Forel, Figs. 12-15.—12, head in anterior view (immature larva),

TETRAMORIUM CAESPITUM PUNICUM (F. Smith)

Apparently very similar to *caespitum s. str.* except in the following details: Spinules on ventral surface of anterior somites only. Body hairs of two types: (1) short (0.018-0.054 mm), with the tip bifid, widely distributed; (2) anchor-tipped with tortuous shaft, about 0.18 mm long, four in a row across the dorsum of each abdominal somite I-V. Head hairs with the tip bifid, 0.018-0.054 mm long. Antennae with two or three sensilla each. Labrum with the anterior surface of each lobe bearing three minute hairs; ventral border with an isolated and two contiguous sensilla on each half. (*Material studied:* two damaged integuments from Afghanistan, labelled var. *lucidula* Emery.)

Gantes, 1949: "La jeune larve a un corps légèrement arqué, mesure 0 mm. 60. Le corp est nu. Seuls les segments thoraciques sont nets. La tête est déjà différenciée, mais nous l'étudierons chez la larve adulte. Cette larve est massive, subcylindrique. . . . Le corp est couvert par plusieurs sortes de poils. 1. *Poils à double crochet,* qui sont plantés sur le dos en cinq rangées à partir du premier segment abdominal: il y a quatre poils par rang. Ces poils mesurent 0 mm. 30; ils sont très souples, ont un ressort important et le double crochet est très grand. 2. *Poils fourchus,* sur les côtés de l'abdomen: ils sont longs, fins, droits et terminés par une minuscule fourche; ils ont 0 mm. 092 de long. 3. Sur le reste du corps, nous avons des poils beaucoup plus courts, 0 mm. 041 et 0 mm. 036, fourchus également, ou bien à trois branches de 0 mm. 050. La tête est bien différenciée, couverte de vingt-six poils fourchus dont les branches parfois se divisent elles-mêmes en deux et de 0 mm. 041 de long. Les pièces buccales n'ont rien de remarquable: le labre a un seul lobe. Les mandibules sont bien formées, brun foncé, mesurent 0 mm. 092; elles ont toujours la même forme" (p. 81). Pl. IV, Fig. 5: mandible, labrum and hairs. Pl. V, Fig. V: larva in side view. Growth pp. 85 and 86.

TETRAMORIUM CAESPITUM SCHMIDTI Forel

Generally similar to *caespitum s. str.* except in the following details: Body hairs of three types: (1) short (0.009-0.054 mm), with simple to multifid tip, the most abundant type; (2) moderately long (about 0.126 mm), with denticulate tip, few; (3) anchor-tipped, with tortuous shaft, long (about 0.3 mm), four in a row across the dorsum of each abdominal somite I-VI. Integument with spinules on the ventral surface of the anterior somites only. Head hairs 0.018-0.054 mm long. Labrum with three hairs and one sensillum on the anterior surface of each lobe; ventral border of each lobe with one isolated and two contiguous sensilla; posterior surface of each half with three or four sensilla in an oblique row slanting upward and outward and also a cluster of two or three sensilla. Maxillary palp with five sensilla, each of which bears a spinule. (*Material studied:* ten larvae from Iran.)

TETRAMORIUM GUINEENSE (Fabricius)

Mature worker larva.—Body length about 2.7 mm. Generally similar to *caespitum.* Abdomen more slender; midventral surface of each abdominal somite I-VI with a boss; bosses decreasing in size posteriorly; anus posteroventral with a prominent posterior lip. (But these differences may be due to maturity or nutrition.) Body hairs of two types: (1) generally distributed, short (0.036-0.17 mm), with short-branched tip (simple-bifid or bifid with the branches denticulate or denticulate or multifid), the most abundant type; (2) long (about 0.4 mm), anchor-tipped with tortuous shaft, four in a row across the dorsal surface of the metathorax and each abdominal somite I-V. Head hairs with multifid tip. Labrum subrectangular with the ventral corners rounded, about 1.6× as broad as long; anterior surface with a few short rows of minute spinules near the ventral border;

×95; 13, left mandible in anterior view (immature larva), ×185; 14 and 15, two types of body hairs of next instar larva, ×95.

Meranoplus oceanicus F. Smith, Figs. 16-18.—16, head in anterior view, ×86; 17, body hair, ×235; 18, left mandible in anterior view, ×185.

Wasmannia auropunctata (Roger), Figs. 19-26.—19, head of worker larva in anterior view, ×148; 20, right antenna of queen larva in anterior view, ×680; 21, right galea of queen larva in lateral view, ×680; 22, left mandible of worker larva in anterior view, ×340; 23, profile of worker larva, ×10; 24, profile of queen larva, ×10; 25, body hair of worker larva, ×185; 26, worker larva in side view, ×56.

each half of the ventral border with one isolated and two contiguous sensilla; posterior surface of each half with a cluster of three contiguous sensilla.

Young larva.—Length about 0.68 mm. Head wider than the prothorax; diameter decreasing to abdominal somite I, increasing to V and decreasing to the posterior end which is sharp-pointed. Body hairs of two types: (1) simple, minute to short (0.006-0.018 mm), on ventral and lateral surfaces of the thorax and abdominal somites I-VIII; (2) short (0.018-0.045 mm), with denticulate tip, on the dorsal surface of the thorax and abdominal somites I-V; abdominal somites IX and X naked. A few minute spinules on the dorsal surface of abdominal somites V-X. Head hairs simple and slender, 0.012-0.027 mm long. Maxillary palp a slightly raised cluster of four sensilla; galea a low knob with two sensilla. (*Material studied:* a dozen larvae from Queensland, courtesy of Dr. W. L. Brown.)

TETRAMORIUM STRIATIVENTRE Mayr

Immature (?) larva.—Length about 2.3 mm. Generally similar to *caespitum* but differing in the following details: Body hairs of three types: (1) short (0.036-0.081 mm), bifid-tipped, with the branches denticulate, the most abundant type; (2) few, moderately long (0.1-0.14 mm), bifid-tipped, with the branches denticulate; (3) anchor-tipped, with tortuous shaft, long (about 0.32 mm), four in a row across the dorsum of each abdominal somite I-IV. Head hairs bifid-tipped, with the branches denticulate, 0.027-0.072 mm long. Labrum with the anterior surface bearing three hairs and one or two sensilla; ventral border of each lobe with one isolated and two contiguous sensilla; posterior surface of each lobe with one or two isolated and a cluster of two or three sensilla. Mandibular teeth longer and sharper-pointed. Maxillary palp a tall frustum bearing five sensilla (four apical and one lateral).

Young larva.—Length about 1.3 mm. (Ready to molt.) Slender, thorax slightly curved ventrally; ventral profile of abdomen nearly straight. Body hairs very few. Of three types: (1) minute to short (0.001-0.018 mm), simple, on the entire ventral surface and on the dorsal surface of abdominal somites VI-X; (2) long (0.027-0.072 mm), on the dorsal and lateral surfaces and one at either end of each row of anchor-tipped hairs, simple or with bifid tip; (3) anchor-tipped, long (0.054-0.105 mm), with sinuous shaft, 2-4 in row across the dorsum of each abdominal somite I-V. Head hairs with short-bifid tip, 0.018-0.036 mm long. Antennae minute. Mandibles with short acuminate teeth. Maxillary palp a cluster of five sensilla; galea a short knob with two apical sensilla. (*Material studied:* 13 integuments from Turkestan.)

Genus STRONGYLOGNATHUS Mayr

STRONGYLOGNATHUS TESTACEUS (Schenck)

Wheeler (1910, p. 491) stated that the workers of this social parasite took no interest in their own brood, which was tended by the host workers (*Tetramorium caespitum*).

Genus XIPHOMYRMEX Forel

Body hairs of two types: (1) short to moderately long, with long flexible tip; (2) long, anchor-tipped. Head hairs few, moderately long, with the tip simple, bifid or denticulate. Antennae minute. Labrum feebly bilobed; posterior surface densely spinulose. Mandibles divided into two portions, basal two-thirds subtriangular in anterior view, with a stout double-pointed distal tooth projecting ventromedially; apical third very slender, curved medially, with the apex narrowly round-pointed and bearing on its inner surface a small acute tooth. Maxillae bearing a few minute spinules; apex paraboloidal. Labium with the anterior surface spinulose; palps lateral, each represented by a slight elevation bearing sensilla; an isolated sensillum between each palp and the opening of the sericteries. Hypopharynx densely spinulose, the spinules rather long and arranged in short rows dorsally; ventrally the spinules are shorter and the rows longer.

XIPHOMYRMEX TURNERI Forel

Pl. I, figs. 12-15

Immature larva.—(Ready to molt.) Leg vestiges present. Spiracles small; the mesothoracic the largest; size diminishing posteriorly. Integument of ventral surface of anterior somites and dorsal surface of posterior somites with minute spinules in short transverse

rows. Body hairs of two types: (1) short to moderately long (0.036-0.108 mm), with denticulate tip; (2) anchor-tipped, about 0.18 mm long. Cranium subquadrate in anterior view, with all corners rounded. Head hairs few, moderately long (0.036-0.072 mm), with the tip simple or bifid or denticulate. Antennae minute, elevated, each with three sensilla, each of which bears a spinule. Labrum subrectangular, slightly narrowed dorsally, breadth about 1.7× the length; feebly bilobed; anterior surface of each lobe with one short and three minute hairs and one sensillum; ventral border of each lobe with numerous spinules, one or two isolated sensilla and two contiguous sensilla; posterior surface of each lobe with two isolated and two contiguous sensilla; posterior surface spinulose, the spinules minute and in short rows. Mandibles divided into two portions: basal two-thirds subtriangular in anterior view with a stout double-pointed distal tooth projecting ventromedially; apical third very slender, curved medially, with the apex narrowly round-pointed and bearing on its inner surface a small acute tooth. Maxillae with the apex paraboloidal and bearing a few spinules; palp a skewed peg bearing five sensilla; galea a tall frustum bearing two apical sensilla. Labium with the anterior surface spinulose, the spinules minute and in short transverse rows; palp a slight elevation bearing sensilla; an isolated sensillum between each palp and the opening of the sericteries; the latter a short transverse slit. Hypopharynx densely spinulose, the spinules relatively long and arranged in short rows dorsally; ventrally the spinules are shorter and the rows longer.

Next instar larva.—Body hairs of two types: (1) short to moderately long (0.036-0.29 mm), with denticulate tip; (2) anchor-tipped, long (about 0.32 mm), with tortuous shaft. (*Material studied:* parts of two damaged integuments from New South Wales.)

Genus TRIGLYPHOTHRIX Forel

TRIGLYPHOTHRIX AREOLATUS Stitz

Eidmann, 1944, p. 456: "Die Larven haben einen dichten Besatz von ankerförmigen Oncochäten, besonders auf der Rückseite des Abdomens, wo diese besonders gross und korkzieherartig gekrümmt sind und dadurch elastisch federnd wirken."

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