

SUPPLEMENTARY STUDIES ON  
ANT LARVAE: PONERINAE

BY  
George C. Wheeler  
AND  
Jeanette Wheeler

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# SUPPLEMENTARY STUDIES ON ANT LARVAE: PONERINAE

BY GEORGE C. WHEELER AND JEANETTE WHEELER

*Laboratory of Desert Biology, Desert Research Institute  
University of Nevada System, Reno 89507*

## INTRODUCTION

In the interval between the closing of the manuscript in 1973 and the publication in 1976 of our "Ant Larvae: Review and Synthesis," other myrmecologists have added 43 species to our collection of larvae. These species are in 36 genera, 15 of which have not been represented previously. This paper reports on the study of our new Ponerinae.

## Tribe PLATYTHYREINI Genus PLATYTHYREA Roger

REVISED CHARACTERIZATION.—Profile platythyreoid; with neck long and slender; abdomen with paired ventrolateral bosses on some somites (usually) and with a few transverse welts on the venter of some posterior somites; anus ventral, on anterior base of tail. Mandibles platythyreoid.

### **Platythyrea modesta** Emery.

Length (through spiracles) about 7.5 mm. Similar to *P. inermis* (1952: 118 and 1964: 446) except as follows. Neck longer and abdomen stouter, head smaller, lateral longitudinal welts well developed; ventral welts: 1 small on posterior portion of AV, entire ventral portion of VI and a large welt between AVI and AVII. Leg and wing vestiges present. About 6 differentiated somites. Thoracic spiracles larger, abdominal smaller and subequal. Entire integument densely spinulose, the spinules minute and in short rows of 2 or 3, rows mounted on ridges which are frequently very long. Body hairs sparse, 0.008-0.028 mm long, smooth unbranched spikes, most numerous on T1. Head widest at antennal level and with a small middorsal projection. Head hairs more numerous but still sparse. Labrum  $1\frac{1}{4}$  wider than long; each ventrolateral lobe with about 14 sensilla on and near ventral border; median lobe with 6 sensilla; posterior surface sparsely spinulose, spinules minute and in short rows basally, isolated or in short rows ventrally; medial portion of posterior surface with about 16 sensilla. Mandibles with three apical and subapical teeth curved posteriorly. Maxillary palp with 5 (2 apical, 2 subapical and 1 lateral) sensilla; galea with

2 apical sensilla. Labium with a transverse densely spinulose welt dorsally. Opening of sericteries wide and salient. Hypopharynx sparsely spinulose, the spinules minute and in short arcuate rows. (Material studied: 6 larvae labelled: "Angola: Parc Dr. Carrisso, m, Durdo, 7-XI-1972, ex. nest T-443, coll. D. H. Kistner & RV Swift;" courtesy Dr. W. L. Brown.)

### **Platythyrea parallela** (F. Smith)

Length (through spiracles) about 4.2 mm. With ventral welt on each AVI and AVII. Very similar to *P. inermis* (1952: 118 and 1964: 446). Spiracles of moderate size, decreasing posteriorly. Body hairs moderately abundant, short (0.008-0.075 mm long), smooth. Head with sides more nearly parallel, but with a bulge at antennal level. Head with about 12 hairs, 0.003-0.006 mm long. Labrum with breadth about equal to length; anterior surface with about 6 sensilla; ventral border with about 4 sensilla; posterior surface with about 7 sensilla. Mandibles platythyreoid; with subapical tooth and denticles larger. Labium with an isolated sensillum between each palp and opening of sericteries; the latter wide and salient.

**IMMATURE LARVA.** — Length (through spiracles) about 3.3 mm. Similar to mature larva except in the following details. Body profile crescentic; no distinct tail or ventral welts. Spiracles small. Body hairs few, slender, flexuous, 0.003-0.018 mm long. Head hairs about 0.001 mm long. Galea and maxillary and labial palps shorter.

**Material studied.** — 5 larvae labelled: "Kerala State (W. Ghats), Kottiyoor, Wynaad Taluk, 650 m, 7-IV-1969, evgrn. forest, A. B. Soans & W. L. Brown;" courtesy of Dr. W. L. Brown.

## Tribe TYPHLOMYRMECINI

### Genus TYPHLOMYRMEX Mayr

**REVISED CHARACTERIZATION.** — Body aphaenogastroid. Body and head hairs branched (usually 2- or 3-branched). Antennae cylindrical; with 3 sensilla, each bearing a stout spinule. Mandibles typhlomymecoid, with 2 minute teeth on medial border.

### **Typhlomymex rogenhoferi** Mayr.

Fig. 1

Length (through spiracles) about 3.3 mm. Similar to *T. robustus* (1952: 121 and 1964: 447) except as follows. Entire body more slender; anus with a small posterior lip. Body hairs sparse, longer and fewer posteriorly, 0.025-0.2 mm long, 2- or 3-branched; longer and mostly 3-branched on T1 becoming shorter, sparser and mostly 2-branched on AX. Head hairs 3-branched (rarely 2-branched), longer (0.038-0.1 mm long), with long slender flexuous branches. Ventral border of labrum with 2 sensilla (1

projecting) on each half. Mandibles with spinules shorter. Maxillary palp with minute spinules in short encircling rows, with 4 apical and 1 subapical sensilla. Labium subtrapezoidal, narrowed basally; palp with 2 apical, 1 subapical and 1 lateral sensilla; opening of sericteries a short transverse slit in a shallow depression. Hypopharynx spinulose, the spinules minute and in short transverse rows.

*IMMATURE LARVA.* — Fig. 1. Length (through spiracles) about 2.1 mm. Similar to mature larva except as follows. Body more slender; a swelling on venter of each TI and AIII-AVII. Body hairs more numerous, except on venter of AV-AVI.

*Material studied.* — 8 larvae labelled: "Brazil, Pará, 19-VII-1962, P. F. Darlington," courtesy of Dr. W. L. Brown.

### Tribe ECTATOMMINI

### Genus GNAMPTOGENYS Roger

*REVISED CHARACTERIZATION.* — Profile pogonomymecoid, with neck rather slender. Body hairs moderately abundant, short to moderately long. Head hairs few, minute to short. Antennae minute, peg-like, each of the 3 sensilla bearing a stout spinule. Labrum large, strongly narrowed ventrally, feebly bilobed. Mandibles ectatommoid; basal  $\frac{1}{3}$  to  $\frac{2}{3}$  of anterior surface with numerous spinules arranged in longitudinal rows; spinules mostly minute but exceedingly long near and along lateral border of middle portion.

### *Gnamptogenys binghami* (Forel).

Length (through spiracles) about 6.4 mm. Similar to *G. bispinosa* (= *Ectatomma bispinosum*) (1952: 133) except as follows. Body more slender, abdomen nearly cylindrical. Anus posteroventral with lips. Body hairs of 2 types: (1) 0.175-0.55 mm long, 2- to 4-branched, the longer with very fine flexuous tips; (2) 0.1-0.3 mm long, with simple shaft and frayed tip, stout, a few on each somite, more numerous posteriorly. Head hairs short to long (0.025-0.21 mm long), simple or branched. Labrum with 1 hair (about 0.018 mm long) and 9 sensilla on each half; each half of posterior surface with about 10 sensilla. Mandibles with apical tooth shorter and basal tooth erose. Maxillae with less distinct apex; palp with 3 apical, 1 subapical and 1 lateral sensilla. Labial palp a peg with 2 apical, 2 subapical and 1 lateral sensilla; opening of sericteries wide and salient. (Material studied: 15 larvae labelled: "SE Celebes, 1-2 km E of Wolas, 42 km S Kendari, ca 350 m, 13-14-VII-1972, rot. wood, rainfor.;" courtesy of Dr. W. L. Brown.)

**Gnamptogenys costata** (Emery)

Length (through spiracles) about 6.7 mm. Similar to *G. bispinosa* (1952: 133) except as follows. Body more slender. Body hairs long and moderately numerous. Of 2 types: (1) 0.1-0.33 mm long, with short base and 2- to 4-branched, the longer with fine flexuous tips, on all surfaces of all somites; (2) 0.013-0.15 mm long, with single stout shaft and frayed tip, on all surfaces of AX, scattered elsewhere. Head hairs longer (0.025-0.113 mm long), with smooth shaft and simple to frayed tip. Labrum with sides straighter. Mandibles with apical and subapical teeth longer and basal tooth shorter. Maxillae with apex paraboloidal; palp with 3 apical and 2 lateral sensilla. Labial palp with 3 apical and 2 lateral sensilla; opening of sericteries a transverse slit on ventral border. Hypopharynx with a few minute spinules in short transverse rows basally.

**VERY YOUNG LARVA.**—Length (through spiracles) about 2.9 mm. Similar to mature except as follows. Type 2 body hairs 0.015-0.5 mm long, stout anteriorly, becoming long, slender and flexuous posteriorly. Maxillary palp with 5 (1 apical, 3 subapical, 1 lateral) sensilla. Opening of sericteries a slit in a depression.

**Material studied.**—15 larvae from Indonesia, courtesy of Dr. W. L. Brown.

Genus **HETEROPONERA** Mayr

**REVISED CHARACTERIZATION.**—Profile pogonomymecoid but with abdomen straight and subcylindrical. Body hairs moderately numerous, mostly short; of 2 types: (1) branched; (2) simple, longest with flexuous tip. Antennae small. Head hairs branched, moderately long and moderately numerous. Labrum short, broad and deeply bilobed. Mandibles ectatommoid.

**Heteroponera dolo** (Roger)

Figs. 2 a and b

Length (through spiracles) about 5.4 mm. Very similar to *H. imbellis* (1971a: 1200) but differing in the following. Body hairs of 2 types: (1) 0.1-0.35 mm long, deeply bifid or multifid, branches very fine off main stout trunk; (2) 0.13-0.5 mm long, smooth, slightly curved to flexuous, a few on each somite, shortest on venter of T1. Cranium subcordate. Head hairs 0.038-0.225 mm long, finely denticulate. Labrum about 1.6 times as wide as long; ventral border with middle spinulose. Mandibles with all teeth longer. Maxillae with apex more spinulose. Labium not so bulging. Hypopharynx with very short arcuate rows of minute spinules.

**YOUNG LARVA.**—Fig. 2a. Length (through spiracles) about 2.1 mm. Similar to mature larva except as follows. Profile crescent-shaped; diameter

greatest at AIII and AIV, decreasing rapidly to AX which is narrowly round-pointed; less tapered anteriorly. Spiracles on thorax small, largest on AI, diameter decreasing posteriorly. Entire integument spinulose. Body hairs moderately numerous on thorax and AI-AVI; posterior somites lacking hairs. Of 2 types: (1) smooth, 0.025-0.275 mm long, with long flexuous slender tip; (2) 0.05-0.275 mm long, 2- to 3-branched, with tip long and flexuous. Cranium subhexagonal. Head hairs smooth or with denticulate tip. Labrum shorter. Mandibles with all teeth shorter and sharp-pointed; spinules minute. Maxillary palp a skewed peg with 5 sensilla (2 apical, 2 subapical and 1 lateral); galea a short cone. Labial palp represented by a cluster of 5 sensilla.

*VERY YOUNG LARVA.*—Fig. 2b. Length (through spiracles) about 1.5 mm. Similar to young larva except as follows. Widest at AV, decreasing to AX which is narrow-pointed; same diameter from AV anteriorly. Integument of dorsum minutely spinulose. Body hairs restricted to 2 on each ventrolateral surface of T1, about 0.013 mm long. Integument of head minutely spinulose. Head hairs about 6, 0.004-0.03 mm long, smooth and slightly curved. Labrum with about 16 sensilla on anterior surface; ventral surface with 8 sensilla. Mandibles with apical tooth sharp-pointed, basal portion minutely spinulose on all surfaces. Maxillary palp represented by a cluster of 5 sensilla; galea by 2 sensilla. Labial palp represented by a cluster of 5 sensilla; opening of sericteries slightly protruding.

*Material studied.*—10 larvae labelled: "Brazil, Dist. Federal, Parque Mun. do Gama, 14-V-1971," courtesy of Dr. W. L. Brown.

### Tribe PONERINI

### Genus BOTHROPONERA Mayr — Type II

*REVISED CHARACTERIZATION.*—Profile pogonomyrmecoid, but with abdomen straight and subcylindrical; anus ventral, with posterior lip. Tubercles moderately numerous (90) to numerous (300); shape varied. Body hairs few, smooth, minute. Mandibles ectatommoid, with a few minute spinules on basal half.

### **Bothroponera tridentata** F. Smith

Length (through spiracles) about 14.9 mm. Similar to *B. mayri* (1971b: 392) except as follows. Tubercles short, stout cones; 94, distributed thus: (1) on dorsal and ventrolateral surfaces: T1-AI, 12 each; (2) on ventrolateral surfaces only: AII-AIV, 12 each; AV, 10; AVI-AVIII, 6 each; (3) on dorsal and dorsolateral surfaces: AIX, 6; none on AX. Integumentary spinules large and conspicuous, in long to short rows, rows concentric around bases of tubercles and spiracles. Body hairs very few, about 0.025

mm long (so short and fine that they are obscured by long spinules), simple. Integumentary structures of unknown function dorsal to spiracles in intersegmental membranes and transversely between spiracles on abdomen. Thoracic spiracles largest. Head subheptagonal, a third broader than long; occipital border feebly impressed. Head hairs moderately numerous, 0.05-0.1 mm long, simple, mostly on cheeks and below antennal level. Labrum about 1.4 times as broad as long; ventrolateral borders densely spinulose, the spinules longer ventrally; middle of ventral border with minute spinules in short transverse rows. Mandibles with a few rows of very fine spinules on dorsal half of anterior surface; posterior surface of basal  $\frac{1}{3}$  with numerous small spinules, isolated or in short rows.

**YOUNG LARVA.** — Length (through spiracles) about 8.9 mm. Length of head greater than diameter of thorax. Tubercles 106, distributed as follows: (1) on dorsal and ventrolateral surfaces: T1-T3, 12 each; (2) on ventrolateral surfaces only: AI and AV, 10 each; AII, 8; AIII, 12; AIV, 14; AVI, 6; AVII, 4; AVIII, 2; (3) on dorsal surface only: AIX, 4; none on AX. Body hairs 0.013-0.025 mm long. Spinules on posterior surface of labrum shorter. Apical and subapical teeth of mandibles distinct and sharp-pointed. Maxillae with apex more narrowly rounded and spinules longer. Labium with longer spinules; palp a short frustum. Hypopharynx with spinules in short arcuate rows, the rows forming a reticulate pattern. Otherwise similar to mature larva.

**Material studied.** — 4 larvae from Borneo, 17-46 km W Batulitjin, 28 VI-2 VII-1972, courtesy of Dr. W. L. Brown.

### Genus BOTHROPONERA Mayr — Type III

**REVISED CHARACTERIZATION.** — Profile pogonomymecoid, with neck more slender. Tubercles about 95; stout conoids or spires or conoid surmounted by spire. Integument densely spinulose. Body hairs few and usually smooth. Mandibles ectatommoid, with a few spinules on basal half.

#### **Bothroponera tesserinodis (Emery)**

Fig. 3

Length (through spiracles) about 6.1 mm. Similar to *B. sjostedti* (1971b: 392) except as follows. Tubercles 98, distributed as follows: T1, 10; T2-AVIII, 8 each; AIX, 6; AX, 2; each 0.1-0.2 mm tall, a conoid surmounted by a long spire, conoid with a few encircling rows of minute spinules and with 1-3 (usually 2) hairs 0.025-0.06 mm long, smooth and unbranched. Leg, wing and gonopod vestiges present. Spiracles moderately large. Body hairs sparse, moderately long (0.025-0.05 mm), smooth, unbranched, rarely bifid. Cranium subcordate, slightly broader than long. Antennae each with 3 minute sensilla on a small knob on a slightly raised base. Head hairs few, long (0.05-0.125 mm), smooth, unbranched, with

a slight basal constriction. Labrum bilobed; anterior surface of each lobe with a low ventrolateral boss, each boss with 7 sensilla and 2 short hairs; ventral border of each lobe with 1 isolated and 2 or 3 contiguous sensilla near middle; entire posterior surface densely spinulose, middle  $\frac{3}{4}$  with fine spinules in rather short transverse subparallel rows; each lateral  $\frac{1}{4}$  with coarse spinules in short arcuate rows; each half of posterior surface with 3 large sensilla ventrally and 6 small near dorsolateral angle. Mandibles narrowly ectatommoid, heavily sclerotized. (Material studied: 1 larva from India, courtesy of Dr. W. L. Brown.)

### Genus BRACHYPONERA Emery

REVISED CHARACTERIZATION. — Profile pogonomyrmeoid, but with ventral profile of abdomen straight. Tubercles numerous, stout subcones or subcylinders with apical spine and with transverse rows of minute spinules; also 1 or 2 intersegmental middorsal discoids or doorknobs. Entire integument spinulose. Body hairs very few, smooth, very short to moderately long. Head large; head hairs few. Mandibles diacammoid but less curved apically. Maxillae small.

#### **Brachyponera luteipes** (Mayr)

Fig. 4

Length (through spiracles) about 3.1 mm. Similar to *B. lutea* (1971b: 1207) except as follows. Tubercles 122; a large middorsal boss between AIII and AIV and a similar structure between AIV and AV; only 2 tubercles on AX. Tubercles about 0.013 mm tall, with apical spine about 0.025 mm tall, ranging to a subcylinder about 0.038 mm tall, with an apical spine about 0.038 mm tall; integument with minute spinules in encircling rows. Body hairs slightly longer (0.019-0.075 mm long), spike-like and with constriction at base. Head with distinct lateral bosses at antennal level. Head hairs straight and spike-like. Labrum with minute spinules on ventral border; about 1.7 times as broad as long; spinules on posterior surface minute and in numerous long transverse rows medially; rows fewer laterally. Mandibles with teeth subequal; medial surface with fewer rows of minute spinules. Maxillae with apex paraboloidal and sparsely spinulose, the spinules long and in short rows. Labium with spinules on anterior surface long and isolated or shorter and in rows; with a dorsal densely spinulose transverse welt; palp digitiform with 5 apical sensilla; opening of sericteries with 3 projections. Hypopharynx with minute spinules in rather long transverse rows.

YOUNG LARVA. — Fig. 4. Length (through spiracles) 1.6-1.9 mm. Body and neck less differentiated; head relatively larger. Anus postero-ventral. Tubercles 120, distributed as follows: T1 with 2 rounded ventrolateral elevations near head and with 10 typical tubercles; T2-AI, 10 each; AII-AIV, 8 and with 2 dorsal doorknobs each; AV-AVIII, 10 each; AIX,



6; AX, 2. Body hairs very few, restricted to ventral surface, 0.006-0.038 mm long, spike-like. Head hairs shorter (0.025-0.038 mm long). Antennae each represented by 3 sensilla on a small flat area. Labrum feebly bilobed; anterior surface of each lobe with only 9 sensilla and/or minute hairs near ventral border. Mandibles with small sharp-pointed teeth; anterior surface with few rows of minute spinules. Maxillae with entire integument spinulose, the spinules minute and in short rows and a few isolated; palp a frustum with 5 apical sensilla. Labial palp a short peg with 3 apical and 2 subapical sensilla; opening of sericteries a slit in a depression. Hypopharynx with minute spinules dorsally, longer ventrally. Otherwise similar to mature larva.

*Material studied.* — 14 larvae from N. Celebes, Mt. Klabat, 19-VI-1972, courtesy of Dr. W. L. Brown.

### Genus CENTROMYRMEX Mayr

**REVISED CHARACTERIZATION.** — Profile pogonomymecoid; body beset with a very large number (300-500) of spine-like tubercles, which are so slender as to simulate hairs; surface of tubercles with several denticles and usually with a few fine basal or lateral hairs. Body hairs very few, simple. Mandibles pogonomymecoid; base spinulose.

#### **Centromyrmex bequaerti (Forel)**

Fig. 5

Length (through spiracles) about 6.6 mm. Very similar to *C. feae* (1952: 604) except as follows: Tubercles about 518, distributed as follows: T1, 16; T2, 26; T3, 28; AI and AII, 34 each; AIII and AIV, 50 each; AV, 52; AVI, 54; AVII, 60; AVIII, 64; AIX, 36; AX, 14. On each ventrolateral surface of AII-AIV is an integumentary structure of unknown function. Entire integument spinulose, the spinules minute and in short transverse rows, spinules and rows more numerous ventrally. Body hairs 0.025-0.1 mm long. Cranium transversely subelliptical; integument with minute spinules in short arcuate rows. Head hairs shorter (0.038-0.075 mm long). Labrum with lateral borders more sinuate and ventral border less indented; each lobe with 9-11 minute hairs and/or sensilla on and near ventral border; ventral border spinulose, the spinules minute and in short arcuate rows. Mandibles with sides more nearly straight and with blunter teeth. Maxillary and labial palps with 5 apical sensilla each.

**VERY YOUNG LARVA.** — Length (through spiracles) about 3.6 mm. Thorax and AI forming a distinct neck, remainder of abdomen swollen, but with a flat ventral profile. Anus ventral. Head large. Tubercles about 472, distributed as follows: T1, 14; T2, 24; T3, 26; AI, 24; AII, 32; AIII, 42; AIV and AV, 52 each; AVI and AVII, 54 each; AVIII, 48; AIX, 38; AX, 13. Body hairs shorter (0.002-0.025 mm long). Antennae

lower on head. Head hairs shorter (0.013-0.025 mm long). Mandibles with teeth sharper and spinules shorter. Maxillae with spinules shorter; galea shorter. Labium with minute spinules; palp represented by a cluster of 5 sensilla; opening of sericteries in a shallow depression. Hypopharynx with shorter spinules. Otherwise similar to mature larva.

*Material studied.* — 12 larvae labelled: "Angola, Rio Musonguege, nr. Calondo, Reserve de Gado, 26 XII 1972, nesting in mound 2773, D. H. Kistner, S. A. Peles and R. J. Swift;" courtesy of Dr. W. L. Brown.

### Genus LEPTOGENYS Roger

REVISED CHARACTERIZATION. — Profile pogonomyrmecoid, but more slender and with a long slender neck. Tubercles numerous (90-140); conoidal and with apical nipple; encircled by subapical ring of 4-6 relatively long hairs; exceptionally tubercles very small, subcylindrical, with 3 minute hairs or sensilla apically and a few basal hairs. Head rather small; subhexagonal; usually longer than broad; genae bulging at middle. Head hairs few, minute to short. Labrum small; not bilobed. Mandibles leptogenyoid; spinulose in part.

Larvae of *Leptogenys diminuta* from different localities are so different that they merit separate descriptions.

#### *Leptogenys diminuta* (F. Smith)

Length (through spiracles) about 6.0 mm. Similar to *Leptogenys* sp. #119 (1952: 640) except as follows. Abdomen with venter more paunchy. Tubercles 131, distributed thus: T1, T3, AII and AIX, 8 each; T2, 8 plus a ventral transverse boss; AI, 10; AIII and AVIII, 12 each; AVI-AVII, 12 and a dorsal boss each; a large ventral pair of bosses between AI and AII. Spiracles on small bosses with opening directed posteriorly. Integument on all surfaces of AX with isolated spinules; spinules on dorsal surfaces of posterior somites, number and size diminishing anteriorly; rows of minute spinules on venter of thorax and anterior abdominal somites. Body hairs shorter (0.013-0.038 mm long). Head hairs longer (0.009-0.038 mm long). Lateral borders of labrum with a few minute spinules; nearly entire posterior surface with spinules in short arcuate rows and with about 14 sensilla. Mandibles with lateral and medial borders more nearly straight; blade not bearing teeth; anterior surface with minute spinules, isolated or in short rows; posterior surface with denticles; posterior edge of apex with numerous rugae. Maxillary and labial palps each a cylinder with 5 (2 apical and 3 lateral) sensilla. Labium densely spinulose, the spinules long and isolated or shorter and in short rows. Hypopharynx densely

spinulose, the spinules minute and in short arcuate rows. (Material studied: 5 larvae labelled: "INDIA: Karala State (W. Ghats), A. B. Scans and W. L. Brown, Kottiyoor Wynaad Taluk 650 m., 7 Apr. 68, evgrn. forest;" courtesy of Dr. W. L. Brown.)

### **Leptogenys diminuta** (F. Smith)

Length (through spiracles) about 6 mm. Similar to above *L. diminuta*, except as follows: tubercles 126, distributed as above but lacking the dorsal bosses. Body hairs about 0.013 mm long. Head hairs about twice as numerous, but still few; about 0.013 mm long. Labrum with about 30 sensilla on posterior surface. Mandibles with spinules on posterior surface of blade only. Hypopharynx densely spinulose, the spinules minute and in short arcuate rows. (Material studied: 19 larvae labelled: "India, Karala State (W. Ghats). A. B. Soans & W. L. Brown, Thirunelly, Wynaad Taluk 900 m., 6 Apr. 69, evgrn. forest;" courtesy of Dr. W. L. Brown.)

### **Leptogenys diminuta** (F. Smith)

Fig. 6 a-c

Length (through spiracles) about 5.3 mm. Similar to first described above, except as follows. Tubercles 136, distributed as follows: T1 and T3, 8 and 2 vestigial each; T2, 10 and 2 vestigial; AI and AII, 10 each; a large ventral pair between AI and AII; AIII and AVIII, 12 each, AIX, 8; AX, 2. Spiracles on tubercles, with opening apical. Body hairs very few on each somite, 0.006-0.05 mm, longest with flexuous tip. Head hairs more than twice as numerous, but still few, about 0.013 mm long. Posterior surface of labrum with 3 spinulose areas: 1 mediobasal (with narrow extension down middle) and 2 ventrolateral. Mandible with medial border straight and blade-like, lateral border slightly sigmoid; apex and posterior surfaces roughened with denticles. Maxillae with lateral border smoothly convex. Labium with spinules large and isolated. Hypopharynx densely spinulose, the spinules large and isolated or in short rows. (Material studied: 7 larvae labelled "N. Celebes, June 1972, W. L. Brown, rot. wood, SW slope Mt. Klabat, 400-600 m, 13-19 VI, rain forest;" courtesy of Dr. W. L. Brown.)

### **Leptogenys diminuta** (F. Smith)

Fig. 6 d and e

Length (through spiracles) about 4.8 mm. Similar to first described above except as follows. Typical tubercles mammiform, with an apical sensillum and, usually, 2 hairs about 0.016 mm long as base; 126, distributed thus: T1-T3, 8 each; AI and AII, 10 each; AIII-AVIII, 12 each; AIX, 6; AX, 2; and 2 bosses on the ventrolateral surface between AI and AII. Spiracles with openings apical. Body hairs very few, simple and very

fine, about 0.006 mm long. Head hairs about twice as numerous but still few, minute (about 0.006 mm long), simple. Labrum with lateral borders nearly straight. Mandibles with spinules on anterior and posterior surfaces near apex. Maxillary and labial palps with 4 (2 apical, 1 subapical and 1 lateral) sensilla.

*SUBMATURE LARVA*.—About 4.6 mm long. Similar to mature larva, except as follows. AI more constricted; AIII and following more swollen. Tubercles of 2 types: (1) conoidal, some with small apical tubercle and with 10-16 hairs about 0.075 mm long, with fine flexuous tip; (2) tubercles hemispherical, some with numerous small papillae on apex, with 2-6 hairs (or none), 0.012-0.05 mm long, with fine flexuous tip. Integument with sparse coarse spinules on AX, spinules fewer and smaller anteriorly on abdomen; coarse spinules on venter and dorsum of T1; small and in transverse rows on T2 and T3. Labrum paraboloidal. Mandibles subtriangular in anterior view; blade without medial teeth, medial third with minute spinules. Hypopharynx spinulose, the spinules in short transverse rows.

*VERY YOUNG LARVA*.—Length (through spiracles) about 1.4 mm. Body with subcylindrical thorax, constricted at AI, widest at AV; length of head greater than diameter of thorax. Tubercles 126, distributed thus: T1-T3 and AIX, 8 each; AI and AII, 10 each; AIII-AVIII, 12 each; AX, 2. Tubercles represented by small hemispheres (largest on AX) with 2-6 minute (about 0.004 mm long) hairs. Spiracles on T2 and T3 vestigial, remainder larger and subequal. Integument on AX, on entire venter and on dorsal surface of posterior somites spinulose, the spinules minute and mostly in transverse rows. Maxillae with minute spinules, isolated or in short rows; palp represented by a cluster of 5 sensilla; opening of sericteries in a slight depression. Otherwise similar to submature.

*Material studied*.—15 larvae, labelled: "N. Celebes, June 1972, Mt. Klabat, Air Madid, slope 400-600 m, 13-19 June, wet for., W. L. Brown," courtesy of Dr. W. L. Brown.

### ***Leptogenys iridescens* (F. Smith)**

Fig. 7

Length (through spiracles) about 7.6 mm. Very similar to *L. sp.* #119 (1952: 640) except as follows. Tubercles reduced to very small (about 0.023 mm high) subcylinders, bearing 3 apical sensilla and with none or 1 or 2 minute (0.006 mm tall) slender hairs near base. Tubercles 96, distributed thus: T1, 4; T2, T3, AI and AIX, 6 each; AII-AVII, 10 each; AVIII, 8; AX, 2. Integument of venter of anterior somites with minute spinules in short transverse rows. Labrum subrectangular; anterior surface with about 20 sensilla; posterior surface densely spinulose, the spinules in subtransverse parallel rows; posterior surface with 2 sensilla near each lateral surface. Mandibles with apex strongly curved posteriorly. Maxil-

lary palp a short peg with 2 apical and 1 lateral sensilla. Labial palp with 2 apical, 1 subapical and 2 lateral sensilla. (Material studied: 9 larvae collected by R. Crozier, Malaya: Selangor, 22 Aug. 1967; courtesy of Dr. W. L. Brown.)

### **Leptogenys kitteli** Mayr

Length (through spiracles) about 12.9 mm. Similar to *L. sp.* #119 (1952: 640) except as follows. Neck more distinct; AI and AII more constricted; posterior end more narrowly rounded. Typical tubercle with 1-7 (usually 4) subbasal hairs, 0.025-0.25 mm long, simple, with slender flexuous tip; apex of tubercle spinulose; tubercles 130, distributed as follows: T1-T3 and AIX, 8 each; AI, AII and AIV-AVIII, 12 each; AIII, 10 and 2 vestigial; AX, 2. Integument on venter of T1 with spinules in short transverse rows; on T2 and T3 spinules very few and small, venter of AIII and AIV with numerous rows of coarser spinules, becoming dense and smaller posteriorly; AX with minute spinules (isolated or in short rows) on all surfaces; spinules on dorsal surfaces of posterior somites, becoming sparser anteriorly. Body hairs very few, about 0.025 mm long, simple spikes. Head hairs about 0.01 mm long, few small spikes. Antennae smaller and higher on head. Labrum paraboloidal (i.e., not narrowed at base); anterior surface with about 20 sensilla on and near ventral and lateral borders; ventral and lateral borders spinulose; posterior surface densely spinulose, spinules long and in numerous short transverse rows medially, larger and isolated laterally; posterior surface with about 9 sensilla. Mandibles with sides more nearly straight and with apex rounded. Maxillae with apex paraboloidal; palp with 5 (3 apical and 2 lateral) sensilla. Labial palp with 5 (2 apical and 3 lateral) sensilla. Hypopharynx spinulose, the spinules minute and in short arcuate rows. (Material studied: 2 larvae labelled "SE Borneo, 17-46 km W Batulitjin, 28 June-2 July 72, Lowl. rainfor., W. L. Brown;" courtesy of Dr. W. L. Brown.)

### **Leptogenys (Lobopelta) aspera** E. André

Length (through spiracles) about 4.7 mm. Similar to *L. (Lobopelta) elongata* (1952: 641) except as follows. Hairs on tubercles 0.056-0.175 mm long, with very fine flexuous tip. Body hairs lacking. Integumentary spinules minute, mostly isolated, a few in short transverse rows posteriorly; spinules on all surfaces of T1 and on venter of T2 and T3 in short to long transverse rows. Head capsule with the genae less bulging; integument with about 22 sensilla. Antennae smaller and higher on cranium. Head hairs lacking. Labrum slightly longer than wide; lateral borders feebly sinuate; ventral border with projection less distinct. Mandibles with anterior and medial surfaces with small spinules, isolated or in short rows. Maxillae with apex paraboloidal; palp a slender peg with 5 sensilla.

Labium with numerous long spinules on anterior surface. Hypopharynx with minute spinules in short transverse rows.

*IMMATURE LARVA*.—Length (through spiracles )about 3.7 mm. Very similar to mature larva but with all somites differentiated.

*Material studied*.—5 larvae, labelled: "SE Celebes, 42 km S Kendari, ca 350 m, 13-14 July 1972, rainfor., W. L. Brown;" courtesy of Dr. W. L. Brown.

### Genus MESOPONERA Emery

**REVISED CHARACTERIZATION**.—Profile pogonomyrmecoid. Body beset with numerous (84-186) tubercles, which are either spire-like or short subcones, integument with encircling rows of spinules; some species have a middorsal discoid or transverse welt on each AIII-AV. Body and head hairs few and minute. Mandibles ectatommoid.

To distinguish *Odontomachus* and *Anochetus* from those species of *Mesoponera* which have dorsal discs make the following changes in the key:

- 19 a. With 2-4 glabrous discoids on dorsum ..... 19'
- 19'a. Typical tubercles consisting of a frustum surmounted by a spire which is tipped by a spine-like hair .....  
..... *Anochetus* and *Odontomachus*
- 19'b. Without such tubercles ..... \**Mesoponera*

#### **Mesoponera constricta** (Mayr)

Length (through spiracles) about 5.4 mm. Very similar to *M. constricta* from British Guiana (1952: 624) except in the following details. Body more slender. Labrum at least partially erectile and with chiloscleres. Maxillary palp with 5 apical sensilla.

*IMMATURE LARVA*.—Length (through spiracles) about 3.4 mm. Similar to mature larva except as follows. Body tubercles about 136; doorknob tubercles in pairs on dorsal surfaces of each AIV-AVI; remainder tall cones. Body hairs slightly shorter (0.009-0.03 mm long). Chiloscleres present as in mature.

*VERY YOUNG LARVA*.—Length (through spiracles) about 2.6 mm. Similar to immature larva except as follows. Tubercles about 138; typical tubercles either tall spires or tall subcylinders; a pair of doorknob tubercles on the dorsum of each AIII-AVII. Thoracic spiracles smaller than abdominal. Entire integument spinulose, the spinules minute and in short transverse rows. Body hairs minute (0.003-0.005 mm long); few; on venter of each abdominal somite. Head hairs shorter (about 0.025 mm long).

Labrum feebly bilobed and lacking chiloscleres. Mandibular teeth short and sharp-pointed. Maxillae with spinules minute and in short rows; palp a low knob with 5 sensilla. Labium with numerous minute spinules in transverse rows; no basal transverse welt; palp represented by a cluster of 5 sensilla; opening of sericteries a transverse slit in a shallow depression. Hypopharynx with a few minute spinules.

*Material studied.* — 3 larvae from Brazil, courtesy of Dr. W. L. Brown.

### **Mesoponera fauveli (Emery)**

Fig. 8

A planidium was found attached to the labio-gular junction of a larva. (Material studied: a larva from Peru, Machu Picchu, ca. 1000 m, 28-II, 1-III-1967, courtesy of Dr. W. L. Brown.)

### **Mesoponera ferruginea (S. Smith)**

Length (through spiracles) about 3.7 mm. Profile pogonomymecoid. Head large. Leg vestiges present; gonopod vestiges represented by paired structures on venter of each VII-IX. Tubercles of 2 types: (1) digitiform, stout and with encircling rows of spinules, with 2 (rarely 1 or 3) smooth, unbranched hairs, 0.001-0.05 mm long on lateral surfaces; (2) discoids, elevated and with 3 hairs about 0.013 mm tall on long spinulose stalk, top without spinules; 134, distributed thus: T1-T3, AI, AVI-AIX, 10 each; AII, 12; AIII-AV with 10 typical and 2 discoids each. Spiracles rather large, on tubercles with spinulose integument. Entire integument heavily spinulose; spinules in transverse rows on venter, in reticulate pattern elsewhere. Body hairs about 4 per somite, on venter, 0.001-0.075 mm long, smooth and unbranched. Cranium subhexagonal, broadest dorsally; integument spinulose, spinules isolated or in short rows. Each antenna a low knob (bearing 3 small sensilla) and mounted on a small base. Head hairs few, 0.025-0.05 mm long, smooth and unbranched. Labrum large; lateral borders strongly sinuate; deeply bilobed, each lobe with a low ventral boss with about 7 sensilla and with 2 minute (about 0.006 mm long) hairs; ventral border spinulose and with 4 sensilla; posterior surface with 3 ventral and about 6 middorsal sensilla; entire posterior surface spinulose; middle  $\frac{1}{3}$  with numerous, long fine spinules in subparallel transverse rows, each lateral  $\frac{1}{3}$  with long spinules in short arcuate rows. Mandibles ectatommoid, slender, with apical and subapical teeth subequal; basal tooth short and stout; integument of basal half spinulose, the spinules minute and in short arcuate rows, the rows longer and covering more of posterior surface. Maxillae large, apex paraboloidal and spinulose, the spinules moderately abundant, rather long and in short arcuate rows; palp a curved cylinder with 4 apical sensilla; galea tall and digitiform with 2 apical sensilla. Labium large, anterior surface coarsely spinulose, the

spinules long, isolated or in short rows; dorsal portion raised into a transverse densely spinulose ridge, the spinules long, slender and in numerous subtransverse rows; palp a short cylinder with 4 apical sensilla; opening of sericteries wide and salient. Hypopharynx densely spinulose, the spinules long and slender, in numerous long transverse subparallel rows. (Material studied: one larva from Turrialba, Costa Rica, January 1973, courtesy of Dr. W. L. Brown.)

Larvae of *Mesoponera stigma* from different localities are so different that they merit separate descriptions. All are so similar to *M. constricta* (1952: 624) that only differences are given.

### **Mesoponera stigma** (Fabricius)

Length (through spiracles) about 3.8 mm. Tubercles cone-shaped ventrally, boss-shaped laterally and dorsally; 131, distributed thus: T1-T3 and AI, 12 each; AII, 10 and 2 vestiges; AIII-AV, 10 and a middorsal boss each; AVI-AVIII, 10 each; AIX, 6; AX, 2 low cones; integument with fewer encircling rows of spinules. Body hairs minute (about 0.006 mm long). Antennae farther apart. Head hairs shorter (about 0.006 mm long). Labrum with 3 minute hairs and about 11 sensilla on each lobe; rows of spinules on posterior surface fewer and forming reticulate patterns. Mandibles with fewer rows of minute spinules. Maxillae with apex covered with larger spinules. Labium with fewer spinules, the spinules shorter and in short arcuate rows.

**YOUNG LARVA.**—Length (through spiracles) about 2.6 mm. Similar to mature larva except as follows. Tubercles 121, distributed thus: T1-T3, AII and AIII, 12 each; AI 10 and 2 vestigial; AIV and AVIII, 10 each; AV-AVII, 10 and a large middorsal boss each; AIX, 6; AX, 2. Body hairs about 0.003 mm long. Head with short rows of spinules laterally. Maxillae with minute spinules on apex. Labial palp a slightly raised cluster of 4 sensilla; opening of sericteries a transverse slit with slightly raised dorsal and ventral lips.

**VERY YOUNG LARVA.**—Length (through spiracles) about 1.4 mm. Similar to mature except as follows. Tubercles all low bosses with apical sensilla but without lateral spinules; 110, distributed thus: T1, AI-AVII, 10 each; T2, T3 and AVIII, 8 each; AIX, 6; AX, 2. Spiracles on T2 and T3 vestigial; abdominal larger and subequal. Integument with minute spinules in short rows on dorsum of posterior somites and on venter; none on tubercles. Labrum erectile; with minute spinules on posterior surface. Mandibles with straight apex and very small teeth. Maxillae with minute spinules. Labium with very short rows of minute spinules; palp represented by a cluster of sensilla; opening of sericteries a transverse slit. Hypopharynx densely spinulose, the spinules minute.



*Material studied.* — 12 larvae labelled "North Celebes, SW slope Mt. Klabat, 400-600 m, 12-19 IV 1973, W. L. Brown," courtesy of W. L. Brown.

### **Mesoponera stigma** (Fabricius)

Length (through spiracles) about 2.8 mm. Typical tubercles spires with narrowly rounded apex; with short encircling rows of spinules and with 1 or 2 sensilla; 163, distributed thus: T1-T3 and AI and AII, 12 each; AIII, AVII and AVIII, 14 each; AIV-AVI, 14 and a middorsal boss each; AIX, 10; AX, 6. Integument of venter with minute spinules in short rows. Head outline similar but less regular (i.e., with slight knobs). Head hairs shorter (about 0.006 mm long). Labrum with 1 or 2 hairs and about 6 sensilla on each lobe; posterior surface with larger isolated spinules on each ventrolateral area. Mandibles with spinules fewer and in fewer rows. Maxillae with apical spinules longer. Labium with spinules sparser, isolated and larger. (Material studied: 1 larva labelled: "Amazonas, Brazil, Rio Tarume, 30 Aug. 1962, W. L. Brown," courtesy of Dr. W. L. Brown.)

### **Mesoponera stigma** (Fabricius)

Length (through spiracles) about 4.3 mm. Typical tubercle a subcone with rounded apex and with short encircling rows of minute spinules, apex with 1-3 sensilla; 148 tubercles, distributed thus: T1-T3, 12 each; AI-AVI, 14 each; AVII and AVIII, 13 each; AIX, 10; AX, 4. Body hairs very few, minute (about 0.009 mm long), simple, slender. Integument with a pair of ventrolateral structures of unknown function, 1 pair on each somite AIII-AVI; integument with minute spinules in transverse rows on venter, diminishing posteriorly. Head with cheeks more bulging at level of antennae. Head hairs much shorter (about 0.013 mm long). Antennae farther apart. Labrum with 2 hairs and about 10 sensilla on each lobe; ventrolateral areas on posterior surface with larger isolated spinules. Mandibles lack constriction between base and apex; spinules fewer and rows farther apart. Maxillae with spinules on apex longer and isolated, a few shorter and in rows. Labium sparsely spinulose, the spinules large and isolated. Hypopharynx with short transverse rows of minute spinules.

*YOUNG LARVA.* — Length (through spiracles) about 2.9 mm. Similar to mature except as follows. Typical tubercle a frustum; middorsal bosses large hemispheres; all tubercles with minute spinules; 168, distributed thus: T1-T3, 12 each; AI-AII, 14 each; AIII-AVII, 14 and 1 large middorsal boss each; AVIII, 12 and 1 low middorsal boss; AIX, 10; AX, 6. Integument on venter of anterior somites and dorsum of posterior somites with minute spinules in short transverse rows. Body hairs about 0.006 mm long. Mandibles with teeth shorter and sharp-pointed, basal surface with numerous rows of minute spinules. Labium with spinules minute

and in short rows; palp a slightly raised cluster of 4 sensilla; opening of sericteries a transverse slit in a shallow depression.

*Material studied.* — 7 larvae labelled: "Pará, Brazil, Belem, P. F. Darlington, 9-VIII-1962, Brown-90;" courtesy of Dr. W. L. Brown.

### **Mesoponera stigma** (Fabricius)

*IMMATURE LARVA.* — Length (through spiracles) about 3.4 mm. Tubercles 160; tall and conical on thorax and around anus, short bosses elsewhere; distributed thus: T1-T3 and AVI-AVIII, 12 each; AI and AII, 14 each; AIII-AV, 14 and a large low boss on middorsum of each; AIX, 10; AX, 5. Integument of venter with minute spinules in short arcuate rows. Body hairs few, about 0.006 mm long. Head capsule relatively wider and with fewer spinules. Head hairs shorter (about 0.013 mm long). Labrum with 2 minute hairs and about 10 sensilla on anterior surface of each lobe, on and near ventral border; posterior surface of lobes with spinules larger and isolated. Mandibles with straighter sides (not so distinctly divided into basal and apical portions). Maxillae with apical spinules larger, sparse and frequently isolated.

*YOUNG LARVA.* — Length (through spiracles) about 2.4 mm. Similar to immature except in the following details. Tubercles mostly tall and conical; 169, distributed thus: T1-T3, 12 each; AI and AII, 14 each; AIII-AV and AVII, 14 and a large middorsal boss each; AVI and AVIII, 13 and a large middorsal boss each; AIX, 11; AX, 6. Mandibles with spinules smaller and in fewer rows.

*VERY YOUNG LARVA.* — Length (through spiracles) about 1.4 mm. Similar to immature except in the following details. Tubercles small bosses and a few frusta; 167, distributed thus: T1-T3, 12 each; AI-AII, 14 each; AIV-AVII, 14 and a large middorsal boss each; AVIII, 12 and a large middorsal boss; AIX, 10; AX, 6. Integument with very few spinules. Labrum less distinctly bilobed; posterior spinules smaller. Mandibles with spinules very few and minute. Maxillae with spinules shorter; palp and galea shorter. Labium with spinules shorter; palp a slightly raised cluster of 4 sensilla; opening of sericteries a transverse slit in a shallow depression. Hypopharynx with smaller spinules.

*Material studied.* — 3 immature larvae and 1 semipupa labelled: "Brazil, P. F. Darlington, B-155;" courtesy of Dr. W. L. Brown.

### **Mesoponera stigma** (Fabricius)

*IMMATURE LARVA.* — Length (through spiracles) about 3.3 mm. Typical tubercle a frustum, middorsal bosses large hemispheres; 161,

distributed thus: T1-T3 and AIX, 12 each; AI and AII, 14 each; AIII-AV, 14 and a middorsal boss each; AVI and AVII, 13 and a middorsal boss each; AVIII, 12 and a low boss; AIX, 10; AX, 4. Integument of venter of anterior somites and lip of anus with minute spinules in short rows. Body hairs about 0.006 mm long, sparse. Head bulging at antennal level. Head hairs about 0.012 mm long. Labrum with 2 or 3 hairs and about 8 sensilla on each lobe; posterior surface of each lobe with short isolated spinules. Mandibles less indented; spinules minute and in fewer rows. Maxillae with apical spinules larger and isolated.

*VERY YOUNG LARVA.*—Length (through spiracles) about 2 mm. Similar to immature except as follows. Tubercles 165, distributed thus: T1-T3, 12 each; AI-AIII, 14 each; AIV and AV, 14 and a large middorsal boss each; AVI and AVII, 13 and one middorsal boss each; AVIII, 12 and a large middorsal boss; AIX, 10; AX, 6. Head hairs about 0.006 mm long. Mandibles with teeth shorter and sharper. Labial palp represented by a slightly raised cluster of 4 sensilla; opening of sericteries a transverse slit in a slight depression.

*Material studied.*—7 larvae and 1 semipupa labelled: "Pará, Brazil, P. F. Darlington, Aug. 15, B-200;" courtesy of Dr. W. L. Brown.

### **Mesoponera stigma** (Fabricius)

*IMMATURE LARVA.*—Length (through spiracles) about 4 mm. Tubercles tall cones, except low bosses on middorsum of AIV and AV; 160, distributed thus: T1-T3 and AVIII, 12 each; AI-AIII, 14 each; AIV, 14 and 1 middorsal boss; AV, 13 and 1 middorsal boss; AVI and AVII, 13 each; AVIII, 12; AIX, 9; AX, 6. Integument of venter of anterior somites and lip of anus with minute spinules in short transverse rows. Body hairs very few, minute (about 0.006 mm long). Head hairs about 0.013 mm long. Labrum with 2 hairs and about 8 sensilla on anterior surface on and near ventral border of each lobe; ventral border of each lobe with spinules; posterior surface of each lobe with rather coarse isolated spinules; labrum erectile (i.e., can be turned up to about 90° from resting position). Mandibles with fewer spinules in less numerous rows. Maxillae with apical spinules moderately large and isolated. (Material studied: 3 larvae labelled: "Brazil, P. F. Darlington, Aug. 7," courtesy of Dr. W. L. Brown.)

### **Genus MYOPIAS** Roger

*REVISED CHARACTERIZATION.*—Profile pogonomymecoid but more slender and with a long slender neck. Tubercles numerous (125-135); typically a spire-like subcone with an apical hair, but a species may have

in addition some of the following types: (1) stout subcone with 2 or 3 basal hairs; (2) skewed subcone on the ventrolateral surfaces; (3) 2 middorsal knobs or 2 middorsal welts. Body hairs very few and simple. Head with mouth parts pointed forward. Cranium about a third longer than broad. Antennae high on head. Head hairs very few, minute. Labrum subparaboloidal. Mandibles large, cephalotoid.

### ***Myopias cribriceps* Emery**

Length (through spiracles) about 4.4 mm. Similar to *Myopias* sp. (1971: 1211) except as follows. Most tubercles similar to those on *M.* sp. but without doorknobs and with middorsal welts; tubercles 125, distributed thus: T1-T3, 8 each; A1, 12; AII and AIII, 10 and 2 skewed ventrolateral cones each; AIV-AVII, 8 typical and 2 skewed ventrolateral cones and a middorsal welt each; AVIII, 9 typical, 2 ventrolateral skewed cones and 1 middorsal welt; AIX, 6; AX, 3. Entire integument spinulose, the spinules larger and more numerous dorsally and posteriorly where they form a reticulate pattern. Body hairs 0.013-0.75 mm long, sparse, more numerous laterally on abdomen. Antennae twice as far apart. Mandibles with 2 teeth on medial border; medial surface spinulose. Maxillary and labial palps with 5 (3 apical, 1 subapical and 1 lateral) sensilla. (Material studied: 2 larvae from New Guinea, W. L. Brown and E. O. Wilson; courtesy of Dr. W. L. Brown.)

### **Genus PLECTROCTENA F. Smith**

Profile pogonomyrmecoid but more slender and with a long slender neck. Body with a very large number of tubercles (about 350); typical tubercle a stout cone with 1-3 (or more) hairs near apex and with rows of encircling spinules; on this base is mounted a more slender curved cone with spinulose integument. Cranium subhexagonal, slightly wider than long, clypeus bulging. Head hairs few, minute, smooth. Mandibles ectatommoid but with apex curved posteriorly and all teeth blunt, with minute spinules on medial, posterior and lateral surfaces of base. Maxillae swollen laterally.

In our key (1976) the genus would run to 23c, from which it can be distinguished by the shape and number of tubercles.

### ***Plectroctena* sp.**

Fig. 9

Length (through spiracles) about 4.8 mm. Body pogonomyrmecoid but more slender, ventral profile nearly straight; anus ventral. Body beset with numerous tubercles (about 346); typical tubercle a stout cone with 1-3 hairs (0.013-0.038 mm long) (or none) near apex and with rows of

encircling spinules; on this base is mounted a more slender curved cone, with spinulose integument. Tubercles distributed thus: T1, 10; T2 and T3, 14 each; AI, 18; AII, 26; AIII and AIV, 32 each; AV, 24; AVI and AVII, 48 each; AVIII, 30; AIX, 16; AX, 6. Leg and gonopod vestiges present. About 6 differentiated somites. Ten pairs of small spiracles. Entire integument spinulose, the spinules minute and in short arcuate rows, the rows more prominent on venter and all surfaces of the posterior somites. Head subhexagonal; clypeus bulging; entire integument with minute spinules in short arcuate rows. Antennae high on head; each a slightly elevated oval disc with 3 sensilla each; mounted on a teardrop-shaped elevation. Head hairs few (about 20), 0.004 mm long, simple. Labrum subrectangular, lateral borders feebly sigmoid, ventral border nearly straight; with 9 sensilla and/or minute hairs on or near each ventrolateral corner; ventral and ventrolateral surfaces spinulose, the spinules long and in numerous arcuate rows, the rows so close together that the spinules overlap; posterior surface with 3 sensilla on each half (2 contiguous). Mandibles ectatommoid, moderately sclerotized, slightly curved posteriorly, teeth blunt, with minute spinules in arcuate rows on lateral and medial surfaces and extending onto posterior surface. Maxillae swollen laterally; apex short, rounded and directed medially; densely spinulose medially and apically, spinules becoming shorter basally; palp a rounded peg with 5 apical (2 with a spinule each) sensilla; galea digitiform with 2 apical sensilla. Labium spinulose, the spinules small and in numerous transverse rows; with a densely spinulose transverse dorsal welt with longer spinules; palp a skewed peg with 5 apical (2 with a spinule each) sensilla; opening of sericteries wide and salient with 3 projections. Hypopharynx densely spinulose, the spinules long and in numerous transverse rows, the rows so close together that the spinules overlap. (Material studied: 4 larvae from Ivory Coast, courtesy of Dr. W. L. Brown.)

### Tribe ODONTOMACHINI

#### Genus ANOCHETUS Mayr

Generically indistinguishable from *Odontomachus*.

#### **Anochetus inermis** E. André

Length (through spiracles) about 4.1 mm. Very similar to *Anochetus* (A.) sp. (1952: 643 and 1964: 455) except in the following. Tubercles 98, distributed thus: T1, 10; T2, T3, AI-AIII and AVI-AVIII, 8 each; AIV, AV and AIX, 6 each; AX, 2; there are also a pair of pulley-shaped tubercles on dorsum of each AIV and AV. Body hairs on dorsolateral surfaces of each somite, 0.013-0.075 mm long. Head hairs 0.038-0.075 mm long. Mandibles with longer and more sharp-pointed apical and sub-

apical teeth, basal tooth smaller. Maxillary palp with 5 apical sensilla. (Material studied: 2 larvae from Brazil, courtesy of Dr. W. L. Brown.)

### **Anochetus princeps** Emery

Length (through spiracles) about 5.6 mm. Tubercles 92, distributed thus: T1 and T2, 10 each; T3, AII, AIII and AVI, 8 each; AI, AIV, AV and AVII-AIX, 6 each; AX, 2; in addition there are two elevated discoids on the dorsum of each AIV and AV. Integumentary spinules more prominent. Body hairs more numerous (but still very few), 0.013-0.075 mm long. Head with genae more nearly parallel. Labrum  $1\frac{1}{2}$  times as broad as long; lateral borders more sinuate; ventral border more deeply incised; each lobe with 2 hairs (about 0.013 mm long) and with 10 sensilla on and near ventral border; posterior surface with longer spinules, with 2 large sensilla medially and 3 minute sensilla basally on each lobe. Labium with longer spinules. Hypopharynx with numerous long spinules, the spinules in subparallel rows, the rows so close together that spinules overlap. (Material studied: 4 larvae from Celebes, courtesy of Dr. W. L. Brown.)

### **Anochetus rugosus** (S. Smith)

Probably similar to *Anochetus* (*A.*) sp. (1952: 643 and 1964: 455) in shape; differing as follows. Tubercles 94, distributed thus: T1, 10; T2, T3, AII, AIII and AVI-AVIII, 8 each; AI, AIV, AV and AIX, 6 each; AX, 2; on dorsum of each AIV and AV there is a single elevated discoid. Integumentary spinules more prominent. Cranium transversely sub-elliptical. Labrum nearly  $1\frac{1}{2}$  times as broad as long; bilobed; anterior surface of each lobe with 2 hairs and about 11 sensilla on and near ventral border; posterior surface with 2 large and 3 small sensilla on each lobe; entire posterior surface densely spinulose, the spinules rather long and in short to long arcuate rows, which are grouped into long sub-parallel rows, the rows so close together that spinules overlap. Mandibles, maxillae and labium with fewer spinules. Hypopharynx densely spinulose, the spinules long and arranged in subtransverse rows, the rows so close together that spinules overlap. (Material studied: 1 larva and 1 semipupa from Borneo, courtesy of Dr. W. L. Brown.)

## **Genus ODONTOMACHUS** Latreille

REVISED CHARACTERIZATION. — Profile pogonomymecoid but ventral surface of abdomen straight and neck longer and more slender. Tubercles numerous (90-120); a typical tubercle consists of a frustum with 3-14 relatively long simple hairs; on this frustum is a spire-like cone with an apical spine-like hair; integument of spire with short transverse rows of

spinules; on middorsal surface of each AIV and AV there is a pair of glabrous, subcircular areas which may be considerably elevated and pulley-like, or thin discs, or merely differentiated areas; or there may be only one such structure on each AIV and AV. Mandibles ectatommoid.

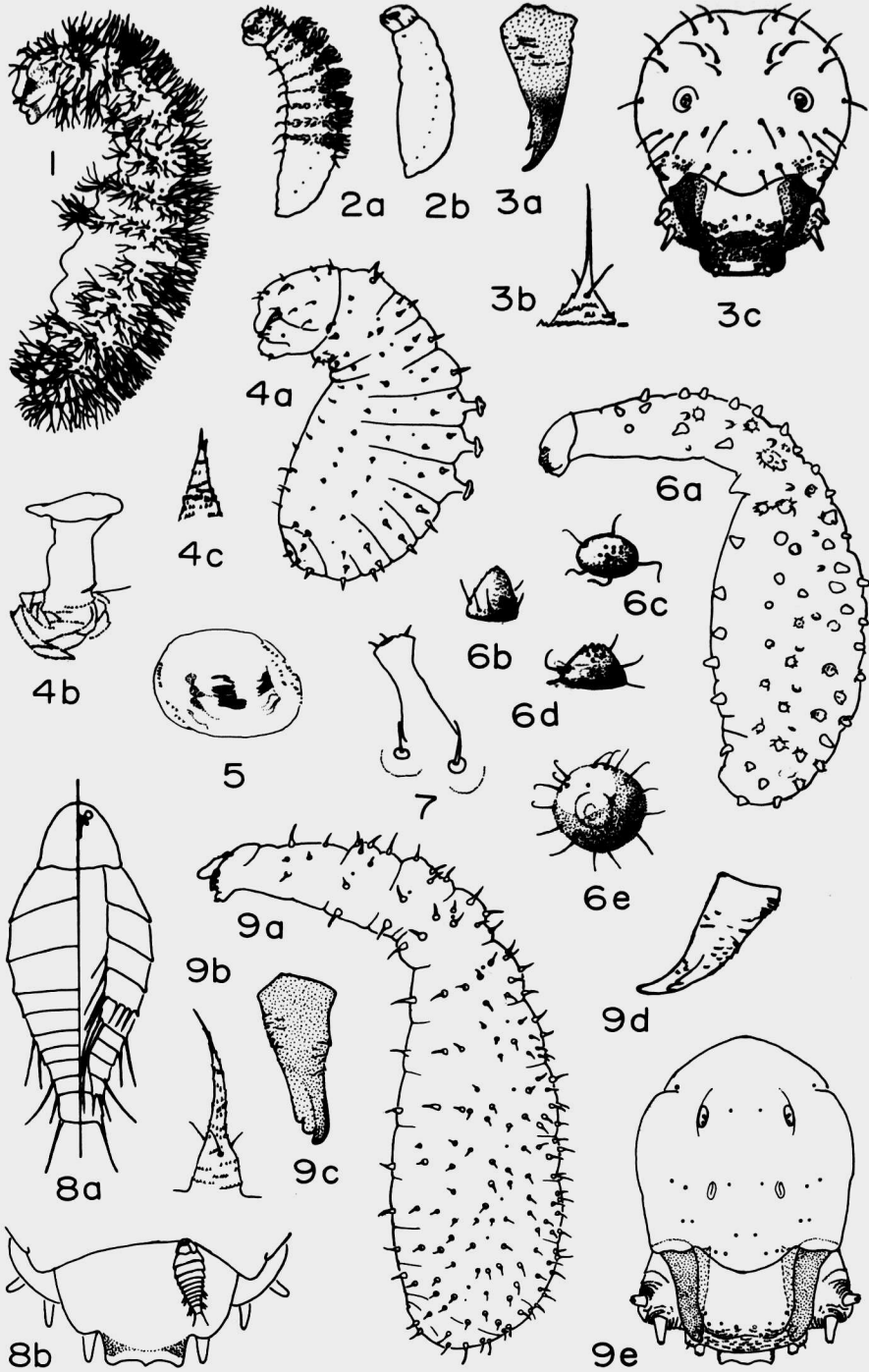
### ***Odontomachus gladiator* Donisthorpe**

Length (through spiracles) about 6.3 mm. Similar to *O. haematoda* (1952: 646; 1964: 455) except as follows. Tubercles less numerous (92) and dorsal discoids more elevated, with broader top and narrower base. Entire integument spinulose, the spinules minute and in short arcuate rows or in an anastomosing network. Body hairs 0.013-0.24 mm long, longest with long slender flexuous tips; most numerous on venter, a few elsewhere. Cranium more nearly quadrate. Each lobe of labrum with 2 hairs about 0.018 mm long and with 11 sensilla on and near ventral border; posterior surface of each lobe with 2 large sensilla ventrally and 2 small sensilla dorsally; entire posterior surface spinulose, spinules long, slender and in long arcuate rows, the rows so close together that the spinules overlap. Mandibles with the outline more smoothly curved, teeth smaller and spinules fewer. Maxillae with fewer spinules; palp with 5 apical sensilla. Labium with spinules long, slender and in subparallel transverse rows; palps with 5 apical sensilla. Hypopharynx densely spinulose, the spinules in numerous arcuate rows, grouped into longer concentric rows.

**IMMATURE LARVA.** — Length (through spiracles) about 4 mm. Similar to mature larva except in the following details. Body hairs 0.001-

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Fig. 1. *Typhlomyrmex rogenhoferi*. Immature larva in side view, X28. Fig. 2. *Heteroponera dolo*. a, Immature larva in side view, X14; b, very young larva in side view, X14. Fig. 3. *Bothroponera tesserinodis*. a, Left mandible in anterior view, X91; b, typical tubercle, X133; c, head in anterior view, X44. Fig. 4. *Brachyponea luteipes*. a, Very young larva in side view, X35; b, doorknob tubercle, X169; c, typical tubercle, X169. Fig. 5. *Centromyrmex bequaerti*. Abdominal integumentary structure, X387. Fig. 6. *Leptogenys dimidiata*. a, Larva in side view, X14; b and c, typical tubercle in surface and side views, X67 (N. Celebes, 13-19 June 1972, rot. wood, SW slope Mt. Klabat, 400-600 m, rain forest, W. L. Brown). d and e, side and surface views of typical tubercle, X67 (N. Celebes, 13-19 June 1972, Mt. Klabat, Air Madid, slope 400-600 m, wet forest, W. L. Brown). Fig. 7. *Leptogenys iridescens*. Tubercle, X1344. Fig. 8. *Mesoponera fauveli*. a, Planidium (left half dorsal view, right half ventral view), X267; b, planidium attached to labiogular suture, X67. Fig. 9. *Plectroctena cryptica*. a, Larva in side view, X18; b, typical tubercle, X169; c, left mandible in anterior view, X137; d, left mandible in medial view, X137; e, head in anterior view, X85.





0.05 mm long. Head hairs 0.025-0.075 mm long. Mandibles with apical tooth longer and more slender. Maxillary palp a stout cylinder. Labial palp a small knob; opening of sericteries not projecting.

*Material studied.* — 22 larvae from Celebes, courtesy of Dr. W. L. Brown.

***Odontomachus* sp.**

Length (through spiracles) about 8.5 mm. Similar to *O. haematoda* (1952: 646; 1964: 455) except as follows. Tubercles 100, distributed thus: T1, AI-AIII, 10 each; T2, T3, AVI-AVIII, 8 each; AIV and AV, 6 and a single dorsal discoid each; AIX, 6; AX, 2; hairs about 0.02 mm long, lanceolate, 3 or 4 per tubercle. Entire integument spinulose, spinules mostly in short rows, remainder isolated. Integument of head minutely spinulose above antennal level. Head hairs 0.04-0.05 mm long. Labrum with 11 sensilla on anterior surface of each lobe; posterior surface of each lobe with 1 small basal and 2 large contiguous medial sensilla. Mandibles with fewer spinules. Hypopharynx densely spinulose, the spinules long, fine and overlapping. (Material studied: 5 larvae labelled: "Ecuador, Lomon Cocha & Vic., Sept-Nov, 1964, H. R. Hermann," courtesy of Dr. W. L. Brown.)

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