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## Taxonomic revision of the ant genus *Leptomyrmex* Mayr (Hymenoptera: Formicidae)

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**Taxonomic revision of the ant genus *Leptomyrmex* Mayr (Hymenoptera: Formicidae)**

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## Abstract

The ants of the genus *Leptomyrmex* (Hymenoptera: Formicidae), commonly called ‘spider ants’, are distinctive members of the ant subfamily Dolichoderinae and prominent residents of intact wet forest and sclerophyll habitats in eastern Australia, New Caledonia and New Guinea. This revision redresses pervasive taxonomic problems in this genus by using a combination of morphology and molecular data to define species boundaries and clarify nomenclature. Twenty-seven *Leptomyrmex* species are recognized and are informally split into two groups: the macro-*Leptomyrmex* (21 species), and its sister group, the micro-*Leptomyrmex* (six species). Nine subspecies are elevated to species status: *L. cnemidatus* Wheeler 1915, *L. geniculatus* Emery 1914, *L. melanoticus* Wheeler 1934, *L. nigriceps* Emery 1914, *L. rothneyi* Forel 1902, *L. ruficeps* Emery 1895, *L. rufipes* Emery 1895, *L. rufithorax* Forel 1915 and *L. tibialis* Emery 1895. Nineteen new synonymies are proposed (senior synonyms listed first): *L. cnemidatus* Wheeler 1915 = *L. erythrocephalus venustus* Wheeler 1934 = *L. erythrocephalus brunneiceps* Wheeler 1934; *L. darlingtoni* Wheeler 1934 = *L. darlingtoni fascigaster* Wheeler 1934 = *L. darlingtoni jucundus* Wheeler 1934; *L. erythrocephalus* (Fabricius 1775) = *L. froggatti* Forel 1910 =

*L. erythrocephalus mandibularis* Wheeler 1915 = *L. erythrocephalus unctus* Wheeler 1934 = *L. erythrocephalus clarki* Wheeler 1934; *L. fragilis* (F. Smith 1859) = *L. fragilis femoratus* Santschi 1932 = *L. fragilis maculatus* Stitz 1938 = *L. wheeleri* Donisthorpe 1948; *L. melanoticus* Wheeler 1934 = *L. contractus* Donisthorpe 1947; *L. niger* Emery 1900 = *L. lugubris* Wheeler 1934; *L. rufipes* Emery 1895 = *L. quadricolor* Wheeler 1934; *L. rufithorax* Forel 1915 = *L. erythrocephalus basirufus* Wheeler 1934; *L. tibialis* Emery 1895 = *L. nigriventris hackeri* Wheeler 1934; *L. varians* Emery 1895 = *L. erythrocephalus decipiens* Wheeler 1915 = *L. varians angusticeps* Santschi 1929; *L. wiburdi* Wheeler 1915 = *L. wiburdi pictus* Wheeler 1915. Tools for identification of the macro-*Leptomyrmex* species include a revised species-level key based on the worker caste, keys to males in Australia and New Guinea, full descriptions of workers, images of known workers, males and queens, and illustration of male genitalia. Phylogenetic relationships among the macro- and micro- *Leptomyrmex* species are discussed, as is the status of a putative fossil relative.

**Key words:** Australia, New Caledonia, New Guinea, illustrated keys, Dolichoderinae, synonymy, molecular systematics

## Introduction

The genus *Leptomyrmex* (Hymenoptera: Formicidae) is a distinctive member of the ant subfamily Dolichoderinae. Commonly known as ‘spider ants’ for their, long legs and spider-like movements, these orange and black ants are prominent residents of intact wet forest and sclerophyll habitats throughout their range. The global distribution of this genus is restricted to eastern Australia, New Caledonia and New Guinea, as well as the nearby Indonesian islands of Aru and Seram.

This revision identifies 27 *Leptomyrmex* species as a result of nomenclatural revisions that include changes in species status and synonymies. The species are informally split into two groups: the macro-*Leptomyrmex* (21 species), and its sister group, the micro-*Leptomyrmex* (six species). Workers of *Leptomyrmex* can be easily recognized by elongate antennal scapes which surpass the posterior margin of the head by more than one half their length, a medially notched hypostoma, mandibles with 7–15 teeth and 5–12 denticles, and a laterally located anterior tentorial pit.

Macro-*Leptomyrmex* are large, diurnal and many are conspicuously colored in black, orange or bicolorous black and orange. Micro-*Leptomyrmex* species have been recently described from Australia’s eastern forests (Smith and Shattuck 2009), and were placed in *Leptomyrmex* based on mandibular dentition, anterior clypeal margin configuration, elongate scapes and head, cleft medial hypostomal margin, anterior tentorial pit location, keeled fourth gastral sternite and reduced hind tibial spurs. In some cases, scapes are shorter than in the macro species, and in one species (*L. ramorniensis*) the hypostoma is only weakly notched. All six species are readily distinguished from their larger congeners by their small size (head width < 0.80mm), brown coloration, relatively short dorsal face of the propodeum, angular (not rounded) petiole and gaster lacking lateral compression (Smith and Shattuck 2009).

Collections and descriptive work on the macro-*Leptomyrmex* date back to the late 1700s, but revisionary work on the entire genus was not undertaken until the early 20<sup>th</sup> century, when W.M. Wheeler (1919, 1934) addressed the taxonomy of the genus. The accumulation of over 40 nominal specific and subspecific names within this genus led to questions about species identity. Complex color variation in several species and local occurrences of mimicry within and among species have contributed to the lack of clarity in species boundaries.

This revision of the genus *Leptomyrmex* attempts to redress this problem by clarifying nomenclature and defining species boundaries within the macro-*Leptomyrmex*. Here we offer a revised species-level key to species based on the worker caste, keys to males in Australia and New Guinea, full descriptions of workers, images of known workers, males and queens, and illustrations of male genitalia. The micro-*Leptomyrmex* species are not redescribed here. However, phylogenetic relationships among all macro- and micro- *Leptomyrmex* species, based on molecular data, are discussed. In stabilizing the taxonomy of this group, we hope to render macro-*Leptomyrmex* available and identifiable for future research and conservation purposes. As the macro-

*Leptomyrmex* species are relatively well-collected throughout their range (with the exception of western New Guinea) we do not expect to see many changes in species numbers in the future. The micro-*Leptomyrmex* group is less well known, and diversity in this recently defined group is expected to increase with further study.

## Materials and Methods

Abbreviations used for Museum Collections—Sources of material examined by the authors

ANIC—Australian National Insect Collection (Canberra, Australia)

BMNH—Natural History Museum (London, U.K.)

IRSNB—Institut Royal des Sciences Naturelles de Belgique (Brussels, Belgium)

LACM—Natural History Museum of Los Angeles County (Los Angeles, CA, USA)

MCZ—Museum of Comparative Zoology, Harvard University (Cambridge, MA, USA)

MHNG—Muséum d'Histoire Naturelle (Geneva, Switzerland)

MNHN—Muséum National d'Histoire Naturelle (Paris, France)

MSNG—Museo Civico di Storia Naturale 'Giacomo Doria' (Genoa, Italy)

NHMB—Naturhistorisches Museum, Basel (Basel, Switzerland)

OXUM—Hope Entomological Collections, University Museum (Oxford, UK)

PSWC—Philip S. Ward Collection (Davis, CA, USA)

QMBA—Queensland Museum (Brisbane, Australia)

TERC—CSIRO Tropical Ecosystem Research Centre (Darwin, Australia)

UCDC—Bohart Museum of Entomology, University of California (Davis, CA, USA)

ZMHB—Museum für Naturkunde der Humboldt-Universität, Berlin (Berlin, Germany)

Abbreviations used for other collections:

HMUG—Hunterian Museum, University of Glasgow (Glasgow, UK)

SMNS—Staatliches Museum für Naturkunde, Stuttgart (Stuttgart, Germany)

ZMUC—Zoologisk Museum, University of Copenhagen (Copenhagen, Denmark)

### *Material examined*

For each species, the specimens examined are listed alphabetically first by country, then by primary administrative division and then by locality name. Dubious locality records are listed separately for each species under Material Examined, and are excluded from distribution maps. Each of these questioned records occurs beyond the well-circumscribed distribution ranges that are expected to occur in species, such as those of macro-*Leptomyrmex*, where the queens are entirely wingless.

In listing type material examined, we list modern primary administrative division and country, but cite original locality name; any annotations are enclosed in square brackets. Where original descriptions are ambiguous as to whether a single specimen or multiple specimens were described, we use the convention 'specimen(s)' and 'worker(s)' in reference to type material. Collections of *Leptomyrmex* in the ANIC, UCDC and PSWC comprised the bulk of material examined in this study. Selected specimens from the other collections listed above, including types, were also examined.

### *Analyses of morphology—measurements*

Measurements were taken to quantify interspecific differences in size and shape among specimens. We attempted to measure at least ten workers and at least two males of each species wherever possible. Generally, specimens from the same nest were not measured, except in cases of very rare species where few specimens

were available. Full face view is here defined for workers as the frontal view of the head at which the length of the eyes is maximized. For males a full-face view is one in which the ocelli and the posterior margin of the clypeus lie in the same plane of view. We consider ants to be prognathous, and references to anterior and posterior portions of the head reflect this perspective. Measurements and indices are defined below and illustrated in Figure 1. All measurements were taken in millimeters (mm). Note that indices are presented here as decimals and not multiplied by 100, as in some other papers.

#### Measurements used

HL—Head Length: in full face view, excluding mandibles: midline length of head proper, from the posterior margin of the head to the anterior extremity of the clypeus.

HW—Head Width: in full face view, maximum width of head. This excludes the eyes in workers, but includes the eyes in males.

MFC—Minimum frontal carinal distance: minimum distance between the frontal carinae.

IOD—Intraocular distance: minimum distance between the eyes.

SL—Scape length: length of the first antennal segment, excluding the radicle.

LA2—Length of second antennal segment (measured in males only).

LA3—Length of third antennal segment (measured in males only).

EL—Eye length: length of compound eye, measured in the same view as HL. (Note that in males this is not the same as maximum eye length).

EW—Eye Width: the maximum width of the eye, as seen in profile, measured perpendicular to the long axis of the eye.

WL—Weber's length: the diagonal length of the mesosoma in profile, from the anteriormost point of the pronotum, excluding the collar, to the posterior basal angle of the metapleuron.

PW—Pronotal width: maximum pronotal width in dorsal view.

DPW—Dorsal petiolar width: maximum petiolar width in dorsal view.

HTL—Hind tibial length: maximum length of the hind tibia including the median condyle.

HTWmin—Minimum hind tibial width: measured on the narrow side; width at the midpoint of the tibia.

HTWmax—Maximum hind tibial width: measured on the broad, flat side; maximum width of the tibia.

CI—Cephalic index: HW divided by HL

SI—Scape Index: SL divided by HW

SI2—Scape Index 2 (males only): SL divided by (LA2 + LA3)

OI—Ocular index: EL x EW divided by HW

HTC—Hind tibial compression: HTWmin divided by HTWmax.

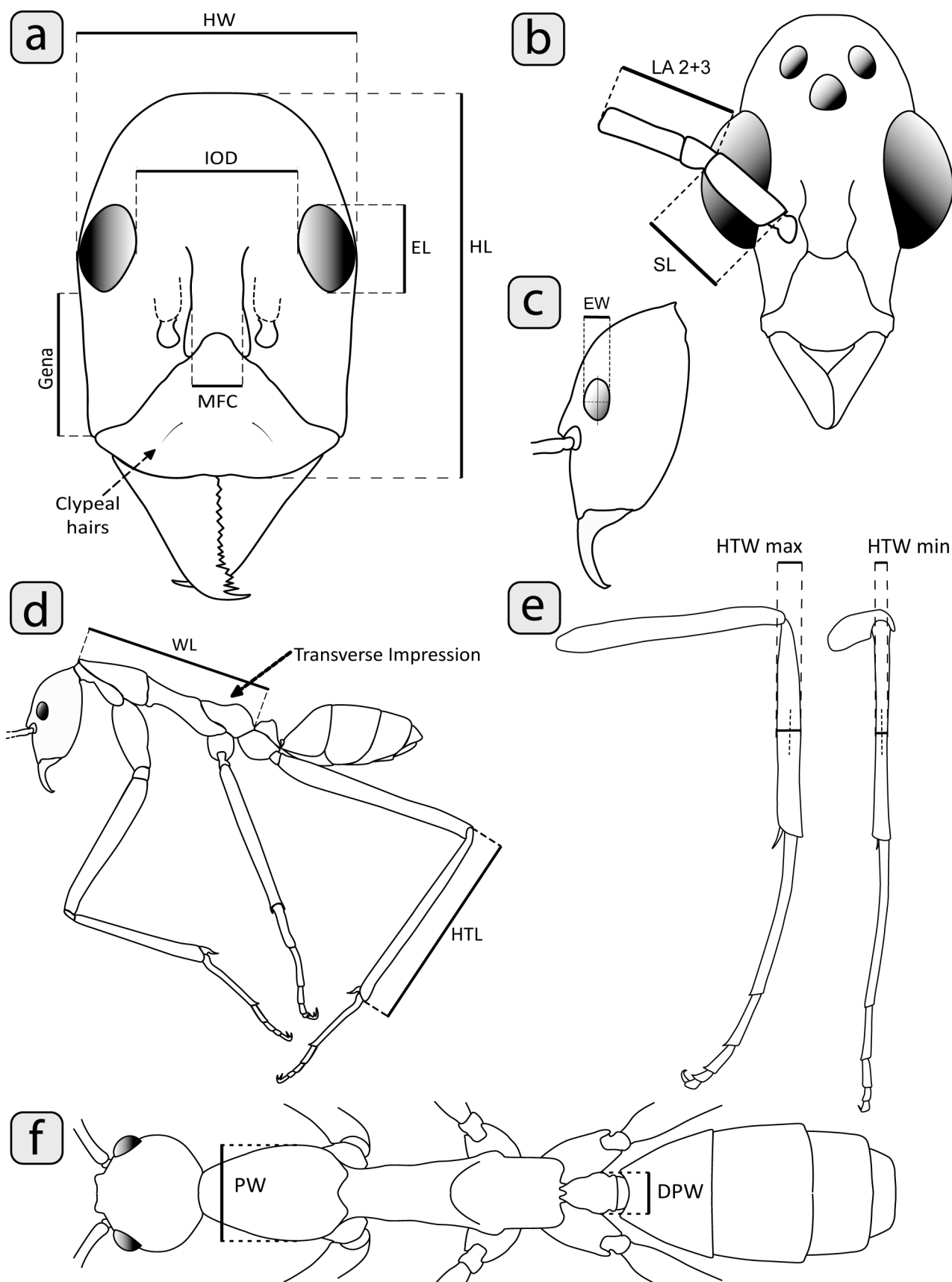
#### Other characters used in species descriptions:

*Standing hairs on posterior face of hind tibiae*—stout, bristle-like hairs on the inner face of tibia. Viewed in posterior view when the hind leg is perpendicular to the body (see key to workers, Figs 33–34).

*Postocular head shape*—shape of the posterior portion of the head in full face view. Most species have the posterior portion of the head either broadly rounded or narrowing abruptly, sometimes into a necklike constriction (see *necklike constriction* below).

*Necklike constriction*—in lateral view, the posterior portion of the head becoming constricted dorsoventrally and projecting posteriorly. In full face view this appears as an abruptly narrowed postocular margin (see key to workers, Fig. 29a–d).

*Genae*—in full face view, the lateral portion of the head anterior to the eyes and posterior to the lateral clypeal margin.



**FIGURE 1.** Morphometric measurements used in this study: a) head characters. HW = head width; HL = head length; EL = eye length; IOD = interocular distance; MFC = minimum frontal carinal distance. b) Male: LA 2+3 = length of antennal segments 2+3; SL = scape length. c) EW = eye width. d) WL = Weber's length; HTL = hind tibial length. e) HTW = hind tibial width. f) PW = pronotal width; DPW = dorsal petiolar width.

*Clypeal hairs*—stout erect or suberect black hairs, not to be confused with pale setae which may be abundant.

Where hairs have broken off, a dark pit will still be present, although these may be difficult to see in some specimens.

*Transverse impression of the dorsal face of the propodeum*—in lateral view the transverse impression appears as a distinct depression in the dorsal face of the propodeum. Degree of development varies among species.

## LEPTOMYRMEX Mayr 1862

### Synonymic list of extant species of macro-*Leptomyrmex*

*L. cnemidatus* Wheeler 1915 stat. nov.

= *L. erythrocephalus venustus* Wheeler 1934 syn. nov.

= *L. erythrocephalus brunneiceps* Wheeler 1934 syn. nov.

*L. darlingtoni* Wheeler 1934

= *L. darlingtoni fascigaster* Wheeler 1934 syn. nov.

= *L. darlingtoni jucundus* Wheeler 1934 syn. nov.

*L. erythrocephalus* (Fabricius 1775)

= *L. froggatti* Forel 1910 syn. nov.

= *L. erythrocephalus mandibularis* Wheeler 1915 syn. nov.

= *L. erythrocephalus unctus* Wheeler 1934 syn. nov.

= *L. erythrocephalus clarki* Wheeler 1934 syn. nov.

*L. flavitarsus* (F. Smith 1859)

*L. fragilis* (F. Smith 1859)

= *L. fragilis femoratus* Santschi 1932 syn. nov.

= *L. gracillimus* Wheeler 1934

= *L. fragilis maculatus* Stitz 1938 syn. nov.

= *L. wheeleri* Donisthorpe 1948 syn. nov.

*L. geniculatus* Emery 1914 stat. nov.

*L. melanoticus* Wheeler 1934 stat. nov.

= *L. contractus* Donisthorpe 1947 syn. nov.

*L. mjobergi* Forel 1915

*L. niger* Emery 1900

= *L. lugubris* Wheeler 1934 syn. nov.

*L. nigriceps* Emery 1914 stat. nov.

*L. nigriventris* (Guérin-Méneville 1831)

*L. pallens* Emery 1883

*L. puberulus* Wheeler 1934

*L. rothneyi* Forel 1902 stat. nov.

*L. ruficeps* Emery 1895 stat. nov.

*L. rufipes* Emery 1895 stat. nov.

= *L. varians quadricolor* Wheeler 1934 syn. nov.

*L. rufithorax* Forel 1915 stat. nov.

= *L. erythrocephalus basirufus* Wheeler 1934 syn. nov.

*L. tibialis* Emery 1895 stat. nov.

= *L. nigriventris hackeri* Wheeler 1934 syn. nov.

*L. unicolor* Emery 1895

*L. varians* Emery 1895

= *L. erythrocephalus decipiens* Wheeler 1915 syn. nov.



= *L. varians angusticeps* Santschi 1929 **syn. nov.**

*L. wiburdi* Wheeler 1915

= *L. wiburdi pictus* Wheeler 1915 **syn. nov.**

**Description of the worker caste** (modified from Shattuck 1992)

Images of all macro-*Leptomyrmex* workers can be found in Figs 2–22.

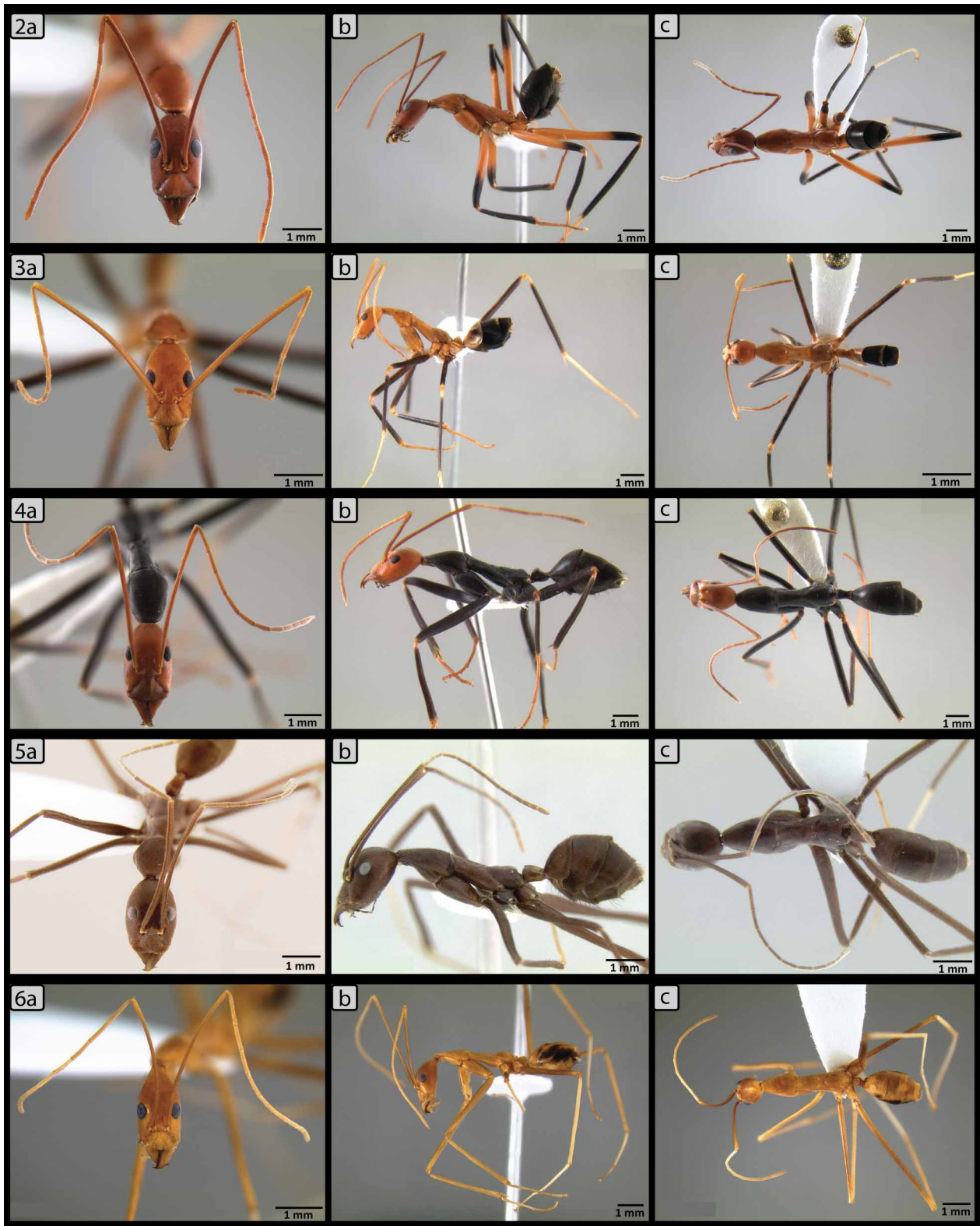
Worker caste monomorphic. Medium to large (HW 0.80–1.96mm); head longer than wide (CI 0.41–0.76). Postocular margin convex to very weakly concave. Anterolateral clypeal margin even with mediolateral region (sometimes with a weakly developed shoulder). Anteromedial clypeal margin entire, lacking a central notch or concavity. Anterior clypeal setae 2–9, less than twice the maximum scape diameter, straight. Posterior clypeal margin even with or anterior to the anterior surfaces of the antennal socket cavities. Anterior tentorial pit near the lateral junction of the gena and clypeus (near the mandibular insertion). Frontal carina present. Anterolateral hypostoma reduced to a thin sclerite (rarely slightly expanded, but never tooth-like). Medial hypostoma notched. Compound eyes present, approximately round, relatively posterior on head. Ocelli absent. Antennae 12 segmented. Scape long, surpassing postocular margin by about one-half of its length or more. Palp formula 6:4 (very rarely 5:4). Third maxillary palp segment subequal in length to segment 4. Fifth maxillary palp segment at the apical extreme of segment 4. Mandible with 7–15 teeth and 5–12 denticles. Apical tooth slightly longer than the subapical tooth. Basal angle weakly defined by a denticle. Basal margin denticulate distally, smooth proximally.

Posteroventral pronotum weakly expanded medially. Mesopleural process absent. Anteromedial mesosternum even with the lateral regions. Declivitous face of propodeum flat; dorsal face weakly convex to concave, longer than the declivitous face, often with transverse impression. Propodeal angle distinct (sometimes only weakly). Mesosomal spines absent. Erect pronotal hairs absent (rarely with numerous short, erect hairs). Dorsal pro-mesonotal junction with the pronotum and mesonotum even, or rarely with the mesonotum above the pronotum. Metanotal groove forming a distinct angle between the mesonotum and the propodeum (often reduced and with the mesosomal dorsum nearly flat). Metanotal spiracle dorsal and lying on the dorsal surface when viewed in lateral profile, or rarely lateral and ventral of the dorsal surface when viewed in lateral profile. Propodeal spiracle lateral and ventral of the propodeal dorsum. Hind tibial spur with reduced barbules (barbules often absent from basal half). Petiolar scale present; rounded and forming an even arch dorsally (in one species compressed and strongly inclined anteriorly). Venter with at most a weakly developed lobe.

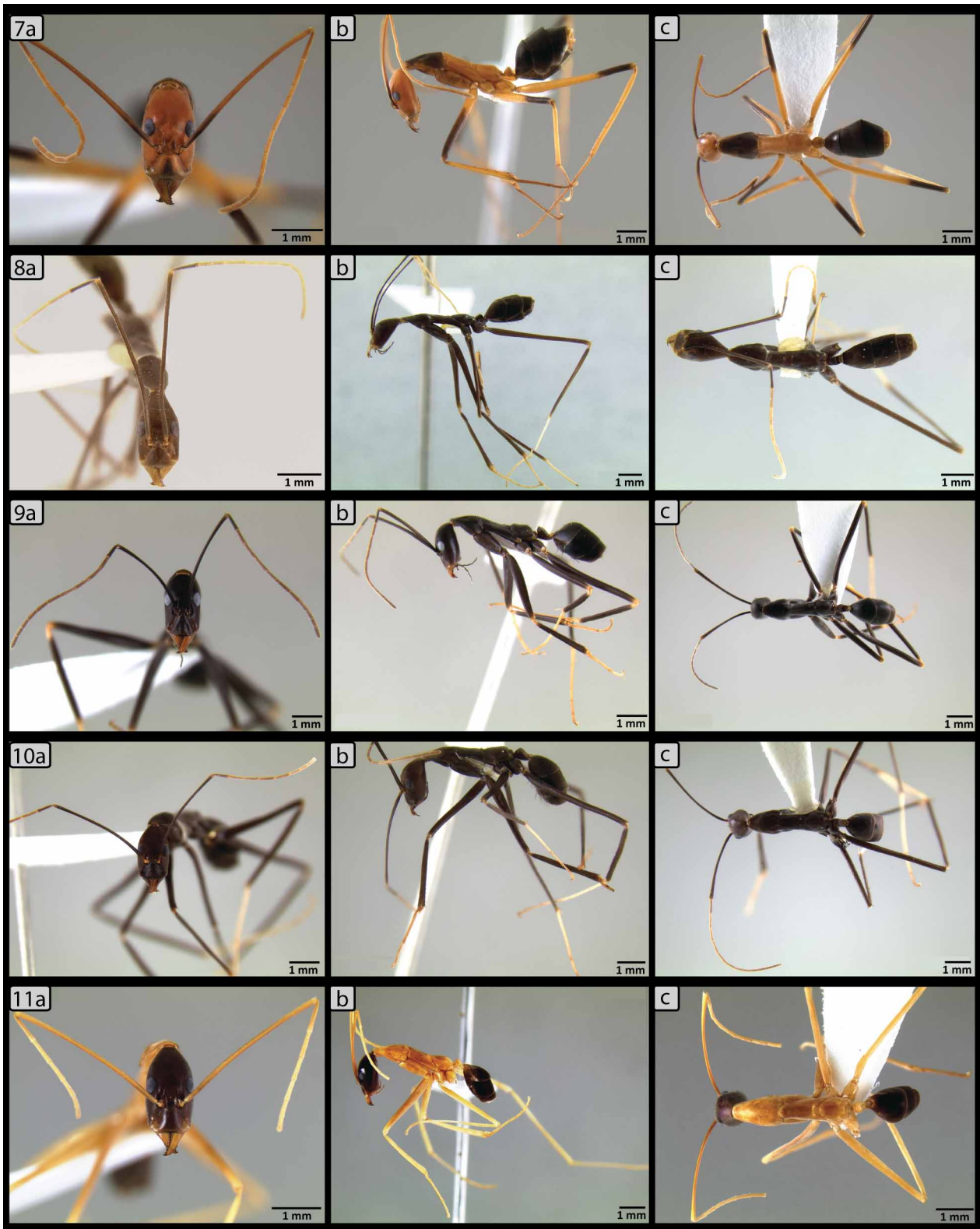
Gaster elliptical to spherical (in swollen repletes). First tergite elongated posteriorly, smooth and without a groove or indentation. Anterior tergo-sternal suture of the first segment extending laterally from the helcium, without or with at most a very weak dorsal arch. Fifth tergite ventral, gaster with 4 apparent tergites. General compression lateral. Fourth sternite keel-shaped posteriorly.

Integument thin and flexible, weakly sculptured. Body surface shagreened to shining, with fine pubescence. Pilosity minimal, primarily confined to clypeus, venter and gaster. Body coloration unicolorous orange, unicolorous black or contrasting patterns of orange and black.

Chromosome number 12 (n=12, *L. erythrocephalus*, Imai *et al.* 1977). Proventriculus with cupola narrow relative to bulb, round, with long pile; smooth, without sculpture, and without phragma. Bulb exposed in lateral view (Wheeler 1915). Longitudinal muscle No. 1 present. Occlusory tract present.

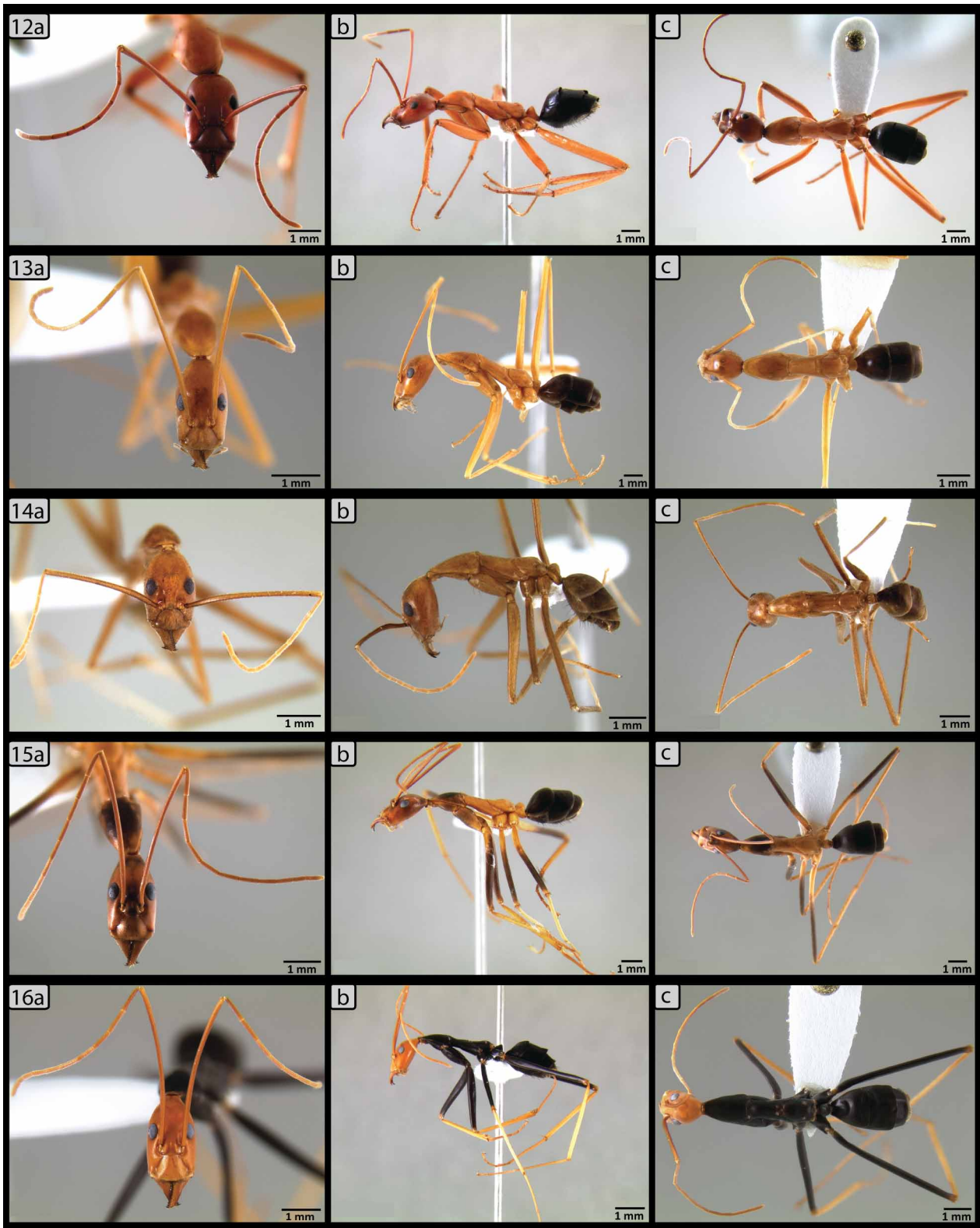


**FIGURES 2–6.** Macro-*Leptomyrmex* workers in head, profile and dorsal view. Fig. 2: *L. cnemidatus*. Fig. 3: *L. darlingtoni*. Fig. 4: *L. erythrocephalus*. Fig. 5: *L. flavitarsus*. Fig. 6: *L. fragilis*.

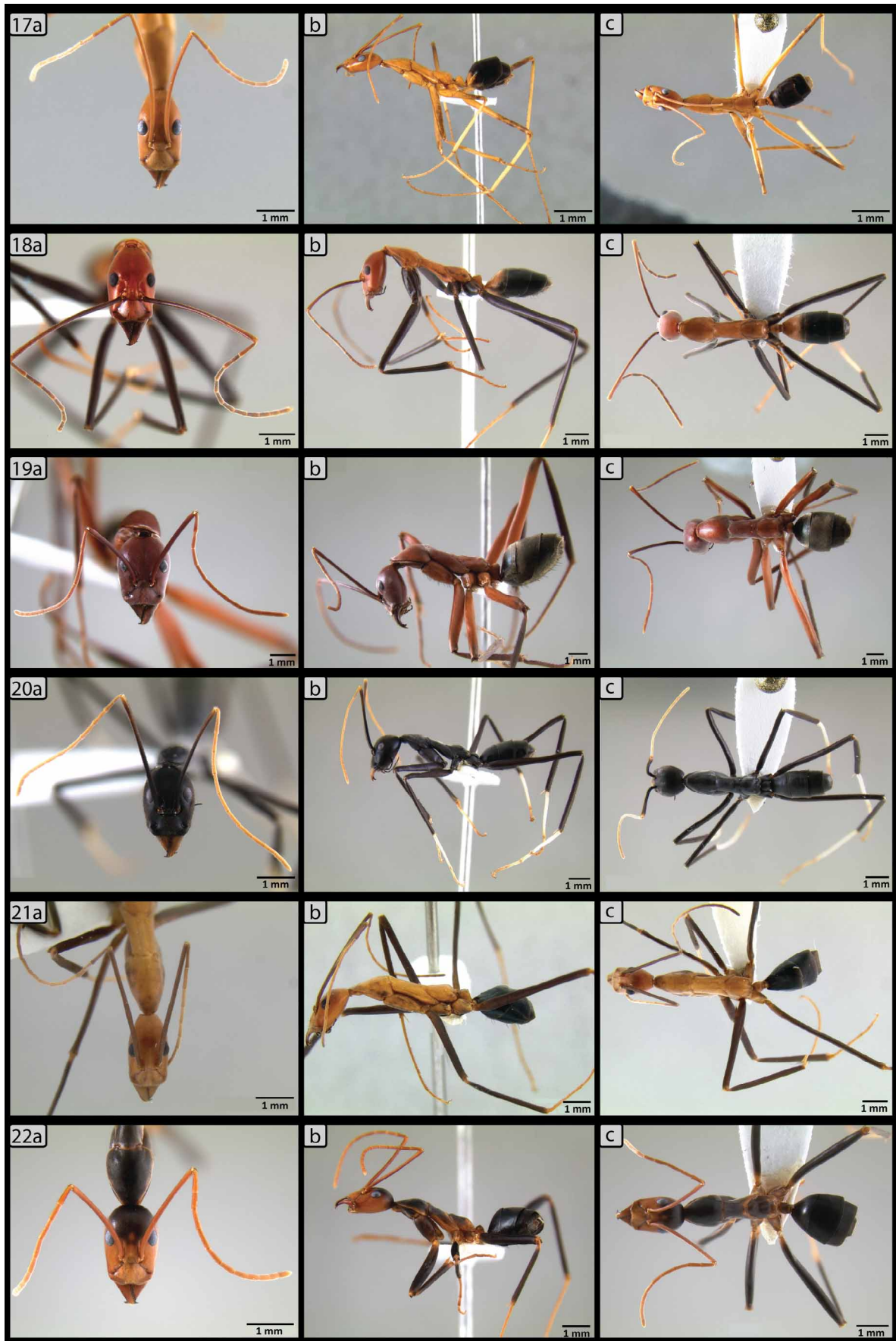


**FIGURES 7–11.** Macro-*Leptomyrmex* workers in head, profile and dorsal view. Fig. 7: *L. geniculatus*. Fig. 8: *L. melanoticus*. Fig. 9: *L. mjobergi*. Fig. 10: *L. niger*. Fig. 11: *L. nigriceps*.





**FIGURES 12–16.** Macro-*Leptomyrmex* workers in head, profile and dorsal view. Fig. 12: *L. nigriventris*. Fig. 13: *L. pallens*. Fig. 14: *L. puberulus*. Fig. 15: *L. rothneyi*. Fig. 16: *L. ruficeps*.

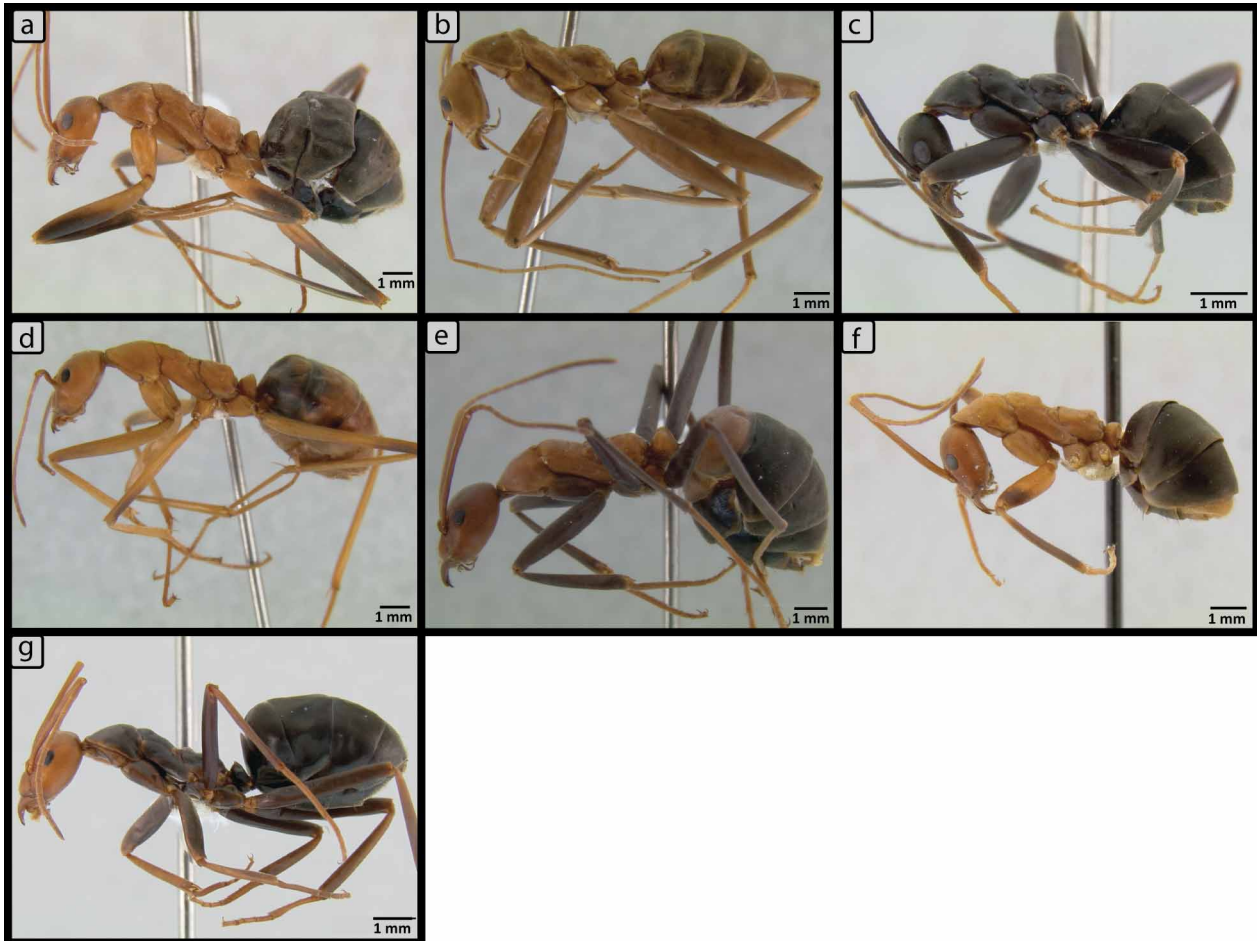


**FIGURES 17–22.** Macro-*Leptomyrmex* workers in head, profile and dorsal view. Fig. 17: *L. rufipes*. Fig. 18: *L. rufithorax*. Fig. 19: *L. tibialis*. Fig. 20: *L. unicolor*. Fig. 21: *L. varians*, Fig. 22: *L. wiburdi*.

**Description of queen** (modified from Shattuck 1992)

Images of all known macro-*Leptomyrmex* queens can be found in Fig. 23.

Queens are known from only seven species. All known macro-*Leptomyrmex* queens are wingless (ergatoid). They can be differentiated from workers by the presence of ocelli and their larger size, including enlarged mesosoma and gaster. Whereas the workers possess a mesosoma that is smooth in profile, the profile of queens is distinctly impressed at the promesonotal suture and the metanotal groove. Appendages are noticeably stouter. Queens of at least one 'micro-'*Leptomyrmex* species possess wings; a full description of winged queens is provided by Shattuck (1992).



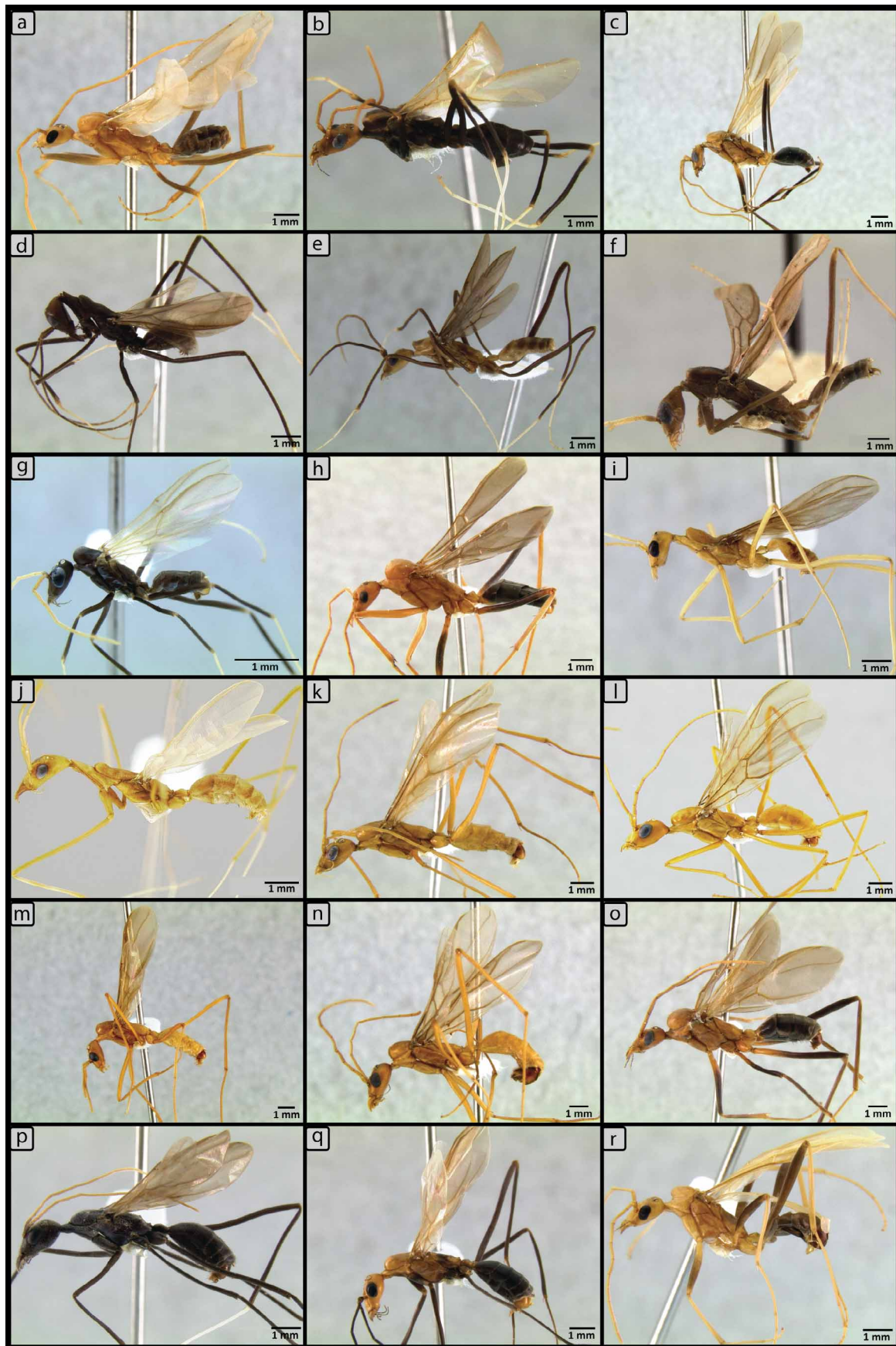
**FIGURES 23.** Known macro-*Leptomyrmex* queens: a) *L. cnemidatus*, b) *L. fragilis*, c) *L. mjobergi*, d) *L. rufipes*, e) *L. rufithorax*, f) *L. tibialis*, g) *L. wiburdi*.

**Description of male** (modified from Shattuck 1992)

Images of known macro-*Leptomyrmex* males appear in Fig. 24.

Inner margin of eye entire, flat. Thirteen antennal segments (reduced to twelve in two New Guinea species). Scape length variable, but shorter than the length of antennal segments 3+4. Second antennal segment cylindrical or cone-shaped. Third antennal segment cylindrical, straight. Antennal segments 3 (usually) and 4 (always) more than twice as long as broad. Fourth and fifth antennal segments bent and forming an angle between them (angle either between segments or at the distal end of segment 4). Anteromedial clypeal margin entire, without a central notch or concavity of any type. Anterior clypeal setae 0–6; when present short, about as long as maximum diameter of the scape; straight. Posterior clypeal margin even with or anterior to the anterior surfaces of the antennal socket cavities. Anterior tentorial pit near the lateral junction of the gena and





**FIGURE 24.** Macro-*Leptomyraxes* males: a) *L. cnemidatus*, b) *L. darlingtoni*, c) *L. erythrocephalus*, d) *L. flavitarsus*, e) *L. fragilis*, f) *L. melanoticus*, g) *L. mjobergi*, h) *L. nigriventris*, i) *L. pallens*, j) *L. puberulus*, k) *L. rothneyi*, l) *L. ruficeps*, m) *L. rufipes*, n) *L. rufithorax*, o) *L. tibialis*, p) *L. unicolor*, q) *L. varians*, r) *L. wiburdi*.

clypeus (near the mandibular insertion). Anterolateral hypostoma reduced to a thin sclerite. Medial hypostoma notched. Palp formula 6:4. Third maxillary palp segment subequal in length to segment 4. Mandible with no prominent teeth (except apical, if present) and about 0–26 denticles. Apical tooth absent (tip of mandible rounded or occasionally angular) or rarely well defined and much longer than the subapical tooth. Basal angle either indistinct (with a relatively uninterrupted curve between the two margins and without a distinct tooth or angle) or weakly defined by a denticle. Basal margin smooth and without teeth or denticles.

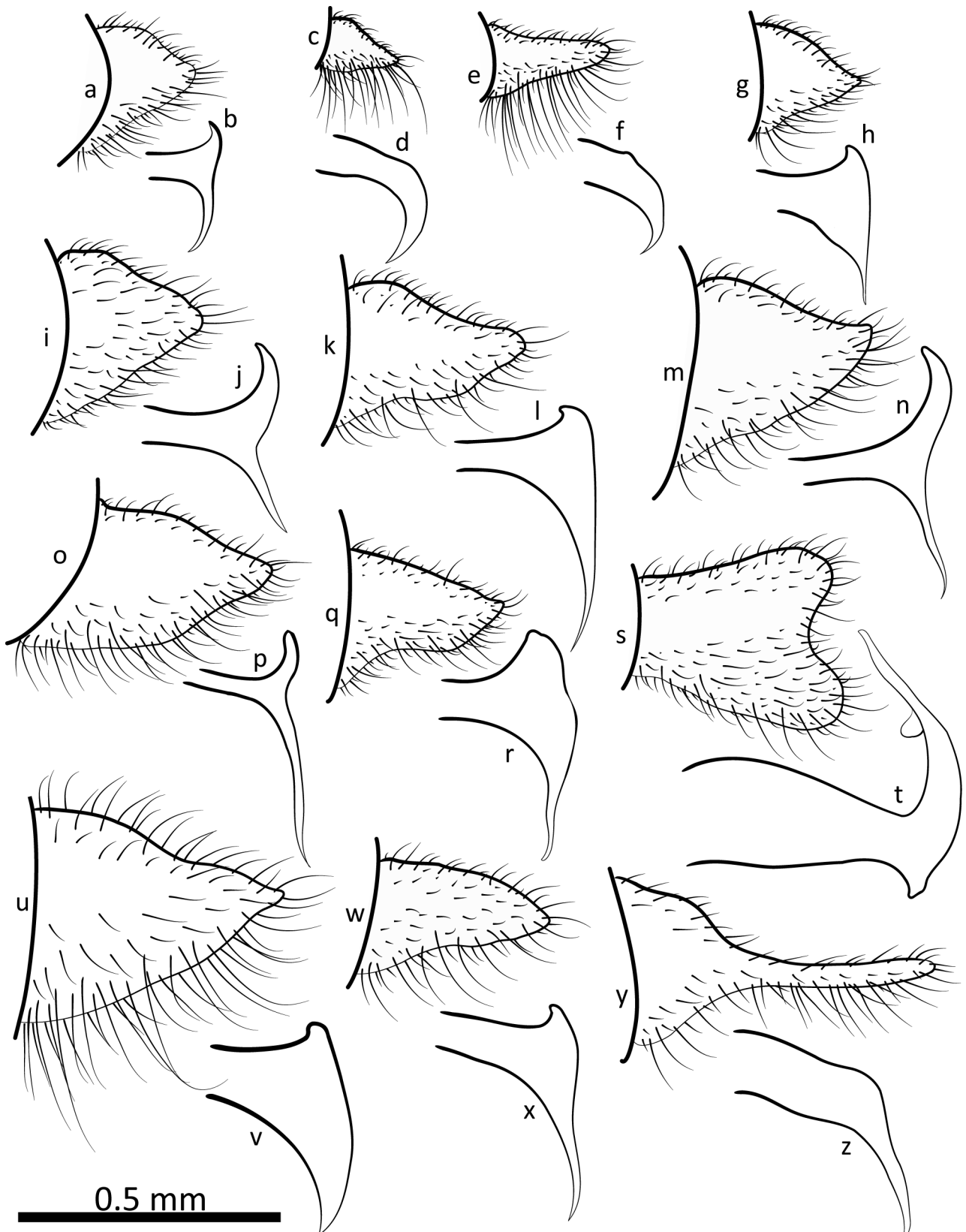
Posteroventral pronotum lateral, rounded or angled. Episternal suture present and complete (but weak posteriorly), or reduced and incomplete. Axilla absent dorsally. Anterior axillary suture straight. Declivitous and dorsal faces of propodeum flat; dorsal face longer than the declivitous face. Propodeal angle indistinct.

Radial cell of forewing closed; no cubital or discoidal cells in macro-*Leptomyrmex*; 2 cubital cells and 1 discoidal cell in micro-*Leptomyrmex*. Pterostigma well-developed in micro-*Leptomyrmex*, much reduced in macro-*Leptomyrmex*; the latter with a unique digitiform “pterostigmal appendage” (Wheeler 1934: 79). Hind wing with 2 closed cells.

Petiole node-like, usually longer than high; in profile dorsum of petiole either rounded or angular. Venter with a slight or weakly developed lobe. Attachment to gaster relatively narrow. First segment of gaster elongated posteriorly, smooth and without a groove or indentation. Genitalic pygostyles present. Posterior margin of subgenital plate convex to even across entire width. Paramere divided in micro-*Leptomyrmex*, entire in macro-*Leptomyrmex*; basal ring of normal size in micro-*Leptomyrmex*, but greatly enlarged in macro-*Leptomyrmex*. Digitus with a down-turned tip and often also with a dorsal tooth or prong. Cuspis parallel with digitus. Aedeagus with ventral teeth.

Distinctive male genital appendages of the macro-*Leptomyrmex* are depicted in Fig. 25 (paramere=above left, volsella= below right), in approximately left lateral view, with anterior (proximal) portions to the left side of the diagram. *Leptomyrmex* genitalia are often visible without dissection, but are frequently recurved ventrally, so we depict orientation (anterior vs. posterior) in relation to the terminal abdominal segments.





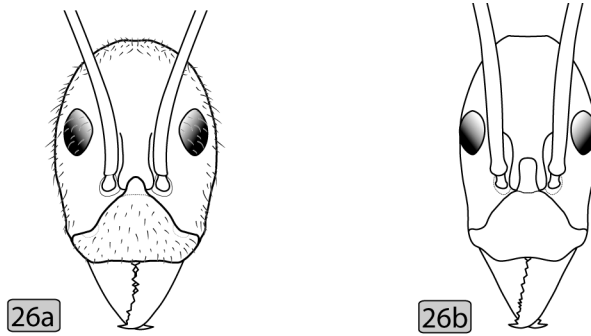
**FIGURE 25.** Distinctive genital appendages of macro-*Leptomyrmex* males, with paramere pictured above left and volsella below right: a–b) *L. mjobergi*; c–d) *L. fragilis*, *L. niger*, *L. melanoticus*; e–f) *L. puberulus*, *L. flavitarsus*; g–h) *L. geniculatus*, *L. nigriceps*, *L. pallens*; i–j) *L. erythrocephalus*, *L. cnemidatus*; k–l) *L. wiburdi*; m–n) *L. tibialis*; o–p) *L. nigriventris*; q–r) *L. unicolor*; s–t) *L. darlingtoni*; u–v) *L. rufithorax*; w–x) *L. rothneyi*, *L. ruficeps*, *L. rufipes*; y–z) *L. varians*.

**Keys to the worker caste (macro-Leptomyrmex)**

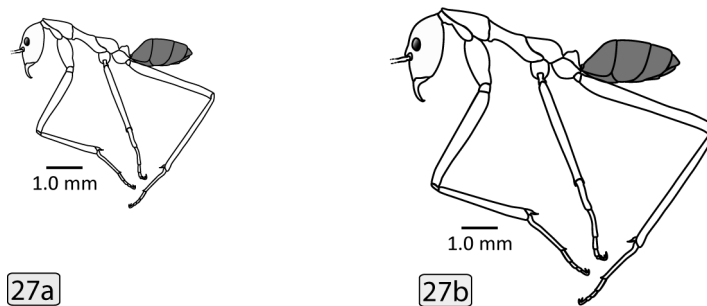
Geographic regions are abbreviated as follows: ACT = Australian Capital Territory; NSW = New South Wales; QLD = Queensland; VIC = Victoria.

**KEY TO AUSTRALIAN LEPTOMYRMEX WORKERS**

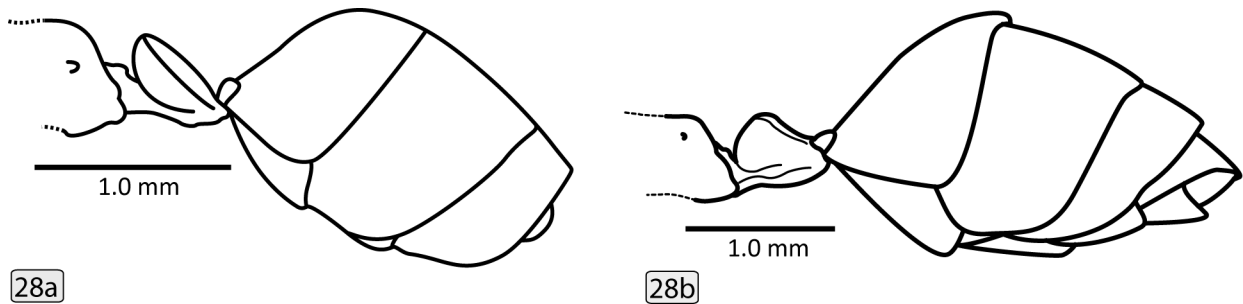
- 1 (a) Pubescence, in the form of decumbent to suberect pilosity, conspicuous and common on eyes, head and pronotum [Fig. 26a]; unicolorous black; larger species (HW 1.37–1.51 mm), with broad head (CI 0.72–0.80); NE QLD ... *unicolor* Emery
- (b) Pubescence inconspicuous, consisting of very fine, short, appressed hairs; eyes hairless [Fig. 26b]; coloration and size variable (HW 0.82–1.96 mm, CI 0.53–0.79); ACT, NSW, QLD, VIC..... 2



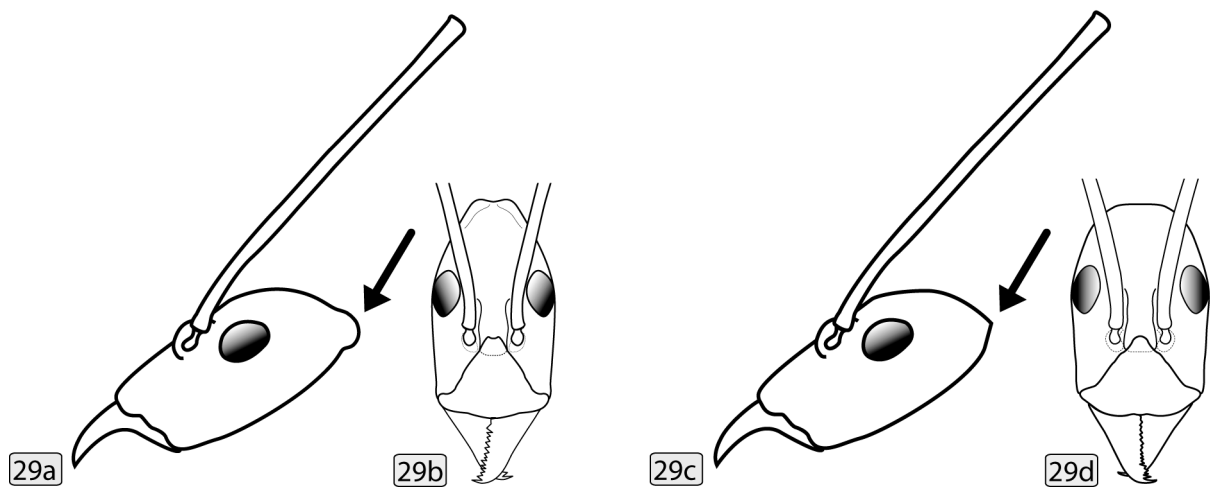
- 2 (a) Small, slender species (HL 1.40–1.72 mm, HW 0.82–1.03 mm, CI 0.56–0.62) [Fig. 27a]; postocular portion of head rounded, without necklike constriction; QLD..... 3
- (b) Generally larger species (HL 1.65–2.63 mm, HW 1.04–1.96 mm, CI 0.53–0.79) [Fig. 27b]; if HL < 1.72 mm (*i.e.* some workers of *L. wiburdi*, NSW), then head broader (CI 0.65–0.70); postocular portion of head rounded or with necklike constriction; ACT, NSW, QLD, VIC..... 4



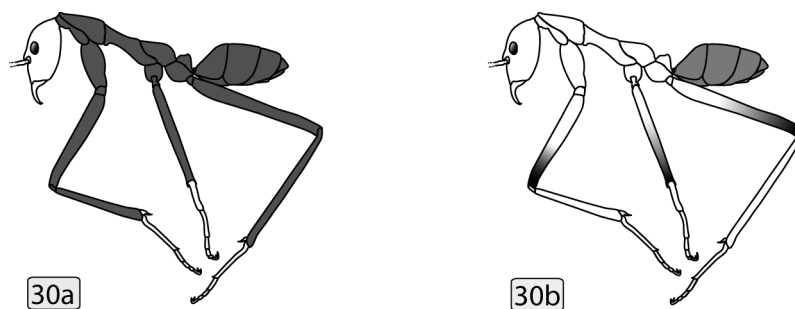
- 3 (a) Very small species (HL 1.40–1.53 mm, HW 0.82–0.87 mm); unicolorous black with large eyes and compressed, scale-like petiole [Fig. 28a]; QLD..... *mjobergi* Forel
- (b) Relatively larger species (HL 1.60–1.72 mm, HW 0.94–1.03 mm); head and often mesosoma rufotestaceous, with medium sized eyes, petiole node-like [Fig. 28b]; restricted to Cape York, QLD..... *darlingtoni* Wheeler



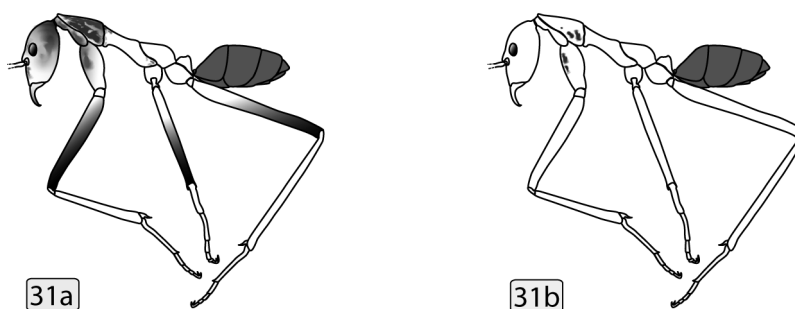
- 4 (a) Posterior margin of head narrowing to a necklike constriction, head slender and elongate (CI 0.53–0.64) [Fig. 29a, b] ..... 5  
 - (b) Head lacking necklike constriction, i.e. postocular margin rounded, and margins of head posterior to eyes broadly convex† [Fig. 29c,d], head broad to moderately elongate (CI 0.59–0.79) ..... 8



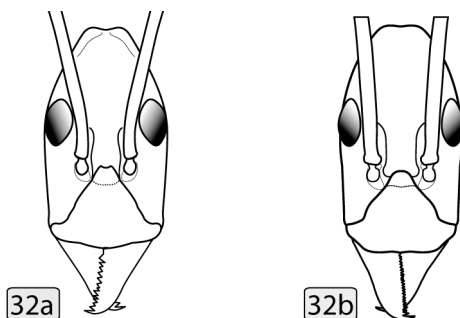
- 5 (a) Head and tarsi testaceous, otherwise entirely black [Fig. 30a]; NE QLD ..... *ruficeps* Emery  
 - (b) Mesosoma partially or fully rufotestaceous, or mottled; tarsi testaceous; femora often dark distally [Fig. 30b]; NSW, QLD ..... 6



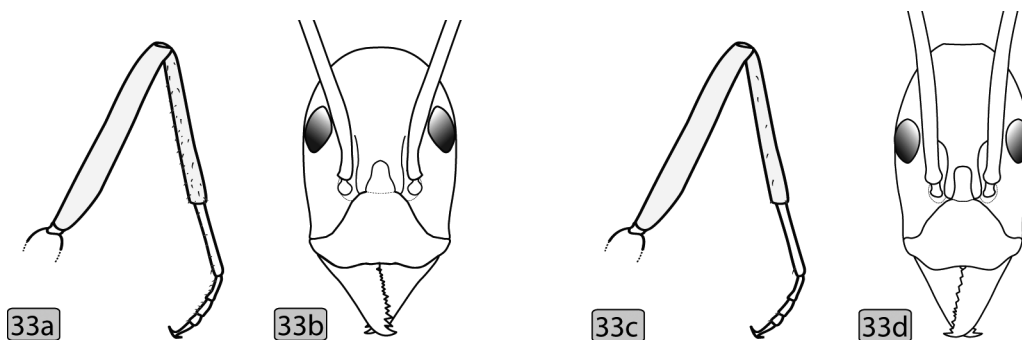
- 6 (a) Pronotum and head dark and mottled [Fig. 31a], sometimes dark patches extending further onto mesosoma; necklike constriction exaggerated and distinctly flattened [Fig. 29a]; tibiae pale; SE QLD ..... *rothneyi* Forel  
 - (b) Mesosoma and head rufotestaceous, if dark spots present, confined to discrete patches on pronotum and fore-coxae [Fig. 31b]; necklike constriction either exaggerated or slight [Figs 29a]; tibiae pale or dark; QLD, N. NSW ..... 7



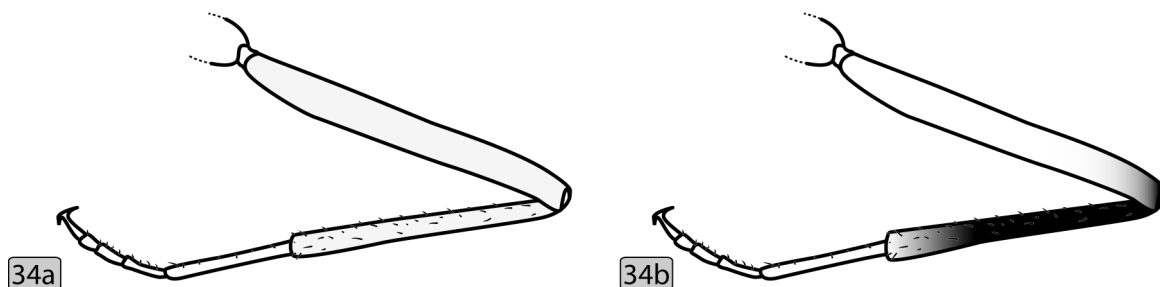
- 7 (a) Tibiae pale; if femur dark, at least proximal ¼ pale; scapes relatively short (SI 2.75–3.35), surpassing posterior margin by less than 2/3 of their length; eyes not surpassing lateral margins of head [Fig. 32a]; QLD, NE NSW ..... *rufipes* Emery
- (b) Tibiae and femora dark; scapes long (SI 3.31–3.82) surpassing posterior margin by approx. 2/3 of their length; eyes surpassing lateral margins of head [Fig. 32b]; Central QLD..... *varians* Emery



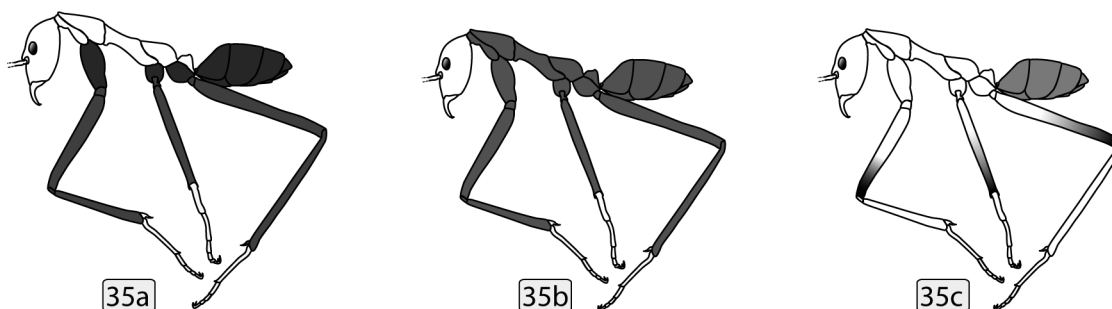
- 8 (a) Ten or more standing hairs on posterior face of hind tibia [Fig. 33a]; erect pilosity more abundant on body; very large species (HL 2.27–2.63 mm, HW 1.49–1.96 mm) with broad head (CI 0.66–0.79), [Fig. 33b]..... 9
- (b) Zero to five standing hairs on posterior face of hind tibia [Fig. 33c]; erect pilosity less abundant on body; small to large species (HL 1.65–2.41 mm, HW 1.15–1.56 mm) generally with less broad head (CI 0.59–0.66)[Fig. 33d]; species with broad head (e.g. some workers of *L. wiburdi*, CI 0.66–0.70) are much smaller (HL 1.65–1.94 mm, HW 1.15–1.33 mm)..... 10



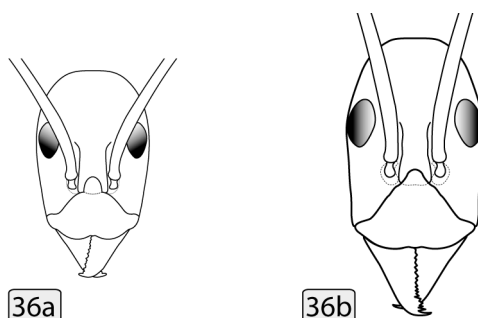
- 9 (a) Tibiae rufotestaceous [Fig. 34a], less compressed (HTC 0.52–0.66); NSW..... *nigriventris* Guerin
- (b) Tibiae dark [Fig. 34b], more compressed (HTC 0.34–0.49); SE QLD, NE NSW ..... *tibialis* Emery



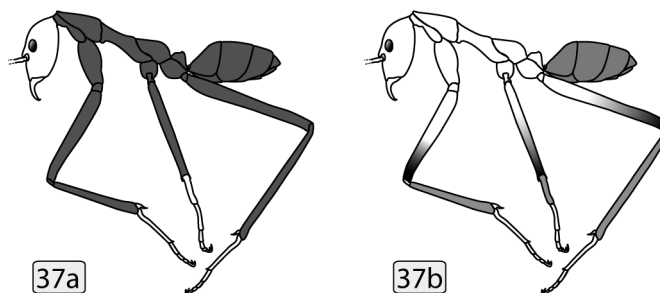
- 10 (a) Coxae black [Fig. 35a], head rufotestaceous, not black or mottled, mesosoma rufotestaceous; head broad (CI 0.61–0.66), tibiae only moderately compressed, their widths < MFC; SE QLD..... *rufithorax* Forel
- (b) Coxae variable, but if dark, then most of mesosoma dark also [Figs 35b, 35c]; head narrow to broad (CI 0.59–0.70); head rufotestaceous, black or mottled; tibiae compressed or not, their widths greater than, equal to or less than MFC; mesosoma rufotestaceous, black or mottled; ACT, NSW, QLD, VIC ..... 11



- 11 (a) Small species (HL 1.65–1.94 mm, HW 1.15–1.33 mm) with broad head (CI 0.66–0.70); head reaching maximal width posterior to eyes [Fig. 36a]; postocular portion of head short and broadly rounded; eyes large; antennal scapes relatively short (SI 2.29–2.64), surpassing posterior margin of head by less than 2/3 their length; hind tibiae short (HTL 3.32–3.88); color pattern extremely variable; NSW..... *wiburdi* Wheeler
- (b) Generally larger species with less broad head (CI 0.59–0.63), reaching maximum width at eye level [Fig. 36b]; postocular portion of head usually more elongate and less broadly rounded; antennal scapes longer (SI 2.87–3.20), surpassing posterior margin of head by approximately 3/5 their length; hind tibiae long (HTL 4.44–5.38 mm); color pattern usually matching the dominant forms described in couplet 12..... 12



- 12 (a) Larger species, on average (HL 2.17–2.41 mm; HW 1.31–1.47 mm); typical color pattern consisting of black body with contrasting rufotestaceous head [Fig. 37a], but in northern half of range some individuals with black head and variable amounts of rufotestaceous color on mesosoma\*; in areas of sympatry with *L. cnemidatus* (Sydney region) central portion of clypeus, excluding the anterior margin, with 0–2 black setae: if 2 setae then these separated by 0.25 mm or more; ACT, VIC, NSW, SE QLD..... *erythrocephalus* Fabricius
- (b) Smaller species on average (HL 1.99–2.29 mm; HW 1.20–1.39 mm); typical color pattern consisting of rufotestaceous head and mesosoma, with gaster, tibiae, and distal portions of femora black\*†[Fig. 37b]; in area of sympatry with *L. erythrocephalus* (Sydney region) central portion of clypeus, excluding the anterior margin, with 2–4 black setae (sometimes abraded, look for black setal base): if only two setae, then these separated by less than 0.25 mm; NSW, SE QLD..... *cnemidatus* Wheeler

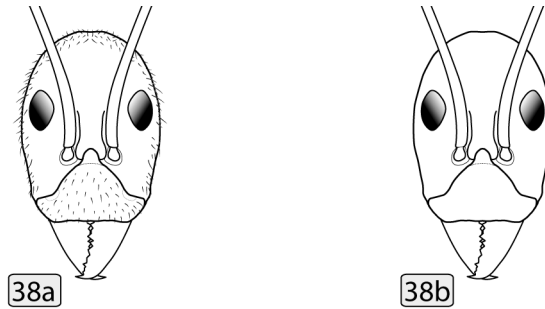


\* See text for discussion of differences between these closely related species.

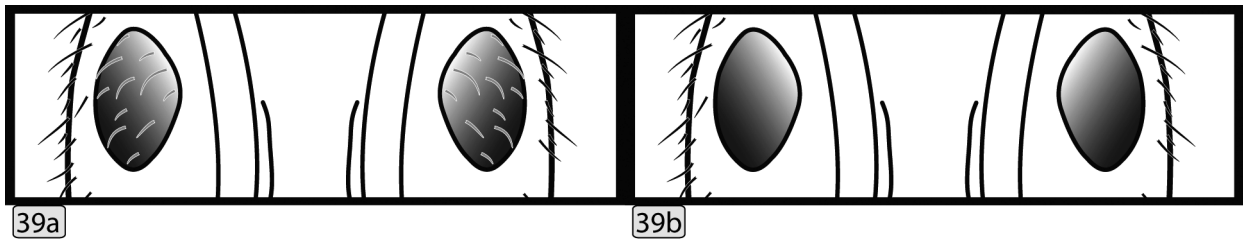
† Some workers of *L. varians* will key out to couplet 12 if the postocular portion of the head is considered rounded rather than necklike (couplet 4). For specimens from central QLD approximately matching the color pattern of *L. cnemidatus*, but with tibiae and femora entirely dark, and with head very narrow (CI 0.53–0.59), follow couplet 4a.

KEY TO NEW GUINEA *LEPTOMYRMEX* WORKERS

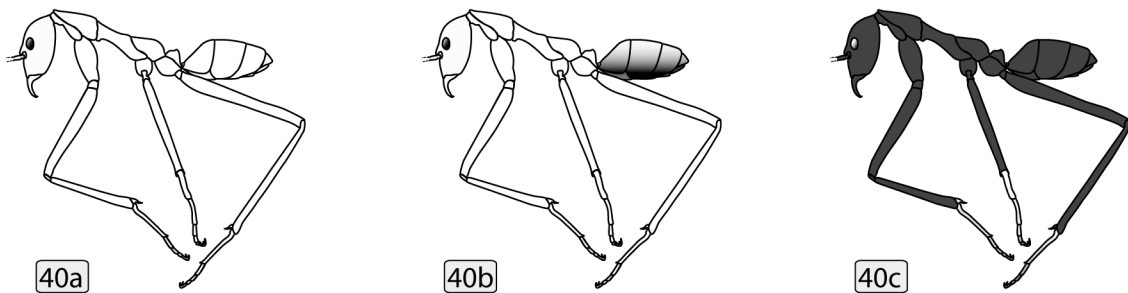
- 1 (a) Pubescence conspicuous, in the form of decumbent to suberect pilosity, common on body, including head and especially on the pronotum; eyes with or without hairs [Fig. 38a]..... 2  
 - (b) Pubescence inconspicuous, consisting of very fine, short, appressed hairs, or hairs less evenly dense on head, pronotum mostly bare; eyes hairless [Fig. 38b]..... 3



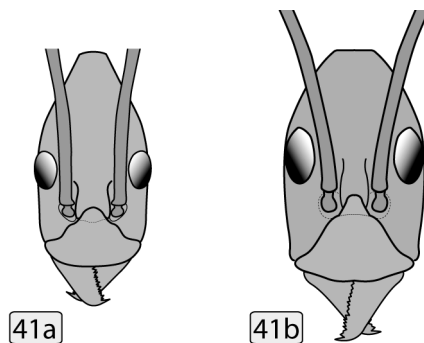
- 2 (a) Smaller species with more elongate head (HW 1.02–1.20 mm, CI 0.61–0.66); eyes conspicuously hairy [Fig. 39a]; pale yellow to brown..... *puberulus* Wheeler  
 - (b) Larger species, with broader head (HW 1.18–1.45 mm, CI 0.67–0.73), eyes appearing essentially hairless [Fig. 39b], body dark brown/black..... *flavitarus* F. Smith



- 3 (a) Pale testaceous in color, very slender (CI 0.51–0.58), especially the petiole (DPW 0.27–0.33) [Fig. 40a]; sometimes bearing dark spots laterally on gaster [Fig. 40b] or with gaster entirely dark (Ambunti form). *fragilis* F. Smith  
 - (b) Unicolorous black/brown, head relatively broad (CI 0.54–0.69), petiole slender to broad (DPW 0.27–39) [Fig. 40c]..... 4

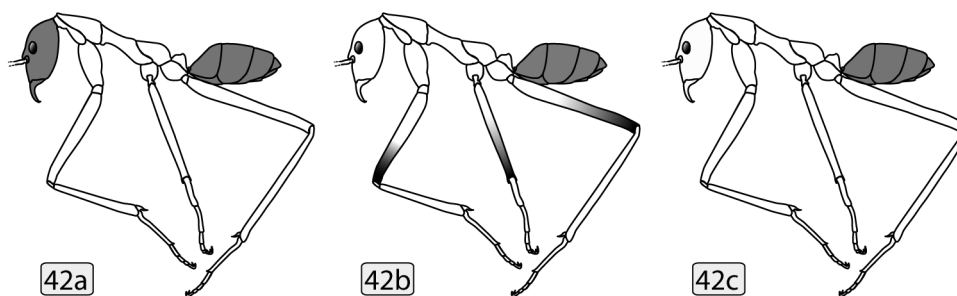


- 4 (a) Head elongate, slender (HW 0.99–1.06 mm, CI 0.54–0.56), narrowing to conical neck [Fig. 41a]; scape relatively long (SI 4.02–4.05) ..... *melanoticus* Wheeler  
 - (b) Head relatively stout (HW 1.01–1.25 mm, CI 0.57–0.69), narrowing posteriorly but lacking conical neck [Fig. 41b]; scape relatively short (SI 2.96–3.89) ..... *niger* Emery



KEY TO NEW CALEDONIAN *LEPTOMYRMEX* WORKERS

- 1 (a) Orange, with black gaster and head (Fig. 42a) ..... *nigriceps* Emery  
 - (b) Orange body and head with black gaster ..... 2  
 2 (a) Distal half to third of femora black (Fig. 42b); some with dark pronotum ..... *geniculatus* Emery  
 - (b) Legs unicolorous orange (Fig. 42c) ..... *pallens* Emery



Keys to males

These keys are designed to allow identification of the males of the thirteen species of Australian and 5 species of New Guinea macro-*Leptomyrmex*. Such males are frequently collected at lights or on vegetation, unassociated with workers. The distinctions between *L. erythrocephalus* and *L. cnemidatus* (Australian key, couplet 12) should be considered provisional, and subject to confirmation. We indicate the number of individual males that were measured (n = ...) for all metric measurements. Because the sample size of male specimens was small for many species, we acknowledge that measurements of additional specimens might reduce some of the differences described here. For each species we tried to measure a series of males from different populations, if they were available. Unless otherwise noted, samples sizes are the same for all measurements cited in any given lug of a couplet.

KEY TO AUSTRALIAN *LEPTOMYRMEX* MALES

1. (a) Eye densely covered with short erect pilosity; body uniformly black [Fig. 24p] ..... *unicolor* Emery  
 - (b) Eye lacking pilosity; body color variable, but usually not uniformly black ..... 2  
 2. (a) Smaller species (HW 0.84–1.02 mm; n = 6), with relatively short legs (HTL 2.72–3.22 mm); QLD ..... 3  
 - (b) Larger species (HW 1.02–1.61 mm; n = 50); most species with relatively long legs (HTL 3.84–5.14 mm; n = 46), the one exception (*L. wiburdi*, HTL 3.14–3.42 mm; n = 4) restricted to NSW ..... 4

3. (a) Scape much longer than third antennal segment (SI2 1.20–1.37; n=2); genitalia distinct: paramere distally bilobed [Fig. 25s] and dorsal prong of volsella much longer than ventral prong [Fig. 25t]..... *darlingtoni* Wheeler
- (b) Scape subequal to, or shorter than, third antennal segment (SI2 0.53–0.65; n=4); paramere not distally bilobed [Fig. 25a]; ventral prong of volsella much longer than dorsal prong [Fig. 25b] ..... *mjobergi* Forel
4. (a) Scape long (SL 0.72–0.86 mm; n = 7), exceeding the combined length of antennal segments 2 and 3 by 25% or more (SI2 1.26–1.60); large species (HW 1.30–1.61 mm) with rufotestaceous body and contrasting black gaster [Figs 24h, 24o]; volsella slender, T-shaped apically [Figs 25n, 25p] ..... 5
- (b) Scape shorter (SL 0.34–0.64 mm; n = 43), usually subequal to, or less than the combined length of antennal segments 2 and 3 (SI2 0.65–1.33); generally smaller species (HW 1.02–1.37 mm); color variable but if HW > 1.29, then without the preceding color pattern (i.e., without rufotestaceous body and contrasting black gaster); volsella often stouter, its apical portion variable in shape [e.g., Figs 25j, 25x, 25z] ..... 6
5. (a) Eye longer (EL/HL 0.35–0.42; n=4); scape shorter (SL 0.72–0.78 mm, SI 0.47–0.54); head broader (CI 0.74–0.82); dorsal and ventral prongs of volsella subequal in length [Fig. 25n]..... *tibialis* Emery
- (b) Eye shorter (EL/HL 0.29–0.33; n=3); scape longer (SL 0.79–0.86 mm, SI 0.61–0.62); head more elongate (CI 0.67–0.69); ventral prong of volsella much longer than dorsal prong [Fig. 25p] ..... *nigriventris* Guerin
6. (a) Head extended and narrowed below compound eyes, malar region strongly concave in full-face view; third antennal segment subequal in length to, or shorter than, second antennal segment; paramere extended posteriorly in the form of an elongate digitiform appendage [Fig. 25y]; volsella lacking apical dorsal process [Fig. 25z] ..... *varians* Emery
- (b) Head not extended and narrowed below compound eyes, malar region more or less straight in full-face view; third antennal segment notably longer than second antennal segment; paramere lobe-like to subtriangular, not extended posteriorly as a digitiform appendage [e.g., Figs 25i, 25u, 25w]; apex of volsella with a dorsal process in the form of blunt tooth [e.g., Fig. 25x] or an extended prong [Fig. 25j] ..... 7
7. (a) Smaller species (HW 1.09–1.15 mm; n = 4), with relatively short tibiae (HTL 3.14–3.42 mm); gaster darker than rest of body [Fig. 24r]; apex of volsella with blunt dorsal angle and slender ventral prong [Fig. 25l] ..... *wiburdi* Wheeler
- (b) Body size variable (HW 1.02–1.37 mm; n = 35), but tibiae longer (HTL 3.84–5.03 mm); *either* body uniformly orange to orange-brown *or* apex of volsella with well developed dorsal and ventral prongs ..... 8
8. (a) Body uniformly light orange to orange-brown [Figs 24k–24n]; ventral prong of volsella well developed, dorsal process weakly developed [Fig. 25x]..... 9
- (b) Body variously bicolored, gaster dark and contrasting with lighter color on parts of head and mesosoma [Figs 24a, 24c]; volsella with well developed dorsal and ventral prongs [Fig. 25j] ..... 12
9. (a) Eye smaller (EL/HW 0.48–0.49; n = 3); scape shorter (SI 0.29–0.33); ventral prong of volsella relatively short and stout [Fig. 25v]; paramere large and subtriangular [Fig. 25u] ..... *rufithorax* Forel
- (b) Eye larger (EL/HW 0.51–0.55; n = 19); scape longer (SI 0.33–0.42); ventral prong of volsella longer and more slender [Fig. 25x]; paramere small and elongate [Fig. 25w] ..... 10
10. (a) Large species (HW 1.27–1.33 mm; n = 4), with relatively short tibiae (HTL/HW 3.55–3.66); confined to SE QLD ..... *rothneyi* Forel
- (b) Size and tibiae variable (HW 1.14–1.37 mm; HTL/HW 3.48–4.32; n = 15) but in region of overlap with *L. rothneyi* in SE QLD smaller in size and with proportionately longer tibiae (HW 1.14–1.16 mm; HTL/HW 4.11–4.32; n = 4) ..... 11
11. (a) Scape shorter (SL 0.38–0.50 mm, SI 0.33–0.37, SI2 0.65–0.78; n = 11)..... *rufipes* Emery
- (b) Scape longer (SL 0.51–0.57 mm, SI 0.39–0.42, SI2 0.85–0.89; n = 4) ..... *ruficeps* Emery
12. (a) Smaller species (HW 1.02–1.11 mm; n = 5) with shorter scapes (SL 0.44–0.50 mm, SI 0.42–0.45, SI2 0.91–1.02); eye tending to be larger, such that EL/SL 1.21–1.43 ..... *cnemidatus* Wheeler
- (b) Larger species (HW 1.10–1.30 mm; n = 9) with longer scapes (SL 0.56–0.64 mm, SI 0.46–0.55, SI2 1.03–1.20); eye tending to be smaller, such that EL/SL 0.96–1.15 ..... *erythrocephalus* Fabricius

#### KEY TO NEW GUINEA *LEPTOMYRMEX* MALES

1. (a) Antenna with 12 segments, the third segment very long (>1.25 mm) and representing the fusion of (original) antennal segments 3 and 4; pronotum extending much farther forward than anterior extremity of mesonotum [Fig. 24d] ..... 2
- (b) Antenna with 13 segments, the second and third segments short and subequal in length (each about 0.15–0.20 mm); pronotum not protruding much farther forward than anterior extremity of mesonotum [Fig. 24f] ..... 3



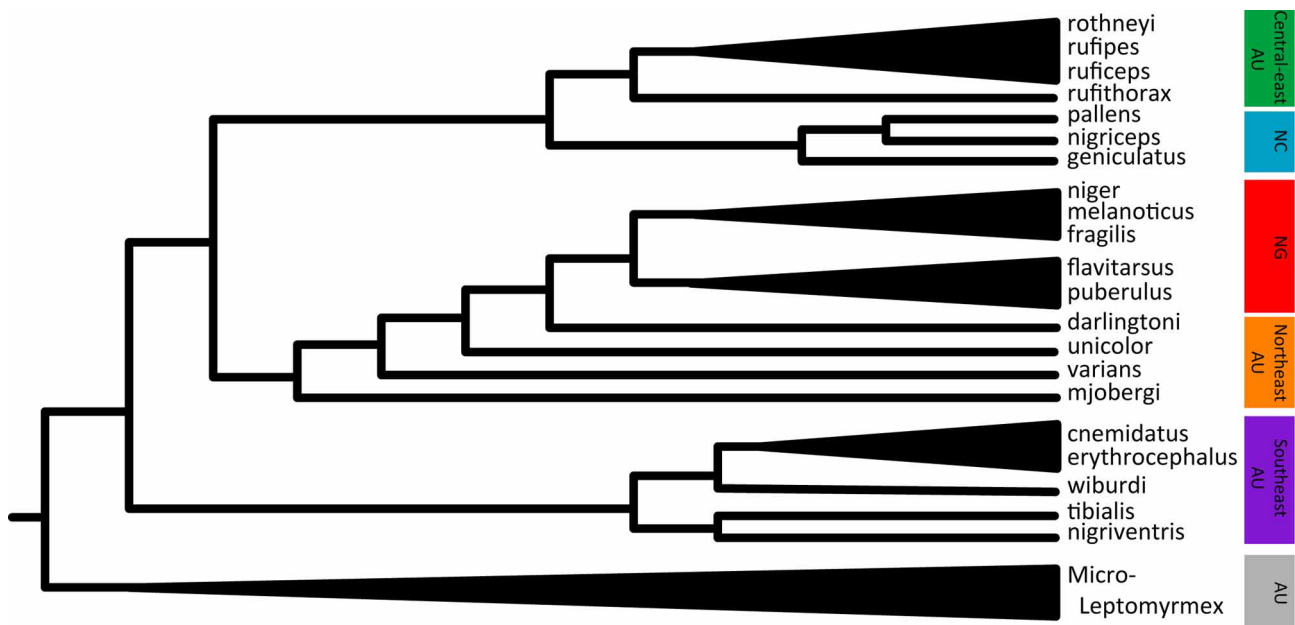
2. (a) Head very elongate (HW 0.76–0.77 mm, CI 0.50–0.51; n=2); scape longer (SL 0.77–0.82 mm, SI 1.01–1.05) .... *puberulus* Wheeler
- (b) Head less elongate (HW 1.00–1.03 mm, CI 0.64–0.68; n = 2); scape shorter (SL 0.64–0.70 mm, SI 0.63–0.70) .. *flavitaris* F. Smith
3. (a) Body predominantly orange-brown to yellowish-brown, with variable infuscation of the gaster and mesosoma [Fig. 24e]..... *fragilis* F. Smith
- (b) Body predominantly dark brown to black [Fig. 24f]..... *melanoticus* Wheeler and *niger* Emery

### Species accounts

Accounts of the 21 species of macro-*Leptomyrmex* are given below in alphabetical order. See Smith & Shattuck (2009) for discussion of six recently described micro-*Leptomyrmex* species. The separate and cursory treatment of the latter is due to the very recent description of these taxa, and the fact that we have not had the opportunity to thoroughly review type material.

Previous revisions of *Leptomyrmex* assigned the macro-species to species-groups (Wheeler, 1934), none of which are recognized here. Molecular phylogenetic analyses based on multiple nuclear markers reveal four well-supported clades within the genus, which we find to also be well-supported based on morphological evaluation (Fig. 43; Lucky, in press). Species relationships in these clades differ significantly from Wheeler's previous species-group hypotheses. Three of the clades correspond to geographical regions of Australia's east coast: a northern clade (*L. darlingtoni*, *L. unicolor*, *L. varians*, *L. mjobergi* plus all five New Guinea species), a central clade (*L. rothneyi*, *L. ruficeps*, *L. rufipes*, *L. rufithorax* plus all three New Caledonia species), and a southern clade (*L. cnemidatus*, *L. erythrocephalus*, *L. nigriventris*, *L. tibialis* and *L. wiburdi*). The fourth clade is comprised of the six micro-*Leptomyrmex* species known from Australia, and is strongly supported as the sister-group of the macro-*Leptomyrmex* species (Ward et al., 2010).

Geographic distributions of the macro-*Leptomyrmex* species in Australia, New Guinea and New Caledonia are presented in figures 44–45.



**FIGURE 43.** Simplified cladogram depicting relationships within the genus *Leptomyrmex*. Triangles represent species complexes not fully resolved by molecular phylogenetic analyses; AU = Australia, NC = New Caledonia, NG = New Guinea (modified from Lucky, in press).

## The macro-*Leptomyrmex* species

### *Leptomyrmex cnemidatus* Wheeler, stat. nov.

(Figs 2a–c, 23a, 24a)

*Leptomyrmex erythrocephalus* var. *cnemidatus* Wheeler, 1915: 268.

*Leptomyrmex erythrocephalus* subsp. *venustus* Wheeler, 1934: 87, fig. 5. **Syn. nov.**

*Leptomyrmex erythrocephalus* subsp. *brunneiceps* Wheeler, 1934: 88. **Syn. nov.**

*Leptomyrmex erythrocephalus* subsp. *cnemidatus* Wheeler; Wheeler, 1934: 92. Description of male.

#### Type material examined

*L. erythrocephalus cnemidatus* Wheeler. Holotype, worker, **Australia**, “NSW” (Staudinger & Bang-Haas) [MCZ].

*L. erythrocephalus venustus* Wheeler. Syntypes, six workers, one queen, **Australia**, New South Wales: Mt. Tomah (Taylor, F.H.) [MCZ].

*L. erythrocephalus brunneiceps* Wheeler. Syntypes, four workers, **Australia**, New South Wales: Mt. Wilson (Darlington, P.J.) [MCZ].

#### Other material examined

**AUSTRALIA: New South Wales:** 10km S of Mangrove Mountain (Lowery, B.B.); 15km E Legume (Greenslade, P.J.M.); 17km S Gosford (Katz, D.); 3 mi SSE Pt Macquarie (Upton, M.S.); 4km E Bilpin, 420 m (Ward, P.S.); 4km NE Bulahdelah, 100 m (Ward, P.S.); 7km NE Woodenbong, 520 m (Ward, P.S.); 8km NE Blackheath, 440 m (Ward, P.S.); 8km S Ebor, 1400 ft (Taylor, R.W.); Acacia Plateau (McAreavey, J.); Acacia Plateau (Bugeja, J.); Banjo Creek Rd. at stream crossing, Doyles River State Forest, 2.2km along road from Oxley Hwy., 620 m (Shattuck, S.O.); Bellangry Forest, NW Wavehope (Darlingtons); Berowra Waters, Sydney, 200 ft (Lowery, B.B.); Berowra, 40 ft (Lowery, B.B.); Berowra, 500 ft (Lowery, B.B.); Blackheath, 450 m (Ward, P.S.); Bowens Creek, 4km E Bilpin, 2km SE Mt. Irvine, 420 m (Shattuck, S.O.); Brindle Crk, Border Ranges NP (Naumann, I. & Cardale, J.); Brindle Crk. Wiangarie SF, 740 m (Newton, A. & Thayer, M.); Brindle Crk. Wiangarie, 740 m (Ward, P.S.); Brooklana (Froggatt, W.W.); Bruxner Park, Coffs Harbour, 250 ft (Lowery, B.B.); Bruxner Park, Coffs Harbour, 70 m (Taylor, R.W.); Bulahdelah State Forest (Lowery, B.B.); Bulga (Froggatt, W.W.); c. 15km SE Legume (Greenslade, P.J.M.); Calga, 700 ft (Lowery, B.B.); Calga, nr. Gosford, 400ft (Lowery, B.B.); Cambridge Plateau, Richmond SP (Lowery, B.B.); Cowan Ck., Sydney (Lowery, B.B.); Cowan, 500 ft (Lowery, B.B.); Dalrymple Forest, St. Ives, Sydney (Lowery, B.B.); Dorrigo (Darlington); Dorrigo (Heron, W.); Dorrigo N.P. via Dorrigo (Taylor, R.W.); Dorrigo Nat'l Park, 600 m (Ward, P.S.); Dorrigo Nat'l Park, 750 m (Ward, P.S.); Dorrigo NP, E end Blackbutt Track, 710 m (Newton, A. & Thayer, M.); Doyles River State Forest, 620 m (Ward, P.S.); Eastern New South Wales (Darlingtons); Ebor (Greaves, T.); Ebor, Upper Ebor Falls overlook (Lohman, D. & Eastwood, R.); Frazer Park, 6mi. S Swansea (Lowery, B.B.); Frenchs Forest, Sydney (Lowery, B.B.); Frenchs Forest, Sydney, 200 ft (Lowery, B.B.); Holgate, 50 m (Ward, P.S.); Killara (Day, M.F.); Kyogle (Froggatt, W.W.); Lismore (Deuquet, C.); Martinsville, nr Morisset, 500 ft (Lowery, B.B.); Morisset, 300 ft (Lowery, B.B.); Mt Tomah, 900 m (Ward, P.S.); Mt Warning, 1200 ft (Lowery, B.B.); Mt. Glorious, 630 m (Taylor, R.W. & Kohout, R.J.); Mt. Tomah, 900 m (Shattuck, S.O.); Muogamarra Sanct., Hawkesbury River, 500 ft (Lowery, B.B.); Murwillumbah area (Lowery, B.B.); Myall Lakes N.P. (Ward, P.S.); Myall Lakes, Bingwahla Hill (Greenslade, P.J.M.); Ourimba State Forest, 500 ft (Lowery, B.B.); Ourimbah SF, Wyong, 200 ft (Lowery, B.B.); Pearl Beach, 30 m (Ward, P.S.); Point Lookout, New England NP, 1562 m (Newton, A. & Thayer, M.); Pt. Lookout, New England N.P., 1550 m (Ward, P.S.); 15mls SSE [SSW?] Pt. Macquarie (Upton, M.S.); Pymble (Brown, W.L.); Pymble (Lowery, B.B.); Pymble (McAreavey, J.); Pymble, 600 ft (Lowery, B.B.); Pymble, Sydney, 150 m (Ward, P.S.); Sydney, 10km S Mangrove Mtn (Lowery, B.B.); Sydney, Berowra, 40 ft (Lowery, B.B.); Sydney, Berowra, 500 ft (Lowery, B.B.); Sydney, Blue gum forest, Grose Valley (Lowery, B.B.); Sydney, Brooklyn, on Hawkesbury R. (Lowery,

B.B.); Sydney, Cowan, 500 ft (Lowery, B.B.); Sydney, Dalrymple forest, St Ives (Lowery, B.B.); Sydney, Frenchs Forest (Lowery, B.B.); Sydney, Pearl Beach (Ward, P.S.); Sydney, Strickland State Forest nr Gosford, 100 ft (Lowery, B.B.); The Dorrigo, 3000 ft (Darlington); Tooloom Plateau, 14km W Urbenville (Naumann, I.D.); Tooloom Rge., 2000 ft (Darlingtons); Upper Allyn Valley, nr. Eccleston, 2000 ft (Taylor, R.W. & Brooks, C.); Urbenville (Armstrong, J.); Wentworth Falls (Darlington); Whian Whian S.F., 15min N Lismore, 400 ft (Lowery, B.B.); Whian Whian State For., 200 m (Ward, P.S.); Wiangaree SF, Brindle Ck., 740 m (Newton, A. & Thayer, M.); Wiangaree SF, Sheepstation Ck, 600 m (Newton, A. & Thayer, M.). **Queensland:** 15km ESE Gympie, 100 m (Ward, P.S.); 2km S Booroobin, 400 m (Ward, P.S.); 6km SSW North Tamborine, 500 m (Ward, P.S.); 7km NNW North Tamborine, 490 m (Ward, P.S.); 8km ESE North Tamborine, 500 m (Ward, P.S.); at foot of Blackall Ra., 30km W Kilcoy (Lowery, B.B.); Bald Mt area, via Emu Vale, 3–4000 ft (Monteith, G.B.); Binna Burra, Lamington NP (Kohout, R.J.); Binna Burra, Lamington NP, 2800–3000 ft (Taylor, R.W.); Boombana 24km WNW Brisbane, D'Aguilar NP, 420 m (Lucky, A.); Boombana 24km WNW Brisbane, D'Aguilar NP, 470 m (Lucky, A.); Boombana NP, 440 m (Burwell, C.J.); Boombana NP, 440 m (Queensland Museum Party); Boombana, D'Aguilar NP, 496 m (Lucky, A.); Bunya Mts (Davies & Raven); Bunya Mts (Dumigan, E.J.); Bunya Mts, 3000 ft (Lowery, B.B.); Bunya Mts, 3500ft (Darlingtons); Bunya Mts., 1mi. SE Mt. Mowbullen, 3500 ft (Britton, Holloway & Misko); Christmas Crk. Lamington Nat. Park, 450 m (Ward, P.S.); Cunninghams Gap, 2500 ft (Lowery, B.B.); Cunninghams Gap, 2500–4000 ft (Darlingtons); Cunninghams Gap, Mt. Cordeaux, 3000 ft (Taylor, R.W.); Gwongorella N.P. (Hebert, P.); Jimna (Darlingtons); Laidley [as “Laidely”] (Podenzana); Lamington NP, O'Reillys, 920 m (Taylor, R.W. & Kohout, R.J.); MacDonald NP, Mt Tamborine, 2000ft (Taylor, R.W.); Main Range NP, Bellbird Lookout nr Cunninghams Gap 8km E Maryvale, 480 m (Lucky, A.); Mapleton Falls N.P., 350 m (Ward, P.S.); Mapleton Falls NP, 3km W Mapleton, 450 m (Lucky, A.); Mary Cairncross Pk, S. Maleny (Brown, W.L. & D.E. Brown); Miala NP (Taylor, R.W.); Montville, Blackall Rge. (Darlingtons); Mt Chinghee, 12km SE Rathdowney, 720 m (Monteith, Yeates & Thompson); Mt D'Aguilar Ra, 2000 ft (Taylor, R.W.); Mt Glorious, 630m (R.W. Taylor & Kohout, R.J.); Mt Nebo (Taylor, R.W.); Mt Tamborine (c.u.); Mt. Coot-tha, Brisbane, 400 ft (Lowery, B.B.); Mt. Glorious, 630 m (Taylor, R.W. & Kohout, R.J.); Mt. Jacob, c. 45mi S Gladstone, 2000ft (Darlingtons); Mt. Nebo (Taylor, R.W.); Mt. Nebo, Brisbane (Lowery, B.B.); Mt. Nebo, Brisbane, 2000 ft (Lowery, B.B.); National Park [Lamington National Park] (Carter, H.J.); National Park [Lamington National Park] (Hacker, H.); Nat. Park Q., McPherson Rge (Darlington); nr Kenilworth, 150 m (Taylor, R.W. & Kohout, R.J.); Ravensbourne NP, 33km W Esk, 760 m (Lucky, A.); RF at the foot of Blackall Ra (Lowery, B.B.); Spring Brook, Nat. Park (Darlingtons); Tamborine Mt (Brown); Tambourine Mountain (Hacker, H.); Tomewin (Lowery, B.B.); Toowoomba (Greaves, T.); v. Binnaburra, McPherson Rge., 2600–3600 ft (Darlingtons); v. Manumbar, 20 mi SE Goomeri (Darlingtons); **Dubious locality records: Queensland:** Hyde Park (Conleth); Kamerunga (Podenzana); Mt. Bellendenker (Podenzana).

#### *Worker measurements* (n = 9)

HL 1.99–2.29, HW 1.20–1.39, MFC 0.23–0.30, IOD 0.68–0.80, SL 3.64–4.18, EL 0.40–0.48, WL 3.79–4.32, PW 1.07–1.25, DPW 0.37–0.50, HTL 4.44–5.08, HTWmin 0.12–0.17, HTWmax 0.27–0.31, CI 0.59–0.63, SI 2.94–3.12, OI 0.10–0.14, HTC 0.41–0.60.

#### *Worker description*

Medium to small species (HW 1.20–1.39 mm; WL 3.79–4.32 mm) with head, excluding mandibles, less than twice as long as broad (CI 0.59–0.63). Head widest at eye level, sides of head subparallel, narrowing anteriorly, genae straight. Head posterior to eyes rounding and gently narrowing to flat posterior margin. Masticatory margin of mandible with approximately 7 teeth and 15 denticles interspersed. Anterior clypeal margin weakly concave medially. Eyes positioned approximately at midline of head, relatively small and hairless, reaching but not surpassing lateral margin of head. Antennae not compressed, scapes surpassing the posterior

margin of head by about 3/5 of their length. Pronotum long and slender. Propodeal declivity about 1/3 as long as dorsal face, the latter bearing a transverse impression at anterior end. Propodeal angle rounded. Petiole in profile slightly bulbous, median longitudinal impression on anterior, dorsal and posterior faces. Posterior face of petiole concave, ventral face convex. Gaster elliptical. Femora and tibiae compressed. Whole body, including mandibles, subopaque, finely and densely shagreened. Mandibles with a row of coarse punctures along margin. Short, whitish pubescence covering surface, lending pruinose appearance. Pilosity confined to mandibles and clypeus and venter. Ventral face of fore, mid and hind tibia with irregular row of short dark bristles. Typical color pattern consisting of rufotestaceous head and mesosoma, with gaster and distal portions of femora black. Variation from this color pattern is common; in the area of sympatry with *erythrocephalus* (Sydney region) the central portion of clypeus, excluding the anterior margin, presents 2–4 black setae (sometimes abraded—look for black setal base); if only 2 setae are present, these are separated by less than 0.25 mm.

#### *Queen description*

Head broader than in worker, the posterior border slightly impressed medially. Three ocelli deeply set into head in triangular formation, the anteriormost one largest, the posterior two smaller. Anterior clypeal margin nearly flat. Pronotum, mesonotum and propodeum voluminous, convex. Dorsal face of propodeum convex, thus lacking transverse impression. Petiole broader than high, with distinct medial impression. Gaster globose, larger than in worker. Scapes, femora and tibiae broad, robust.

Surface of body dull and opaque, appearing dusty. Pilosity longer on the clypeus; pubescence on gaster longer and yellowish. Queen coloration similar to that of worker.

#### *Male measurements* (n = 5)

HL 1.37–1.55, HW 1.02–1.11, SL 0.44–0.50, EL 0.55–0.68, HTL 3.84–4.34, CI 0.70–0.78, SI 0.42–0.45, SI2 0.91–1.02.

#### *Discussion*

Throughout the major part of its range in northeastern New South Wales and southeastern Queensland, *L. cnemidatus* can be distinguished from congeners by the combination of head shape (elongate, with rounded postocular margin and long scapes: CI 0.59–0.63; SI 2.94–3.12), coloration (orange, with gaster and distal portions of the femora black) and size (HW 1.20–1.39 mm; WL 3.79–4.32 mm). These characters separate it from sympatric species with which it might be confused, including *L. nigriventris* (considerably larger: HW 1.49–1.76 mm; WL 4.32–4.98 mm; legs unicolorous orange), *L. rothneyi* (postocular margin of head constricted and projecting; head and pronotum spotted or mottled), *L. rufipes* (postocular margin of head constricted and projecting), *L. tibialis* (considerably larger and head broader: HW 1.68–1.96 mm; WL 4.51–5.13 mm; CI 0.71–0.79), *L. varians* (legs, including coxae, black) and *L. wiburdi* (head broad, scapes shorter: CI 0.66–0.70; SI 2.29–2.64).

In some portions of its range, *L. cnemidatus* can be difficult to distinguish from its sister species, *L. erythrocephalus*. In the Blue Mountains these species maintain morphological and color differences in sympatry, and north of Sydney *L. cnemidatus* occurs within 100km of the coast whereas *L. erythrocephalus* is found inland, more than 100km from the coast. In the Sydney region, however, *L. cnemidatus* becomes variable in coloration and can be difficult to distinguish from its sister species. This area of confusion may represent a recent contact zone where the two species are introgressing, or it may be that in this region complete divergence has never occurred. Study of this scenario on the population level will be needed to gain insight into the status of these two species in this area. In general, *L. cnemidatus* is the smaller of the two species, and can be identified by the presence of 2–4 black setae on the clypeus (*L. erythrocephalus* has 0–2 black setae). If only 2 setae are present, then these are separated by less than 0.25 mm, whereas *L. erythrocephalus* possesses 0–2 setae and the hairs are separated by more than 0.25mm.

*L. cnemidatus* has been recorded in wet sclerophyll, dry sclerophyll, rainforest and semi-evergreen vine thicket. Nests occur in or under rocks and logs, or in holes in the ground.

***Leptomyrmex darlingtoni* Wheeler**  
(Figs 3a–c, 24b)

*Leptomyrmex darlingtoni* Wheeler, 1934: 104, fig. 13.

*Leptomyrmex darlingtoni* subsp. *fascigaster* Wheeler, 1934:107. **Syn. nov.**

*Leptomyrmex darlingtoni* subsp. *jucundus* Wheeler, 1934: 107. **Syn. nov.**

*Type material examined*

*L. darlingtoni* Wheeler. Syntypes, 21 workers, 2 males, **Australia**, Queensland: Lankelly Creek, McIlwraith Range [as “McIlhwaite”], Cape York (Darlington) [MCZ].

*L. darlingtoni fascigaster* Wheeler. Syntype, 1 worker, **Australia**: Queensland: Coen, Cape York (Darlington) [MCZ].

*L. darlingtoni jucundus* Wheeler. Syntypes, 2 workers, **Australia**: Queensland: Coen, Cape York (Darlington) [MCZ].

*Other material examined*

**AUSTRALIA: Queensland:** 11km ENE of Mt. Tozer (Weir, T. & Calder, A.); 13km WNW Lockhart River, 60 m (Ward, P.S.); 28 km NNE Coen, 420 m (Ward, P.S.); 28 km NNE Coen, 420 m (Wild, A.L.); 3km ENE Mt. Tozer (Cardale, J.C.); 3km ENE Mt. Tozer (Weir, T.A.); 3km ENE of Mt. Tozer (Colless, D.H.); Iron Ra. NP, 23km ex. Portland Rd. (Kistner & Jacobson); Black Mountain NP, 25km W Cooktown (Andersen, A.); Iron Range (Filewood, P.); Iron Range (Sedlacek, J.); Iron Range (Taylor, R.W. & Feehan, J.); Iron Range NP, Cooks Hut area (Hertog, A.L.); Lankelly Creek (Gray, B.); Rocky R., Cape York (Darlington); Somerset, Cape York (Monteith, G.B.); W. Claudie R. 12km WNW Lockhart R, 30m (Ward, P.S.); West Claudie R., Iron Range (Monteith, G. & Cook, D.). **Dubious locality records: Queensland:** Mossman (Geeves, M.); Mossman (general) (Greaves, T.).

*Worker measurements* (n = 7)

HL 1.60–1.72, HW 0.94–1.03, MFC 0.18–0.21, IOD 0.56–0.62, SL 3.36–3.73, EL 0.35–0.38, WL 3.11–3.30, PW 0.85–0.92, DPW 0.31–0.34, HTL 2.87–4.19, HTWmin 0.11–0.14, HTWmax 0.21–0.24, CI 0.56–0.62, SI 3.51–3.77, OI 0.09–0.11, HTC 0.50–0.61.

*Worker description*

Small species (HW 0.94–1.03 mm; WL 3.11–3.30 mm) with head, excluding mandibles, less than twice as long as broad (CI 0.56–0.62) and widest at eye level. Sides of head straight, genae parallel and slightly concave. Behind the eyes, sides gently rounding to a flat postocular margin. Masticatory margin of mandible with approximately 15 small, irregular teeth and denticles. Anterior clypeal margin weakly concave medially. Eyes positioned posterior to midline of head, relatively large and convex, hairless, not surpassing lateral margins of head. Antennae extremely long and slender (SI 3.51–3.77), somewhat compressed, scapes surpassing posterior margin of head by 3/5 their length.

Pronotum slender, distinctly elongate. Propodeum short, not much longer than broad, propodeal angle very rounded, dorsal face weakly convex, declivitous face short. Gently sloping petiolar node a triangular wedge with broad base, anterior and posterior faces meeting at sharp angle, in profile anterior face 2/3 length of posterior face, ventral surface of petiole weakly convex. Gaster elongate-elliptical. Legs very long and slender tibiae compressed but not dramatically so (HTC 0.50–0.61).

Surface very finely shagreened and somewhat shining throughout. Pubescence white, moderately dense over whole surface. Pilosity sparse, confined to clypeus, mandibles, apical portions of the tibiae, gastral ventrites and 4th (apical) tergite. Pilosity lacking on the 6<sup>th</sup> abdominal tergite. Head and antennae rufotestaceous, but color pattern on remainder of body variable, ranging from dark with rufotestaceous legs to rufotestaceous body with black gaster and legs dark reddish brown with testaceous joints. An entirely pale yellow form is also known. Femora and tibiae. Intermediate forms may be mottled with dark spots on a pale thorax, with gaster either entirely black or with first tergite pale.

#### *Queen*

UNKNOWN.

#### *Male measurements* (n = 2)

HL 1.40–1.44, HW 0.93–1.02, SL 0.37–0.38, EL 0.53–0.58, HTL 3.12–3.22, CI 0.66–0.70, SI 0.36–0.40, SI2 1.20–1.37.

#### *Discussion*

*Leptomyrmex darlingtoni* is distinctive for its small size and restricted geographic range; it is found only on Cape York Peninsula, as far south as the vicinity of Cooktown. This species can be distinguished from its only sympatric congener, *L. rufipes*, by its smaller size, HW 0.94–1.03 mm; WL 3.11–3.30 mm (*L. rufipes* HW 1.08–1.39 mm; WL 3.61–4.52 mm), and the rounded postocular portion of the head, which lacks the neck-like constriction of *L. rufipes*. The new synonymies presented are based on recent collections in which different color forms were found within a single colony (28 km NNE Coen, 420 m; Ward, P.S. and Wild, A.L.).

*L. darlingtoni* has been recorded from rainforest, savannah, *Araucaria* forest and *Eucalyptus* woodland, in ground nests.

### *Leptomyrmex erythrocephalus* (Fabricius)

(Figs 4a–c, 24c)

*Formica erythrocephala* Fabricius, 1775: 391.

*Leptomyrmex erythrocephalus* (Fabricius); Mayr, 1862: 696. First combination in *Leptomyrmex*.

*Leptomyrmex froggatti* Forel, 1910: 57. **Syn. nov.**

*Leptomyrmex erythrocephalus* subsp. *clarki* Wheeler, 1934: 117. **Syn. nov.**

*Leptomyrmex erythrocephalus* var. *mandibularis* Wheeler, 1915: 268; **Syn. nov.**

*Leptomyrmex erythrocephalus* subsp. *mandibularis* Wheeler; Wheeler, 1934: 87.

*Leptomyrmex erythrocephalus* subsp. *unctus* Wheeler, 1934: 87. **Syn. nov.**

*Leptomyrmex erythrocephalus* (Fabricius); Wheeler & Wheeler, 1951: 179. Description of larva.

*Leptomyrmex erythrocephalus* (Fabricius); Imai, et al. 1977: 345. Description of karyotype.

See also: Wheeler, 1915: 265; Wheeler, 1934: 85.

#### *Type material examined*

*L. erythrocephalus* (Fabricius) **NEOTYPE** worker, designated here. **Australia**, New South Wales: 5 km SSW Blackheath (Ward, P.S.) [ANIC, CASENT0011746].

*L. erythrocephalus clarki* Wheeler. Syntypes, two workers, **Australia**, Queensland: Fletcher (Sutton, E.) [MCZ].

*L. erythrocephalus mandibularis* Wheeler. Holotype, worker, **Australia**, New South Wales: Sydney (Ash-ton, H.) [MCZ].

*L. erythrocephalus. unctus* Wheeler. Syntypes, 15 workers, **Australia**, Australian Capital Territory: Con-dor Creek, nr. Canberra (Tillyard, R.J.) [MCZ].

*L. froggatti* Forel. Syntypes, workers, **Australia**, New South Wales: Walcha [as “Walcher”] (Froggatt, M.M. & Turner, R.) [MNHG, MNHN, ANIC]

*Type material not examined*

*L. erythrocephalus* (Fabricius). Syntype(s), workers(s), **Australia**: “New Holland” [Presumed lost; determined not to be in BMNH, ZMUC or HMUG]

*Other material examined*

**AUSTRALIA: Australian Capital Territory:** Above Gibraltar Crk. Falls (Lowery, B.B.); Blundells Camp [Blundells Flat] (Greaves, T.); Honeysuckle Crk., nr tracking station, 4000 ft (Lowery, B.B.); Jervis Bay (James, J.); Lees Creek (Greaves, T.); Lees Spring (Greaves, T.); Tidbinbilla Nature Res, Koala Enclosure (Shattuck, S.O.); Wombat Ck., 6km NE Piccadilly Circus, 750 m (Weir, T.A., Lawrence, J. & Johnson). **New South Wales:** 10km SW Tathra (Lowery, B.B.); 1km NNW Mt. Keira, 380 m (Ward, P.S.); 25mi E Queenbeyan, 2500 ft (Lowery, B.B.); 3 mi E Berry, 100 ft (Lowery, B.B.); 5km S Mongarlowe (Shattuck, S.O.); 5km SSW Blackheath, 680 m (Ward, P.S.); 9km NE Batemans Bay, West Side Hwy 1, ca. 0.5km N Durras Rd., 20 m (Shattuck, S.O.); 9km NE Blackheath, 1000 m (Ward, P.S.); above Jenolan Caves, 3000 ft (Lowery, B.B.); Bark Hut, Mt. Kaputar Nat. Pk., 1180 m (Shattuck, S.O.); Bark Hut, Mt. Kaputar Natl Pk, 1180 m (Ward, P.S.); below sublime Pt, Bulli, 200 ft (Lowery, B.B.); Berowra Waters, Sydney, 200 ft (Lowery, B.B.); Berowra, 500ft (Lowery, B.B.); Berry Rd., Gerroa (Lowery, B.B.); Bong Bong (Froggatt, W.W.); Bowens Creek, 4km E Bilpin, 2km SE Mt. Irvine, 420 m (Shattuck, S.O.); Braidwood (Riek, E.F.); Broulee (Lowery, B.B.); Bulli (Lowery, B.B.); Bulli Pass (Wheeler); Burrinjuck Dam Sanct. (Lowery, B.B.); Clarence (Gush, T.); Clyde Mt, nr Braidwood (Berg, R.Y.); Coachwood Nature Trail, 3km SSW Blackheath, 800 m (Shattuck, S.O.); Como (Froggatt, W.W.); Congo (Upton, M.S.); Congo, 8km ESE Moruya (Upton, M.S.); Cowan (Taylor, R.W.); Cowan, Sydney (Lowery, B.B.); Currowan SF, W of Nelligen (Lowery, B.B.); Darymple Forest, St Ives, Sydney (Lowery, B.B.); Dawsons Spring Mt. Kaputar Natl. Pk, 1380 m (Ward, P.S.); Dawsons Spring, Mt. Kaputar Natl. Pk, 1380 m (Shattuck, S.O.); East Boyd SF, 54km SE Bombala (Lambkin, C.L. & Starick, N.T.); Eastern Foothills, Clyde Mt (Riek, E.F.); Echo Pt. Katoomba, 940 m (Ward, P.S.); Eulah Ck., Narrabri (Room, P.M.); Forest Path, Royal National Park, 35km SW Sydney, 123 m (Lucky, A.); Gerroa (Lowery, B.B.); Gerroa, 150 ft (Lowery, B.B.); Girralang NR, 20.6km NE Orange (Lambkin, C.L. & Starick, N.T.); Green Camp, Mt. Kaputar Natl. Pk, 920 m (Ward, P.S.); Guyra (Riek, E.F.); Heaton SF, Sugarloaf, Ra., W of Newcastle (Lowery, B.B.); Jenolan Caves (Wiburud, J.C.); K Harb. [Coff’s Harbour?] (Day, M.F.); Kangaroo Valley (Riek, E.F.); Katoomba (Lowery, B.B.); Katoomba (Wheeler); King's Tableland, 5km S Wentworth Falls (Lowery, B.B.); Kioloa Rest Area, Boyne S.F., 30 m (Ward, P.S.); Kioloa S.F., 35 m (Ward, P.S.); Kioloa S.F., 70 m (Ward, P.S.); Kuring Gai Chase, Sydney (Ward, P.S.); Kurrajong (Taylor, F.H.); Lawson (Lea); Manly (Froggatt, W.W.); Maroota State Forest (Gush, T.); Minnihaha area, Katoomba (Lowery, B.B.); Mittagong (Lea); Mittagong, 2000–2400 ft (Lowery, B.B.); Mt Victoria (Lowery, B.B.); Mt. Capel, Narrabri (Room, P.M.); Mt. Conobolas, nr. Orange, 4200 ft (Taylor, R.W. & R.J. Bartell); Mt. Flora nr. Mittagong (Taylor, R.W., Sadler, R. & Bartell, R.J.); Mt. Keira, 300 m (Ward, P.S.); Mt. Keira, Scout Camp nr. Wollongong, 300 m (Shattuck, S.O.); Mt. Wilson (Darlington); Mt. Wilson (general) (Horning, D.S., Jr.); Mt. Wilson, 980 m (Ward, P.S.); Nadgee Reserve (Sugden, E.A.); Nadgee Reserve, 4.7km S. Merrica (Sugden, E.A.); Nadgee Reserve, 5km N Newton's Beach (Sugden, E.A.); Nadgee Reserve, Merrica Trail (Sugden, E.A.); National Park (Wheeler); New England, Glenrock (Hangay, G.); New South Wales (Wheeler); Newlands Crk. 10km W Merrimbula [Merimbula] (Lowery, B.B.); Pymble (McAreevey, J.); Pymble, 500 ft (Lowery, B.B.); R. Nat. Park [Royal NP] (c.u.); Rosedale, SE Batemans Bay, 40 ft (Lowery, B.B.); Royal N.P., 50 m (Ward, P.S.); Royal Nat. Park, 250 m (Ward, P.S.); Royal Nat. Park, nr. Oolool Falls, 130 m (Ward, P.S.); St. Ives (Lowery, B.B.); Sydney (Froggatt); Tallaganda S.F., nr Captain's flat, 3000 ft (Lowery, B.B.); The Gib, Bowral, 2800 ft (Lowery, B.B.); Tindery Mts, 4000 ft (Lowery, B.B.); Tollway w of Wollongong, nr Picton Turnoff (Lowery,

B.B.); Tumut, 3000 ft (Lowery, B.B.); Upper Kangaroo Valley (Riek, E.F.); Vittoria, nr Bathurst (Crozier, R.H., Imai, H.T. & Ward, P.S.); Wallaga Lake, Bermagui (Liepa, Z.); Warrumbungle NP, 25 km W. Coonabarabran, 588 m (Lucky, A.); Warrumbungles NP [Warrumbungle NP], 1500 ft (Lowery, B.B.); Wattamolla (Brown); Wentworth Falls (Mann); Wentworth Falls (Wheeler); Wentworth Falls NP 2km SW Wentworth Falls, 850 m (Lucky, A.); Wentworth Falls nr. Valley of the Waters, West end of Fletcher St., 800 m (Shattuck, S.O.); Wentworth Falls, 800 m (Ward, P.S.); White Munghorn, 13mi. E Mudgee (Lowery, B.B.); White Mung-horns, 13 mi E Mudgee, 1500 ft (Lowery, B.B.); White Munghorns, 13 mi E Mudgee, M 54, 500 ft (Lowery, B.B.); Wilton, 200 m (Ward, P.S.); Yambulla SF, 45km SE Bombala (Lambkin, C.L. & Starick, N.T.). **Queensland:** Girraween Natl. Park, 860 m (Ward, P.S.). **Victoria:** Cabbage tree (c.u.); Cann River. (Clark, J.); Croydon (c.u.); Dalesford [Daylesford] (G&B); E. Orbost (Darlingtons); Eltham (Dixon, J.E.); Eltham (W.K.); Greensborough (McAreavey, J.); Healesville (c.u.); Healesville (Dangerfield, D.); Healesville (Kelly, R.); Healesville (Shaw, A.E.); Hume Range (Ashton, D.); Kingslake NP (Crozier, R.); Lerderderg Gorge (Lowery, B.B.); Marlo, nr Orbost (Lowery, B.B.); Millgrove (E.E. Wilson); Mt. Ben Cairn, nr. Healesville (Greaves, T.); Mt. Drummer (Darlingtons); Narbethong (Lowery, B.B.); Narbethong (McAreavey, J.); near Melbourne (Hill, G.F. ); Wallaby Ck. (c.u.); Wandong (c.u.); Warburtin [Warburton] (c.u.); Warrandyte (Greaves, T.); Woori Yallock (Thorn, L.B.). **Dubious locality record: Queensland:** Peak Downs (probably E. Dämel).

#### *Worker measurements* (n = 10)

HL 2.17–2.41, HW 1.31–1.47, MFC 0.27–0.32, IOD 0.78–0.93, SL 3.90–4.29, EL 0.41–0.50, WL 4.20–4.64, PW 1.21–1.44, DPW 0.44–0.56, HTL 4.80–5.38, HTW<sub>min</sub> 0.13–0.17, HTW<sub>max</sub> 0.27–0.32, CI 0.59–0.62, SI 2.87–3.20, OI 0.09–0.12, HTC 0.42–0.58.

#### *Worker description*

As in *L. cnemidatus*, but larger on average: HW 1.31–1.47 mm; WL 4.20–4.64 mm (*L. cnemidatus* HW 1.20–1.39 mm; WL 3.79–4.32 mm). Typical color pattern consisting of black body with contrasting rufotestaceous head, antennae and tarsi. In northern half of range (> 100km inland, e.g. Girraween NP) some individuals become variable in coloration, with head black and/or variable amounts of black and rufotestaceous color occurring on mesosoma.

#### *Queen*

UNKNOWN. A reference in Bolton et al. (2007) catalogue appears to be a mistake, as no queens of this species are currently known.

#### *Male measurements* (n = 9)

HL 1.60–1.80, HW 1.10–1.30, SL 0.56–0.64, EL 0.55–0.71, HTL 4.57–5.03, CI 0.65–0.76, SI 0.46–0.55, SI2 1.03–1.20.

*Note:* Emery's (1891) description of the male of *L. erythrocephalus* is probably a misidentification, as it does not correspond with known males of this species.

#### *Discussion*

In the Sydney region, where *L. erythrocephalus* is sympatric with *L. cnemidatus*, the two species can be quite difficult to distinguish, but the following characters will aid in separating them: in *L. erythrocephalus*, the central portion of clypeus, excluding the anterior margin presents 0–2 black setae (2–4 in *L. cnemidatus*); if 2 setae are present then these are separated by 0.25 mm or more (< 0.25 mm in *L. cnemidatus*). Outside of the Sydney region geographic distribution can also help distinguish these species: *L. erythrocephalus* occurs coastally and inland from Victoria to the Sydney area, but farther north to the Queensland border it inhabits only inland areas (> 100km from the coastline), whereas *L. cnemidatus* populations remain within 100 km of the coast.



In color pattern *L. erythrocephalus* resembles *L. ruficeps*, but the latter is confined to northern Queensland. The rounded postocular margin also helps to distinguish *L. erythrocephalus* (elongate and constricted in *L. ruficeps*). *L. erythrocephalus* may be difficult to distinguish from some individuals of *L. wiburdi*, which possess the typical *L. erythrocephalus* color pattern. The large size (HW 1.31–1.47 mm; WL 4.20–4.64 mm; in *L. wiburdi* HW 1.15–1.33 mm; WL 3.06–3.65 mm), narrower head (CI 0.59–0.62 mm; in *L. wiburdi* CI 0.66–0.70) and longer scapes (SI 2.87–3.20; in *L. wiburdi* SI 2.29–2.64) will identify *L. erythrocephalus* upon close examination.

*L. erythrocephalus* has been recorded in wet sclerophyll, dry sclerophyll, rainforest, gallery rainforest and beach scrub. Nests occur in the ground, under rocks, in soil at the base of trees and under or in logs.

*Leptomymex flavitarsus* (F. Smith)

(Figs 5a–c, 24d)

*Formica flavitarsus* F. Smith, 1859: 136.

*Camponotus (Tanaemyrmex) flavitarsus* (F. Smith); Roger, 1863: 4.

*Camponotus flavitarsus* (F. Smith); Emery, 1925: 90.

*Leptomymex flavitarsus* (F. Smith); Shattuck, 1992: 114.

*Leptomymex niger*; Wheeler (nec Emery), 1934: 109.

*Type material examined*

*L. flavitarsus* F. Smith. Syntypes, 2 workers, **Indonesia**, Maluku: Aru Island (Smith, F.) [OXUM].

*Other material examined*

**INDONESIA: Irian Jaya:** Japen I. Mt. Eiori, 2000 ft (Cheeseman, L.E.); Mimika R. (Wollaston, A.F.R.); PT Freeport Concession Siewa Camp, 200 ft (Snelling, R.R.); Waigeu Is., Mt. Nok, 2500 ft (Cheeseman, L.E.). **PAPUA NEW GUINEA: Chimbu (Simbu):** Crater Mtn. Station, 6mi E Haia, 800–1200 m (Wright, D.); Eastern Highlands Okapa (Hornabrook, R.). **Gulf:** Lakekamu Basin Ivimka Res. Station, 120 m (Heydon, S.L.); Lakekamu Basin Ivimka Res. Station, 120 m (Sears, T.A.); Lakekamu Basin Ivimka Res. Station, 120 m (Sears, T.A. & Binatung Brigade); Lakekamu Basin Ivimka Res. Station, 120 m (Heydon, S.L. & Schiff, N.). **Madang:** Finisterre Mts., Damanti, 3550 ft (Bacchus, M.E.). **Morobe:** Tekadu (Sears, T.A. & Binatung Brigade). **Southern Highlands:** Moro, L. Kutabu [Lake Kutubu], 2400 ft (Barrett, J.H.); Penguin Area, Talipiko (Thistleton). **West Sepik (Sandaun):** 12km SW Telefomin, 1600 m (Ward, P.S.); Telefomin, 1520 m (Ward, P.S.). **Western:** Star Mountains, near Tabubil, 640 m (Patel, D.).

*Worker measurements* (n = 10)

HL 1.74–1.99, HW 1.18–1.45, MFC 0.21–0.29, IOD 0.66–0.90, SL 3.26–3.62, EL 0.28–0.43, WL 3.25–3.68, PW 0.89–1.04, DPW 0.34–0.43, HTL 3.68–4.19, HTWmin 0.12–0.14, HTWmax 0.18–0.23, CI 0.67–0.73, SI 2.47–3.03, OI 0.06–0.15, HTC 0.55–0.71.

*Worker description*

Medium sized species (HW 1.18–1.45 mm; WL 3.25–3.68 mm) with broad head (CI 0.67–0.73), widest anterior to eyes. Sides of head convex, genae straight to slightly concave anteriorly. Behind the eyes, head gently rounding to flat postocular margin. Approximately 15 teeth and denticles interspersed along masticatory margin of mandible. Anterior clypeal margin weakly concave. Eyes positioned posterior to midline of head, small and round, convex and hairless, not reaching lateral margins of head. Antennae not compressed, scapes surpassing posterior margin of head by 3/5 their length.

Dorsal face of propodeum approximately as long as declivitous face, dorsal face with a slight transverse impression on anterior end. Petiolar node thick (DPW 0.34–0.43 mm), with rounded summit; anterior face

short and perpendicular to base, with shallow median longitudinal groove. Posterior face of petiole long, flat and sloping, ventral surface flat, not projecting. Gaster broadly elliptical. Legs long and slender.

Surface distinctly shagreened and shining throughout, subopaque. Pubescence long and brownish, distributed all over the body, but especially prominent on the head, pronotum and gaster. Black, bristle-like hairs on clypeus, venter and gaster. Body generally dark brown with the tarsi, femoro-tibial joints and antennal funiculus yellow.

#### *Queen*

UNKNOWN

#### *Male measurements* (n = 2)

HL 1.51–1.55, HW 1.00–1.03, SL 0.64–0.70, EL 0.52–0.57, HTL 4.54–4.65, CI 0.64–0.68, SI 0.63–0.70, SI2 0.38–0.40.

#### *Discussion*

This species superficially resembles the two other dark species of *Leptomyrmex* known to occur in New Guinea, *L. niger* and *L. melanoticus*, but can be distinguished by the abundant pubescence on the head and body, especially the pronotum, which is lacking in the others. *L. flavitarsus* is also relatively larger and stouter (HW 1.18–1.45 mm; WL 3.25–3.68 mm) than the other two (*L. niger* HW 1.01–1.25 mm; WL 3.15–3.58 mm. *L. melanoticus* HW 0.99–1.06 mm; WL 3.32–3.76 mm), and closely resembles the pale *L. puberulus*, but is darker in color and lacks the pubescent eyes of *L. puberulus*.

*L. flavitarsus* has been recorded in rainforest, including lowland secondary rainforest and montane rainforest. Nesting habits are unknown.

### *Leptomyrmex fragilis* F. Smith

(Figs 6a–c, 23b, 24e)

*Formica fragilis* F. Smith, 1859: 136.

*Formica fragilis* F. Smith; Emery, 1897: 571. Description of male.

*Leptomyrmex fragilis* (F. Smith); Stitz, 1912: 507.

*Leptomyrmex fragilis* var. *femorata* Santschi, 1932: 17, fig. 3; **Syn. nov.**

*Leptomyrmex fragilis* subsp. *femoratus* Santschi; Wheeler, 1934: 113.

*Leptomyrmex gracillimus* Wheeler, 1934: 115, fig. 16. Synonymy by Baroni Urbani & Wilson, 1987: 2.

*Leptomyrmex fragilis* var. *maculatus* Stitz, 1938: 108. **Syn. nov.**

*Leptomyrmex fragilis* var. *wheeleri* Donisthorpe, 1948: 600. **Syn. nov.**

See also Wheeler, 1934: 113.

#### *Type material examined*

*L. fragilis* (F. Smith). Syntype, 1 worker, **Indonesia**, Maluku: Aru Island (Smith, F.) [OXUM].

*L. fragilis gracillimus* Wheeler. Syntypes, 5 workers, **Papua New Guinea**, Morobe: Finsch Harbor (Wagner, N.G.L.) [MCZ].

*L. fragilis femoratus* Santschi. Syntype, 1 worker, **Indonesia**, Irian Jaya: Siwi (Léopold) [IRSNB].

*L. fragilis wheeleri* Donisthorpe. Syntypes, 5 workers, **Indonesia**, Irian Jaya: Maffin Bay (Ross, E.S.) [BMNH].

*L. fragilis maculatus* Stitz. Syntypes, 8 syntype workers, **Papua New Guinea**: Kaiserin-Augustafluss Expedition [Sepik R.] (Bürgers) [ZMHB].

#### *Other material examined*

**INDONESIA: Irian Jaya:** Cyclops Mts. Mt. Lina, 3500–4500 ft (Cheeseman, L.E.); Cyclops Mts. Sabron, 930 ft (Cheeseman, L.E.); SE Salawati I (Phillips Base Camp) (Brown, W.L.); Mt. Nomo, S of Mt

Bougainville, 600–1500 ft (Cheeseman, L.E.); PT Freeport Concession Siewa Camp, 200 ft (Snelling, R.R.); Waigeu (Wallace); Waigeu Is., Mt. Nok, 2500 ft (Cheeseman, L.E.). **Ceram:** Above Haruru, nr. Masohi [=Amahai], 50–150 m (Brown, W.L.). **PAPUA NEW GUINEA: Central:** 50km E Port Moresby (Room, P.M.); 5–6km W Brown R., 80 m (Brown, W.L.); Bisianumu, E Port Moresby, 500 m (Gressett, J.L.); Bisianumu, nr. Sogeri, 500 m (Wilson, E.O.); Brown R. (Taylor, R.W.); Brown R. (Ford, E.J.); Haveri (Loria); Iora Creek 17km S Kokoda, 1400 m (Ward, P.S.); Karema, Brown (Wilson, E.O.); Kawai River, Manari, 700 m (Ward, P.S.); Kovetapa, nr. Tapini, 1000 m (Taylor, R.W.); Laloki R., nr. Little Mt. Lawes (Wilson, E.O.); Maru R., 32km S Wanigela, Papua (Pullen, R.); Moroka, 1300 m (Loria); Musgrove R. valley, Astrolabe Ra. [Musgrave River], 350 m (Taylor, R.W.); nr. Yahninga, 1250 m (Ward, P.S.); Ofi Creek, 8km SW Naoro, 650 m (Ward, P.S.); Owen Stanley Ra., 2900 ft (Littlechild, H.); Rubulogo Ck., c.15 mi N Port Moresby (Pullen, R.); Sirinumu Dam, 600 m (Ward, P.S.); Tapini, 1000–1200 m (Taylor, R.W.); Tatupiti nr. Tapini, 1200 m (Taylor, R.W.); Variatara [sic], Port Moresby Dist. (Brown, E.S.); Varirata NP, 800 m (Ward, P.S.). **Chimbu (Simbu):** Crater Mtn. Station, 6mi E Haia, 800–1200 m (Wright, D.). **East Sepik:** 12km SSW Dagua, 850 m (Ward, P.S.); 3km S Wewak, 400 m (Ward, P.S.); 9km SSW Dagua, 800 m (Ward, P.S.); Ambunti, 150 m (Ward, P.S.); Ambunti, 50 m (Ward, P.S.); Angoram, <20 m (Taylor, R.W.); Baiyer R. Sanct. (MacKay, D. & Whalen, M.); Hayfield nr. Maprik [Hayfield Mission], 150 m (Taylor, R.W.); Maprik (Colless, D.H.); Passam, nr. Wewak, 270 m (Taylor, R.W.); Wamangu, 200–300 m (Janda, M. et al.). **Gulf:** Lakekamu Basin Ivimka Res. Station, 120 m (Sears, T.A.); Lakekamu Basin Ivimka Res. Station, 120 m (Heydon, S.L., Schiff, N. & Sears, T. A.); Lakekamu Basin Ivimka Res. Station, 120 m (Heydon, S.L.); Lakekamu Basin Ivimka Res. Station, 120 m (Binatung Brigade); Lakekamu Basin Ivimka Res. Station, 120 m (Sears, T.A. & Schiff, N.); Lakekamu Basin Ivimka Res. Station, 120 m (Sears, T.A. & Binatung Brigade); Lakekamu Basin Ivimka Res. Station, 120 m (Heydon, S.L. & Schiff, N.); Lakekamu Basin (Sears, T.A. & Heydon, S.L.); Near Takiloa, Bulldog Rd. 22km S. Edie Creek, 1300 m (Ward, P.S.); Orokolo (Littlechild, H.). **Madang:** Finisterre Mts., Damanti, 3550 ft (Bacchus, M.E.); Gogol Val. c.24km W Madang, 50 m (Taylor, R.W.); Karap, N. of Jimi-Waghi div., 1550 m (Gressitt, J.L.); Madang (Hulcr, J. et al.); 35km SW Madang, 160 m (Ward, P.S.); 38km N Madang, 40 m (Ward, P.S.); 38km SW Madang, 340 m (Ward, P.S.); 40km W Madang, 140 m (Ward, P.S.); Wannang, 200 m (Hulcr, J. et al.). **Morobe:** Lakekamu Basin (Sears, T.A. & Heydon, S.L.); Bubia, 13 km NW Lae (Wilson, E.O.); Finschhafen (Wilson, E.O.); Lower Busu R., Huon Pen. (Wilson, E.O.); Nganduo, Mongi-Mape Watershed, Huon Pen., 1000 m (Wilson, E.O.); Sattleberg, Mongi-Mape Watershed, 660 m (Wilson, E.O.); Tekadu (T.A. Sears & Binatung Brigade); Tekadu (Binatung Brigade); Timber Track 16km NW Lae (Taylor, R.W.). **Northern (Oro):** 8km S Kokoda, 800 m (Taylor, R.W.); Mafulu [Wharton Range], 4000 ft (Cheeseman, L.E.); Kanga, 600 m (Hulcr, J. et al.); Kokoda (Room, P.M.); Kokoda, 1200 ft (Cheeseman, L.E.); Managalese area, 2500–3000 ft (Pullen, R.); Mt. Lamington, 600 m (Hulcr, J. et al.); Saiho (Room, P.M.); Sangara (Baker, G.). **Southern Highlands:** Erave, 3800 ft (Barrett, J.H.); Moro, L. Kutabu [Lake Kutubu], 2400ft (Barrett, J.H.). **West Sepik (Sandaun):** Bewani Rd., nr. Vanimo, ca. km, 12,500 m (Brown, W.L.); c.12km SE Vanimo, 150 m (Brown, W.L.); nr. Vanimo, 50 m (Taylor, R.W.); Pes, nr. Aitape (Taylor, R.W.); Telefomin, 1520 m (Ward, P.S.); Utai (Hulcr, J. et al.). **Western:** Star Mountains, near Tabubil, 640 m (Patel, D.). **Western Highlands:** Korop, Upper Jimmi V., 1300 m (Gressett, J.L.); Kumur, Upper Jimi V., 1000 m (Gressitt, J.L.); Taenga, Upper Jimmi V., 1200 m (Gressett, J.L.); Wana, Upper Jimmi V., 1500 m (Gressett, J.L.); Wara Hill, Jimi Val., 500 m (Ward, P.S.); Wum, Upper Jimmi V., 840 m (Gressett, J.L.). **Dubious locality record: PHILIPPINES: Mindanao:** Agusan, S. Francisco 10km SE (Quate, L.W.).

*Worker measurements* (n = 10)

HL 1.74–1.98, HW 0.94–1.05, MFC 0.17–0.21, IOD 0.53–0.64, SL 3.96–4.61, EL 0.34–0.40, WL 3.21–4.04, PW 0.85–0.96, DPW 0.27–0.33, HTL 4.41–5.02, HTW<sub>min</sub> 0.11–0.15, HTW<sub>max</sub> 0.16–0.21, CI 0.51–0.58, SI 3.92–4.73, OI 0.12–0.16, HTC 0.55–0.74.

### *Worker description*

Small, slender species (HW 0.94–1.05 mm; WL 3.21–4.04 mm) with elongate head (CI 0.51–0.58), excluding mandibles, nearly twice as long as broad, widest at eyes. Sides of head straight; gently tapering anteriorly, posteriorly narrowing abruptly to a conical neck-like constriction. Approximately 15 teeth and denticles interspersed on masticatory margin of mandible. Anterior clypeal margin weakly concave. Eyes positioned at midline of head, relatively small, round, hairless, not surpassing lateral margins of head. Antennae slender, not compressed, scapes surpassing posterior margin of head by 3/5 their length.

Pronotum slender, distinctly elongated anteriorly. Propodeum with dorsal face 1.5 times the length of declivitous face, both faces concave, and meeting at rounded angle. Petiolar node triangular in profile, dorsal face rounded and bearing a longitudinal impression. Ventral surface of petiole weakly concave. Gaster long and slender, legs very long and slender (HTL 4.41–5.02 mm), not compressed (HTC 0.55–0.74).

Surface very finely shagreened and shining. Pubescence yellow, moderately dense on head and gaster. Pilosity confined to clypeus, venter and gaster. Head, thorax and usually gaster rufotestaceous. Femora and tibiae ranging from pale to dark brown, tarsi white. While generally rufotestaceous throughout, some variants with dark spots laterally on the gaster, or with gaster entirely black.

### *Queen description*

Head broader than in worker. Three ocelli deeply set into head in triangular formation, the anteriormost one largest, the posterior two smaller. Pronotum, mesonotum and propodeum voluminous, convex. The anterior portion of the mesonotum with a distinctly raised medial bump. Dorsal face of propodeum broadly convex. Petiole broader than high, with distinct medial impression. Gaster globose, larger than in worker. Scares, femora and tibiae broad, distinctly robust.

Surface of body appearing velvety, shagreened. Queen coloration similar to that of worker; gaster may be unicolorous pale or portions may be black.

### *Male measurements* (n = 3)

HL 1.41–1.58, HW 1.01–1.04, SL 0.34–0.39, EL 0.58–0.65, HTL 4.74–5.26, CI 0.64–0.73, SI 0.34–0.38, SI2 1.09–1.15.

### *Discussion*

*L. fragilis* is the most commonly encountered *Leptomyrmex* species in New Guinea. Distinctively slender (HW 0.94–1.05 mm; PW 0.85–0.96 mm; DPW 0.27–0.33 mm), yellow and virtually hairless, it is unlikely to be confused with the one other pale species found in New Guinea, *L. puberulus*, which is stout and hairy, notably on the pronotum, head and eyes. Closely related to *L. fragilis* is the entirely black *L. melanoticus*, which may be a melanic form of *L. fragilis*. Although no intermediate color forms are currently known, future collections may reveal these sister species to be mere color variants within a single species.

*L. fragilis* has been recorded in rainforest, including lowland secondary and primary rainforest, montane rainforest and native gardens. Nests occur in the soil and in logs.

### *Leptomyrmex geniculatus* Emery, **stat. nov.**

(Figs 7a–c)

*Leptomyrmex pallens* var. *geniculatus* Emery, 1914: 418.

*Leptomyrmex pallens* subsp. *geniculatus* Emery; Wheeler 1934: 109.

### *Type material examined*

*Leptomyrmex pallens geniculatus* Emery. Syntypes, 2 workers, **New Caledonia**: Coula-Boréaré (Sarasin & Roux) [MSNG]; syntypes, 2 workers, **New Caledonia**: Tchalabel (Sarasin & Roux) [MSNG]; also 1 syn-

type worker, **New Caledonia**: "New Caledonia" [MCZ]. One worker from Coula-Boréaré here designated **lectotype** (CASENT0127391).

#### *Other material examined*

**NEW CALEDONIA**: Bourail (Cheeseman, L.E.); Col de Mouirange, 240 m (Ward, P.S.); Col de Petchecara, S. End (Monteith, G.); Farino, 5km N, 750 m (Monteith, G.); Grottes de Koum, 40 m (Ward, P.S.); Tiebaghi (LeBreton, J.).

#### *Worker measurements* (n = 7)

HL 1.80–1.95, HW 0.99–1.10, MFC 0.22–0.26, IOD 0.55–0.61, SL 3.36–3.81, EL 0.33–0.38, WL 3.21–3.52, PW 0.86–0.94, DPW 0.40–0.43, HTL 3.80–4.17, HTW<sub>min</sub> 0.10–0.15, HTW<sub>max</sub> 0.17–0.19, CI 0.54–0.57, SI 3.39–3.63, OI 0.09–0.11, HTC 0.61–0.85.

#### *Worker description*

*L. geniculatus* is a small species (HW 0.99–1.10 mm; WL 3.21–3.52 mm) with elongate head nearly twice as long as broad, excluding mandibles (CI 0.54–0.57). Sides of head parallel, slightly convex, posterior to eyes head narrowing gently to flat postocular margin. Approximately 15 teeth and denticles interspersed on masticatory margin of mandible. Anterior clypeal margin flat to weakly concave. Eyes positioned approximately at midline of head, relatively large, convex, hairless, not reaching the lateral margins of head. Antennae extremely slender, but not compressed. Scapes extending past the posterior margin by 2/3 their length. Pronotum elongate. Propodeum short, dorsal face about 1.5 times as long as the convex declivitous face, angle rounded. Dorsal face of propodeum convex, with a transverse impression at the anterior end. Petiolar node small, triangular in profile with a rounded dorsum. Anterior, dorsal and posterior face of petiole with longitudinal impression posterior face longer than anterior, ventral surface flat. Gaster broadly elliptical. Legs very slender, not compressed (HTC 0.61–0.85).

Surface finely and densely shagreened, slightly shining. Mandibles with a single row of coarse punctures along margin. Pubescence white, extremely fine standing hairs scarce, confined to clypeus, venter and gaster. Body mostly pale rufotestaceous, with first two segments of gaster and distal 1/2 to 1/3 of femora black. Head and sometimes pronotum slightly darker than body.

#### *Queen*

UNKNOWN.

#### *Male*

UNKNOWN.

#### *Discussion*

The distinctive color pattern that distinguishes *L. geniculatus* from its two New Caledonian congeners is the combination of dark gaster and dark distal portions of the femora on an otherwise orange body. In some specimens the pronotum may also be dark. Aside from these color differences, this species greatly resembles *L. pallens* and *L. nigriceps*. There are scattered records of this species throughout the island, where it has been found in sympatry with *L. pallens*. This species appears to be less commonly encountered than *L. pallens*.

*L. geniculatus* has been recorded in rainforest and dry forest. Nesting habits are unknown.

*Leptomyrmex melanoticus* Wheeler, **stat. nov.**

(Figs 8a–c, 24f)

*Leptomyrmex fragilis* subsp. *melanoticus* Wheeler, 1934: 113, fig.15. **Stat. nov.**

*Leptomyrmex contractus* Donisthorpe, 1947: 586. **Syn. nov.**

*Type material examined*

*L. fragilis melanoticus* Wheeler. Syntypes, 6 workers, 2 males, **Papua New Guinea**: China Straight (Eyerdam, W.J.) [MCZ].

*L. contractus* Donisthorpe. Syntype, 1 worker, **Papua New Guinea**: KB Mission (Krombein, K.V.) [BMNH].

*Other material examined*

**INDONESIA: Irian Jaya**: Cyclops Mts., Sabron, Camp 2, 2000 ft (Cheeseman, L.E.); Japen I. Mt. Baduri, 1000 ft (Cheeseman, L.E.). **PAPUA NEW GUINEA: Morobe**: 4mi N Butala, Mongi R, Huon Pen. (Wilson, E.O.); Bulolo (Lowery, B.B.); Bulolo, 1000 m (Ford, E.J.); Sepalakambang, Salawaket Ra, 1920 m (Ford, E.J.); Tumnang, Mongi Watershed, Huon Peninsula, 15–1600 m (Wilson, E.O.). **Northern (Oro)**: Kokoda, 1200 ft (Cheeseman, L.E.); Sangara Poppondetta Dist. (Brown, E.S.).

*Worker measurements* (n = 6)

HL 1.77–2.00, HW 0.99–1.06, MFC 0.18–0.24, IOD 0.56–0.61, SL 3.96–4.54, EL 0.36–0.39, WL 3.32–3.76, PW 0.86–1.01, DPW 0.27–0.35, HTL 4.34–5.09, HTW<sub>min</sub> 0.10–0.13, HTW<sub>max</sub> 0.15–0.19, CI 0.54–0.56, SI 4.02–4.05, OI 0.11–0.15, HTC 0.62–0.75.

*Worker description*

As in *L. fragilis*, but body unicolorous black with only the antennal funiculi, the mandibles and the tarsi pale yellow.

*Queen*

UNKNOWN.

*Male measurements* (n = 2)

HL 1.46–1.52, HW 1.04–1.05, SL 0.37–0.38, EL 0.64, HTL 4.78–4.83, CI 0.68–0.72, SI 0.36–0.37, SI2 1.08–1.09.

*Discussion*

*L. melanoticus* is distinctively slender, unicolorous black and virtually hairless. It is unlikely to be confused with the stout and hairy *L. flavitarsus*, but superficially does resemble *L. niger*. *L. melanoticus* can be distinguished from this species by its narrow and conical 'neck', an extension of the posterior portion of the head not found in *L. niger*. The round eyes of *L. melanoticus* (EL 0.36–0.39) are generally smaller than the large, elongate eyes of *L. niger* (EL 0.38–0.47 mm). Additionally, the propodeal angle of this species gradually rounds into the dorsal and posterior faces, in contrast to the distinct angle of the propodeum of *L. niger*. See the discussion of *L. fragilis* for consideration of the close relationship between *L. melanoticus* and *L. fragilis*.

*L. melanoticus* has been recorded in rainforest. Nesting habits are unknown.

***Leptomyrmex mjobergi* Forel**  
(Figs 9a–c, 23c, 24g)

*Leptomyrmex mjobergi* Forel, 1915: 84.

*Type material examined*

*L. mjobergi* Forel. Syntypes, workers, **Australia**, Queensland: Colosseum, Tolga & Herberton (Mjöberg, E.) [MHNG].

*Other material examined*

**AUSTRALIA: Queensland:** 15km ESE Gympie, 100 m (Ward, P.S.); 6km S Eungella, 700 m (Ward, P.S.); 7km NNW North Tamborine, 490 m (Ward, P.S.); 8km N Finch Hatton, 200 m (Ward, P.S.); 8km W Paluma, 950 m (Taylor, R.W. & Feehan, J.); Babinda (Wilke, J.); Bellenden Ker (c.u.); Boombana, D'Aguilar NP, 496 m (Lucky, A.); Broken R. Eungella NP, 700 m (R.W. Taylor & Wier, T.A.); Broken R., 6km S Eungella, 700 m (Brown, W.L. & Brown, D.E.); Buhot Crk, Burbank, 50 m (Burwell, C.J.); Buhot Crk, Burbank, 50 m (Queensland Museum Party); Callide Ck. Mine (Smith, A.); Callide Ck. Mine (Hoffman, B.); Canungra, Brisbane region (Polo, C.); Cooloola Natl. Pk., Como Forestry HQ (Greenslade, P.J.M.); Cooran Plateau, nr Traveston, 400 m (Taylor, R.W. & Kohout, R.J.); Dingo Ck., 1 km E Traveston, 80 m (Taylor, R.W. & Kohout, R.J.); Eungella Ra., W of Mackay, 2–3000 ft (Darlington); Josephine Falls Bellenden Kerr N.P., 180 m (Ward, P.S.); Malanda (Bourne, E.H.); Mapleton Falls NP, 3km W Mapleton, 450 m (Lucky, A.); Mossman Gorge, 3 mi E Mossman (Taylor, R.W.); Mt. Jacob, c. 45mi S Gladstone, 2000 ft (Darlington); Mt. Nebo, 1800 ft (Lowery, B.B.); Mt. Nebo, Brisbane (Lowery, B.B.); Mt. Spec plateau, c. 40mi N Townsville, 2–3000 ft (Darlington); N. Tamborine, 1800 ft (Upton, M.S.); Palmerston NP, 1 km SE Crawford's Lookout, 300 m (Taylor, R.W.); Tamborine Mt (Brown, W.L.); Toowoomba (Greaves, T.).

*Worker measurements* (n = 10)

HL 1.40–1.53, HW 0.82–0.87, MFC 0.15–0.18, IOD 0.46–0.51, SL 2.44–2.80, EL 0.33–0.38, WL 2.58–2.97, PW 0.75–0.85, DPW 0.29–0.33, HTL 2.17–3.30, HTWmin 0.09–0.14, HTWmax 0.17–0.21, CI 0.57–0.61, SI 2.85–3.34, OI 0.11–0.13, HTC 0.48–0.79.

*Worker description*

Relatively small species (HW 0.82–0.87; WL 2.58–2.97). Head, excluding mandibles, nearly twice as long as broad (CI 0.57–0.61), with nearly straight and parallel sides. Postocular margin of head broadly rounded. Masticatory margin of mandible with approximately 20 small, mostly uniform teeth. Anterior clypeal margin convex. Eyes positioned approximately at the midline of the head; large, somewhat flattened to head, hairless and not surpassing lateral margins. Antennae lightly compressed, scape surpassing posterior margin of head by 3/5 of its length.

Pronotum approximately 1.5 times as long as broad, thorax distinctly laterally compressed. Propodeum abruptly raised from mesonotum; dorsal surface twice as long as declivity, dorsal face weakly convex. Petiole flattened and scale-like, strongly inclined forward, twice as high as long, rounded at apex, ventral surface feebly convex. Gaster elongate-elliptical.

Body surface finely shagreened, somewhat shining, with delicate short sparse pubescence throughout. Standing hairs sparse, confined to gaster, venter, clypeus and mandibles. Body black, mandibles reddish-brown, femora scapes and tibiae brown, tarsi reddish-yellow.

*Queen description*

Head broader than in worker. Three ocelli deeply set into head in triangular formation, the anteriormost one largest, the posterior two smaller. Pronotum, mesonotum and propodeum voluminous, convex. Petiole

node-like and vertical, not scale-like or inclined forward, taller than broad, rounded dorsally. Gaster globose, larger than in worker. Scapes, femora and tibiae broad, distinctly robust. Surface of body appearing velvety, shagreened.

*Male measurements* (n = 4)

HL 1.14–1.26, HW 0.84–0.95, SL 0.17–0.18, EL 0.53–0.64, HTL 2.72–2.90, CI 0.73–0.78, SI 0.19–0.20, SI2 0.53–0.65.

*Discussion*

This smallest macro-*Leptomyrmex* species can be readily identified by both size (HW 0.82–0.87 mm; WL 2.58–2.97 mm) and by the presence of a strongly inclined, scale-like petiole (all others are node-like). Workers of *L. mjobergi* are approximately half the size of the larger species in the genus (e.g. *L. tibialis* HW 1.68–1.96 mm), but remain larger than any of the micro-*Leptomyrmex* (HW < 0.80 mm). *Leptomyrmex mjobergi* occurs from Queensland's northern Wet Tropics to the state's southern border with New South Wales. Although it is unicolorous black, this nearly hairless species is unlikely to be confused with the other entirely black macro-*Leptomyrmex* in Australia, *L. unicolor*, which is distinctly pubescent, and quite large and stout (HW 1.37–1.51 mm; WL 3.27–3.73).

*L. mjobergi* has been recorded in rainforest, open rainforest, wet sclerophyll and eucalyptus forest. Nests occur in the soil and under rocks.

*Leptomyrmex niger* Emery

(Figs 10a–c)

*Leptomyrmex niger* Emery, 1900: 333, pl. 8, Figs 3–4.

*Leptomyrmex niger* Emery; Karavaiev, 1926: 430. Description of male.

*Leptomyrmex lugubris* Wheeler, 1934: 110, fig.14. **Syn. nov.**

*Type material examined*

*L. niger* Emery. Syntypes, 2 workers, **Papua New Guinea**, "New Guinea" [German New Guinea] (Biró) [MSG]. One syntype here designated **lectotype** (CASENT0127396, top specimen).

*L. lugubris* Wheeler. Syntypes, 2 workers, **Papua New Guinea**, Morobe: Bielowat (Stevens) [MCZ].

*Other material examined*

**INDONESIA: Irian Jaya:** Cyclops Mts. Sabron, Camp 2, 2000 ft (Cheesman, L.E.); SE Salawati I., Phillips Base Camp (Brown, W.L.). **PAPUA NEW GUINEA: East Sepik:** 9km SSW Dagua, 800 m (Ward, P.S.); Baiyer R. Sanct., 1150 m (Ward, P.S.). **Gulf:** Wana, Upper Jimi V., 1500 m (Gressitt, J.L.). **Madang:** Kunai Crk. SW side Wau valley, 1300 m (Taylor, R.W.); Wannang, 200 m (Hulcr, J. et al.). **Morobe:** 4 mi N of Butala, Mongi R., Mongi Watershed, Huon Pen. (Wilson, E.O.); Boana to Bandong, Bunbok V., 800–1300 m (Wilson, E.O.); Bubia, 13km NW Lae (Wilson, E.O.); Bulolo R. valley, 6km NE Wau, 1100 m (Taylor, R.W.); Finchhafen, Mongi-Mape watersheds, Huon Penin. (Wilson, E.O.); Lower Busu R., Huon Pen. (Wilson, E.O.); Mt. Misim, 5850ft (Stevens); Sambuang, Mongi Watershed, Huon Peninsula, 400 m (Wilson, E.O.); Sattelburg to Maroruo, Mongi-Mape watersheds, Huon Penin. (Wilson, E.O.); Sattleberg to Maroruo, Mongi-Mape Watershed, 800–900 m (Wilson, E.O.); Surprise Crk. (Stevens); Timber Track 16km NW Lae, 220 m (Taylor, R.W.); Tumnang, Mongi Watershed, 1500–1600 m (Wilson, E.O.). **Northern (Oro):** Dobodura (Darlington); Ilimo, Kokoda to Popondetta (Carne, P.B.); Kanga, 600 m (Hulcr, J. et al.); Kokoda (Room, P.M.); 8 km S. Kokoda, 800 m (Taylor, R.W.); Managalese Area, 2500–3000ft (Pullen, R.); Popondetta (Hulcr, J. et al.); Popondetta, 200 m (Hulcr, J. et al.); Sangara (Room, P.M.). **Western Highlands:** Tsenga, Upper Simi V., 1200 m (Gressitt, J.L.); Wara Hill, Jimi Val., 500 m (Ward, P.S.).



#### *Worker measurements* (n = 11)

HL 1.76–1.89, HW 1.01–1.25, MFC 0.18–0.33, IOD 0.55–0.62, SL 3.62–3.94, EL 0.38–0.47, WL 3.16–3.58, PW 0.90–1.00, DPW 0.31–0.39, HTL 3.25–4.45, HTW<sub>min</sub> 0.09–0.14, HTW<sub>max</sub> 0.16–0.23, CI 0.57–0.69, SI 2.96–3.89, OI 0.11–0.14, HTC 0.50–0.81.

#### *Worker description*

Small and slender (HL 1.76–1.89; HW 1.01–1.25) with head, excluding mandibles, less than twice as long as broad (CI 0.57–0.69) and widest just posterior to eyes. Sides of head straight and subparallel, tapering anteriorly to slightly concave genae, rounded posterior to eyes, gently tapering to flat postocular margin. Approximately 20 teeth and denticles interspersed on masticatory margin of mandible. Anterior clypeal margin flat to slightly concave. Eyes positioned slightly posterior to midline of head, relatively large, oblong, hairless and reaching lateral margins of head. Antennae slender and slightly compressed. Scapes surpassing posterior margin of head by nearly 3/5 their length.

Pronotum with anterior portion dorsoventrally flattened, posterior portion domed. Propodeum with a longitudinal impression, dorsal face 1.5 times length of declivitous face, faces meeting at a distinct (not broad and rounded) angle. Dorsal face of propodeum concave in profile at anterior end. Petiole nearly twice as long as broad, node triangular in profile. Dorsal surface of node with longitudinal impression, anterior face of node much shorter and more rounded than flat posterior face, the two meeting at a rounded angle. Ventral surface flat to weakly concave. Gaster elongate-elliptical. Legs very slender, compressed.

Surface very finely shagreened and shining. Mandibles shining with a row of coarse punctures along margin. Pubescence yellow, mostly limited to head and gaster. Pilosity confined to clypeus, venter and gaster with irregular row of ~4 dark bristles on hind tibiae. Generally black throughout, but portions of mandibles, tarsi, joints and antennal funiculus pale yellow.

#### *Queen*

UNKNOWN.

#### *Male measurements* (n = 2)

HL 1.52–1.65, HW 1.06–1.10, SL 0.39–0.41, EL 0.63–0.68, HTL 4.80–5.14, CI 0.64–0.72, SI 0.35–0.39, SI2 1.00–1.24.

#### *Discussion*

*L. niger* is one of three unicolorous black species found in New Guinea. Lacking dense pubescence, it is unlikely to be confused with the stout and hairy *L. flavitarsus*. Superficially, *L. niger* resembles *L. melanoticus*, but can be distinguished by its lack of a narrow and conical ‘neck’ and relatively stout head (CI 0.57–0.69 vs 0.53–0.56 in *L. melanoticus*). The elongate eyes (EL 0.38–0.47 mm) are generally larger than the small, round eyes of *L. melanoticus* (EL 0.36–0.39). Antennal scapes of *L. niger* are relatively shorter (SI 2.96–3.89) than those of *L. melanoticus* (SI 4.02–4.05). Additionally, the junction of the dorsal and declivitous faces of the propodeum is distinctly angular, unlike in *L. melanoticus* where the dorsal face gradually rounds into the declivitous face.

Wheeler’s (1934) redescription of “*Leptomyrmex niger*” actually refers to *L. flavitarsis*. Wheeler’s concept of *L. niger* was based on a “co-type” that he received from Emery but that “co-type” specimen (deposited in the MCZ) is a worker of *L. flavitarsis*. It is not conspecific with the two syntype workers of *L. niger* in MSNG. As a result of this confusion, Wheeler (1934) described a new species, *L. lugubris*, which in fact corresponds to the true *L. niger*.

*L. niger* has been recorded from rainforest. Nesting habits are unknown.

*Leptomyrmex nigriceps* Emery, stat. nov.

(Figs 11a–c)

*Leptomyrmex pallens* var. *nigriceps* Emery, 1914: 418.

*Leptomyrmex pallens* subsp. *nigriceps* Emery; Wheeler 1934: 109.

*Type material examined*

*L. pallens nigriceps* Emery. Syntype, 1 worker, **New Caledonia**: La Madeleine (Sarasin & Roux) [MSNG].

*Other material examined*

**NEW CALEDONIA**: 2km SW Yaté-village, 400 m (Ward, P.S.); Coulee R., 8km NE St. Louis, 100 m (Ward, P.S.); Farino (Queensland Museum); Lembi Riv., 40 m (Ward, P.S.); Lembi Riviere, 5.5km beyond road to Coulee R., on road to Yate (Ward, P.S.); Riv. Bleue, 370 m (Ward, P.S.); Riv. Bleue, 170 m (Ward, P.S.); Riv. Bleue, Kauri Track, 250 m (Wright, S.); Riv. Bleue, Kouri Track (Queensland Museum); Riviere Bleue (Franz, H.).

*Worker measurements* (n = 9)

HL 1.68–1.90, HW 0.92–1.01, MFC 0.20–0.25, IOD 0.54–0.60, SL 3.17–3.47, EL 0.29–0.36, WL 3.03–3.41, PW 0.75–0.86, DPW 0.27–0.33, HTL 3.57–4.11, HTW<sub>min</sub> 0.10–0.14, HTW<sub>max</sub> 0.14–0.18, CI 0.52–0.56, SI 3.27–3.56, OI 0.08–0.10, HTC 0.65–0.95.

*Worker description*

As in *L. geniculatus*, but with femora unicolorous pale and head black. Gaster and head, excluding mandibles and antennae, black, with remainder of body pale orange.

*Queen*

UNKNOWN.

*Male measurements* (n = 1)

HL 1.24, HW 0.97, SL 0.36, EL 0.53, HTL 3.90, CI 0.78, SI 0.37, SI2 0.81.

*Discussion*

*L. nigriceps* resembles the other two New Caledonian *Leptomyrmex* (*L. pallens* and *L. geniculatus*) but can be recognized by its distinctive color pattern: dark head and gaster on an otherwise orange body. This species appears to be restricted to the ultramafic southern tip of the island, where it occurs in sympatry or parapatry with *L. pallens*.

*L. nigriceps* has been recorded in rainforest, *Agathis* woodland, cloud forest and low, closed riparian forest. Nests have been found in rotting stumps.

*Leptomyrmex nigriventris* (Guérin 1831)

(Figs 12a–c, 24h)

*Formica nigriventris* Guérin-Ménéville, 1831: pl.8, fig. 4. Description based on figure.

*Formica nigriventris* Guérin-Ménéville, 1838: 203. Text description.

*Leptomyrmex nigriventris* (Guérin-Ménéville); Mayr, 1862: 696. First combination in *Leptomyrmex*.

*Leptomyrmex erythrocephalus* (Fabricius); Mayr, 1876: 77. *L. nigriventris* as junior synonym of *L. erythrocephalus*.

*Leptomyrmex erythrocephalus* var. *nigriventris* (Guérin-Ménéville); Emery, 1887: 252. Revived from synonymy, treated as variety of *L. erythrocephalus*.

*Leptomyrme nigriventris* (Guérin-Méneville); Emery, 1895: 351. Revived species status.  
*Leptomyrme nigriventris* (Guérin-Méneville); Wheeler, 1915: 261. Description of larva.  
*Leptomyrme nigriventris* (Guérin-Méneville); Wheeler, 1934: 95. Description of male.

*Type material not examined*

*Formica nigriventris* (Guérin-Méneville). Syntype(s), worker(s), **Australia**, New South Wales: Port Jackson (d'Urville) [location unknown, possibly MNHN].

*Other material examined*

**Australia: New South Wales:** 11km NNW Morrisset, 220 m (Ward, P.S.); 15km W Wombeyan Caves, 3000 ft (Lowery, B.B.); 1km NNW Mt. Keira, 380 m (Ward, P.S.); 4km NE Bulahdelah, 100 m (Ward, P.S.); 17km S Gosford (Katz, D.); 5km SSW Blackheath, 680 m (Ward, P.S.); 8km NE Blackheath, 1000 m (Ward, P.S.); 9km NE Blackheath, 440 m (Ward, P.S.); above Jenolan Caves, 3000 ft (Lowery, B.B.); Blackheath, Blue Mountains (Colvin, A. & Colvin, P.); Blue Mts. (Froggatt, W.W.); Broken Hill, North mine (Lowery, B.B. & Mew, A.H.); Calga (Lowery, B.B.); Colo Vale, near Mittagong (Greaves, T.); Comboyne Plateau, 2000–2800 ft (Darlingtons); Dorrigo (Froggatt, W.W.); Dorrigo Nat'l Park, 750 m (Ward, P.S.); Dorrigo, 3000 ft (Darlington); Doyles River State Forest, 2.2km along road from Oxley Hwy., 620 m (Shattuck, S.O.); Doyles River State Forest, 620 m (Ward, P.S.); Echo Pt. Katoomba, 700 m (Ward, P.S.); Gingra Rge. nr Kanangra Tops, 800 m (Ward, P.S.); Heaton S.F., 700 m (Ward, P.S.); Jenolan Caves (Wibur, J.C.); Katoomba (Lowery, B.B.); Katoomba (Wheeler); Kings Tableland, 10km S Wentworth Falls (Lowery, B.B.); Kurradjong (McAreavey, J.); Leura (Froggatt, W.W.); Leura (Wheeler); Leura Falls, Blue Mts. (Froggatt, W.W.); Minni Hatta area, Katoomba (Lowery, B.B.); Morrisset Ra., Dora Ck. (Lowery, B.B.); Mt. Flora nr Mittagong (Taylor, R.W., Sadler, R. & Bartell, R.J.); Mt. Keira, 300 m (Ward, P.S.); Mt. Tomah (Taylor, F.H.); Mt. Tomah, 900 m (Shattuck, S.O.); Mt. Tomah, 900 m (Ward, P.S.); Mt. Victoria (Lowery, B.B.); Mt. Wilson nr Cathedral of Ferns, 980 m (Shattuck, S.O.); Mt. Wilson, 3500 ft (Darlington); Mt. Wilson, 980 m (Ward, P.S.); Mt. Wilson, Blue Mts., 3500 ft (Darlington); Myall Lakes (Nicholson, A.J.); Myall Lakes, Wallangar SF (Greenslade, P.J.M.); O'Sullivan's Gap Flora Reserve, 4km NE Bulahdelah, 100 m (Shattuck, S.O.); Ourimba State Forest, Wyong, 25 ft (Lowery, B.B.); Perry's Lookdown to Blue Gum Forest, nr Blackheath (Lowery, B.B.); Styx River (Riek, E.F.); Sydney (Ashton, H.); The Gib, Bowral, 2830 ft (Lowery, B.B.); Wentworth Falls (Darlington); Wentworth Falls (Wheeler); Wentworth Falls NP 2km SW Wentworth Falls, 850 m (Lucky, A.); Wentworth Falls nr. Valley of the Waters, West end of Fletcher St., 800 m (Shattuck, S.O.); Wentworth Falls, 800 m (Ward, P.S.). **Dubious locality records: Queensland:** Mt. Nebo, Brisbane (Lowery, B.B.); **New South Wales:** North Mine, Broken Hill, prob. ex. Truckload of timber from Oberon, New South Wales (Mew, A.H.); **Victoria:** 'Chiltern' [presumably Chiltern, Victoria] (c.u.).

*Worker measurements* (n = 10)

HL 2.27–2.53, HW 1.49–1.76, MFC 0.34–0.47, IOD 0.88–1.06, SL 3.67–4.15, EL 0.42–0.52, WL 4.32–4.98, PW 1.34–1.53, DPW 0.55–0.66, HTL 4.52–5.20, HTWmin 0.17–0.21, HTWmax 0.29–0.36, CI 0.66–0.75, SI 2.32–2.46, OI 0.08–0.11, HTC 0.52–0.66.

*Worker description*

Large species (HW 1.49–1.76 mm; WL 4.32–4.98 mm) with very broad head (CI 0.66–0.75). Excluding mandibles, head width nearly 3/4 of head length, broadest at eye level, narrowing anteriorly to concave genae. Posterior to eyes, sides of head broadly rounded and postocular margin broadly rounded. Masticatory margin of mandible with approximately 9 large teeth and 7 denticles interspersed. Anterior clypeal margin medially concave. Eyes positioned posterior to midline of head, small and hairless, not surpassing lateral margins of head. Antennal scapes not compressed, extending beyond posterior margin of head less than 2/3 of their length.

Pronotum rather short, less than 1.5 times as long as broad. Declivity of propodeum about half the length of the dorsal face, which is slightly concave in profile, and bears a longitudinal impression. Petiolar node high, summit convex and rounded. Posterior face of petiole flat to concave, longer than anterior face ventral surface of petiole, which is flat to feebly convex. A distinct longitudinal impression lends a bilobed appearance to the petiole in anterior view. Gaster broad and elliptical. Femora and tibiae somewhat compressed (HTC 0.52–0.66).

Surface subopaque, finely and densely shagreened. Mandibles slightly shining, coarsely punctate along apical margin. Pubescence extremely short and fine, covering the body and appendages. Pilosity on mandibles and clypeus short and yellow. Hairs on venter of gaster and coxae longer and black. Posterior face of hind tibia with ten or more short, brown bristles. Body rufotestaceous throughout, except for black gaster. Head and scapes a deeper, purplish red than remainder of body.

### *Queen*

UNKNOWN

### *Male measurements* (n = 3)

HL 1.91–2.10, HW 1.30–1.42, SL 0.79–0.86, EL 0.54–0.65, HTL 4.52–4.72, CI 0.67–0.69, SI 0.61–0.62, SI2 1.40–1.60.

### *Discussion*

This is one of the largest *Leptomyrmex* species, second in size only to its sister species, *L. tibialis*. Tibial coloration (pale in *L. nigriventris*; dark in *L. tibialis*) distinguishes these taxa. *Leptomyrmex nigriventris* and *L. tibialis* co-occur in the region of Dorrigo, New South Wales. Large body size (HW 1.49–1.76 mm; WL 4.32–4.98 mm), a broad head (CI 0.66–0.75), 10+ standing hairs on the posterior face of the hind tibia, and a consistent color pattern (orange head and body with a black gaster) will separate this species from all others. No type specimen of *L. nigriventris* was found; however, the details in the type description and illustration allow unambiguous identification of this species.

*L. nigriventris* has been recorded in rainforest, wet sclerophyll and dry sclerophyll. Nests occur under rocks, at tree bases, and in soil.

## *Leptomyrmex pallens* Emery

(Figs 13a–c, 24i)

*Leptomyrmex pallens* Emery, 1883: 147.

*Leptomyrmex pallens* Emery; André 1887: 290. Description of male.

See also: Wheeler, 1915: 276; Wheeler, 1934: 108.

### *Type material examined*

*L. pallens* Emery. Syntypes, 2 workers, **New Caledonia**: “N. Caléd.” (Gambey) [MSNG]

### *Other material examined*

**New Caledonia**: “New Caledonia” (Sommer); 2km W Touho, <5 m (Ward, P.S.); 3km SW Touho, 400 m (Ward, P.S.); 6km SE Touaourou, <5 m (Ward, P.S.); 8km ESE Tieta, 100 m (Ward, P.S.); 9km SW Hienghène, 40 m (Ward, P.S.); Aoupinié For. Reserve, 460 m (Ward, P.S.); Aoupinié, 20km NE Poya, 600 m (Monteith, G. & Cook, D.); Baie d'Oupi, Ile des Pins, <5 m (Ward, P.S.); Bouloupari to Thie, km. 10, 270 m (Brown, W.L.); Canal [Kanala] (c.u.); Canala (Rageau, J.); Chapeau Gendarme, Yahoué (Wilson, E.O.); Ciu, nr Mt. Canala (Wilson, E.O.); Col d' Amieu (Queensland Museum); Col d'Amieu Forest Stn., 400 m (Mon-

teith, G. & Cook, D.); Col d'Amieu, W. Slope, 470 m (Monteith, G.); Col d'Amoss, 300 m (Ward, P.S.); Col d'Amoss, nr. Ouégoa, 100 m (Monteith, G. & Cook, D.); Col de Petchecara, middle (G. Monteith); Col de Tongoue, 400–800 m (Krauss, N.L.H.); Coll d'Amoss, 3km WSW, 520 m (Monteith, G.); Farino (Queensland Museum); Fausse Yaté Riv., 10 m (Ward, P.S.); Foret Nord, site 2, 200 m (Burwell & Wright); Grottes de Koum, 40 m (Ward, P.S.); Houailou (Ford, W.H.); Ile des Pins, Kuto Pen (Brown, W.L.); Kuenthio River, 14km SW Thio, 40 m (Ward, P.S.); Kuto Pen., Ile des Pins (Brown, W.L.); Kuto Pen., Pic Nga, Ile des Pins (Brown, W.L.); Kuto Penin., Ile des Pins, 5 m (Ward, P.S.); La Crouen, 130 m (Brown, W.L.); Mandjélia, above Pouébo, 600–750 m (Monteith, G. & Cook, D.); Maquis nr. the Auberge, 450 m (Ward, P.S.); Mt. Koghis, 450 m (Ward, P.S.); Mt. Mou, 180–400 m (Wilson, E.O.); Mt. Panié, 100 m (Ward, P.S.); Mt. Panié, 390 m (Ward, P.S.); Mt. Panié, 450–950 m (Monteith, G. & Cook, D.); New Bourail (Cheeseman, L.E.); Oubatche (c.u.); Ouru, Ile des Pins, 5 m (Ward, P.S.); Pic Nga, Ile des Pins, W. base (Brown, W.L.); PTT, Hienghène, 20 m (Ward, P.S.); Pueblo (coast), 1500 ft (Cheeseman, L.E.); Roches d'Ouaième, 750 m (Ward, P.S.); Sarraméa (Wilson, E.O.); Toili R., Col d'Amieu For. Stn, 350 m (Ward, P.S.); Vahoe, 1500 ft (Lowery, B.B.); Yahoué (c.u.); Yahoué, 1500 ft (Schoener, T.); Yambé (c.u.); Yaté (c.u.).

*Worker measurements* (n = 10)

HL 1.64–1.92, HW 0.92–1.11, MFC 0.19–0.25, IOD 0.54–0.63, SL 3.09–3.61, EL 0.30–0.38, WL 2.94–3.58, PW 0.73–0.93, DPW 0.27–0.39, HTL 3.60–4.09, HTWmin 0.11–0.13, HTWmax 0.14–0.18, CI 0.43–0.46, SI 3.11–3.51, OI 0.10–0.14, HTC 0.66–0.83.

*Worker description*

As in *L. geniculatus*, but femora unicolorous. Entire body rufotestaceous, with black gaster. Head and sometimes pronotum slightly darker yellow than body, terminal abdominal segment pale, contrasting with black gaster.

*Queen*

UNKNOWN.

*Male measurements* (n = 2)

HL 1.35, HW 1.00–1.03, SL 0.36–0.37, EL 0.54–0.56, HTL 3.89–4.04, CI 0.74–0.76, SI 0.35–0.37, SI2 0.71–0.76.

*Discussion*

*L. pallens* can be distinguished from the other two New Caledonian *Leptomyrmex* (*L. nigriceps* and *L. geniculatus*) by its coloration. The black gaster contrasts with an otherwise unicolored orange body. This species occurs throughout the main island and on Ile des Pins, and is the most commonly encountered of the three species that occur on New Caledonia.

*L. pallens* has been recorded from rainforest. Nests occur in soil, under tree roots and under rocks.

*Leptomyrmex puberulus* Wheeler

(Figs 14a–c, 24j)

*Leptomyrmex puberulus* Wheeler, 1934: 112, fig. 14.

*Type material examined*

*L. puberulus* Wheeler. Syntypes, 5 workers, **Papua New Guinea**: 'Morobe District' (Stevens) [MCZ].

### *Other material examined*

**INDONESIA: Irian Jaya:** Maffin Bay, Dutch NG (Ross, E.S.); PT Freeport Concession Siewa Camp, 200 ft (Snelling, R.R.). **PAPUA NEW GUINEA: East Sepik:** 2km E Maprik, 200 m (Ward, P.S.); Wamangu, 200–300 m (Janda, M. et al.). **Gulf:** S of Veiru (Morrison, J.). **Madang:** 24km N Madang, 80 m (Ward, P.S.); 9km NW Madang, 360 m (Ward, P.S.); Baitabag, 50 m (Janda, M. et al.); Ohu, 120 m (Hulcr, J. et al.); Wanang, 200 m (Hulcr, J. et al.). **Morobe:** Bubia, 13km NW Lae (Wilson, E.O.); Didiman Creek, Lae (Wilson, E.O.); Lae (Krauss, N.L.H.). **West Sepik (Sandaun):** Utai (Hulcr, J. et al.). **Western Highlands:** Wara Hill, Jimi Val., 500 m (Ward, P.S.).

### *Worker measurements* (n = 10)

HL 1.63–1.83, HW 1.02–1.20, MFC 0.21–0.26, IOD 0.58–0.68, SL 3.08–3.75, EL 0.33–0.42, WL 2.99–3.29, PW 0.84–0.95, DPW 0.30–0.37, HTL 3.33–3.86, HTWmin 0.10–0.16, HTWmax 0.14–0.18, CI 0.61–0.66, SI 2.77–3.64, OI 0.12–0.16, HTC 0.63–0.96.

### *Worker description*

Smaller species (HW 1.02–1.20 mm; WL 2.99–3.29 mm) with head less than twice as long as broad, excluding mandibles (CI 0.61–0.66). Head widest at eyes, sides of head slightly convex, genae feebly concave anteriorly. Behind the eyes, sides of head gently rounding to flat postocular margin. Masticatory margin of mandible with approximately 15 teeth and denticles. Anterior clypeal margin weakly convex. Eyes positioned at midline of head, small and nearly circular, convex and distinctly hairy, reaching margins of head. Antennal scapes long and slender.

Dorsal face of propodeum with transverse impression at anterior end. Dorsal face slightly longer than convex declivitous face. Dorsal and declivitous faces meeting at rounded angle. Petiole triangular in profile, with rounded dorsum bearing deep longitudinal impression; ventral surface flat. Gaster narrow. Legs long and slender, slightly compressed (HTC 0.63–0.96 mm).

Surface very finely and superficially shagreened, less shining. Pubescence grey, long and abundant on all parts of the body and appendages, especially on the head, pronotum and gaster. Erect hairs present on the clypeus, venter and gaster. Body ranging from pale yellow to dark yellowish-brown. Tarsi nearly white. Some individuals with gaster darker than the rest of the body.

### *Queen*

UNKNOWN.

### *Male measurements* (n = 2)

HL 1.51, HW 0.76–0.77, SL 0.77–0.81, EL 0.46–0.50, HTL 4.48–4.55, CI 0.50–0.51, SI 1.01–1.05, SI2 0.49.

### *Discussion*

*L. puberulus* is distinctive among all the New Guinea species for having short standing hairs on the eyes. This species most closely resembles *L. flavitarsus*, the other species in New Guinea with dense pubescence on the body. Generally, *L. puberulus* is uniformly pale yellow, but some forms are darker yellow, approaching brown. *L. flavitarsus* is very dark brown, approaching black. A stouter head and shorter appendages (HW 1.02–1.20 mm; SI 2.77–3.64; HTL 3.33–3.86) distinguishes *L. puberulus* from the similarly pale *L. fragilis*, which is more gracile, with longer appendages (HW 0.94–1.05 mm; SI 3.92–4.73; HTL 4.41–5.02).

*L. puberulus* has been recorded in secondary and primary rainforest. Nests occur in soil and in logs.

***Leptomymex rothneyi* Forel, stat. nov.**

(Figs 15a–c, 24k)

*Leptomymex varians* var. *rothneyi* Forel, 1902: 473.

*Leptomymex varians* subsp. *rothneyi* Forel; Wheeler, 1934: 102.

*Type material examined*

*L. varians rothneyi* Forel. Syntypes, 4 workers, **Australia**, Queensland: ‘Brisbane’ (Rothney) [MHNG].

*Other material examined*

**AUSTRALIA: Queensland:** 15km ESE Gympie, 100 m (Ward, P.S.); Beerwah (general) (Matthews, R.W.); Blackhall Ranges (Borch, C.M.); Brisbane (Hacker, H.); Brisbane (Taylor, F.H.); Caloundra (c.u.); Camp Mt., Brisbane, 900 ft (Lowery, B.B.); Camp Mt., Glasshouse Mts. & Ithaca, 500 ft (Lowery, B.B.); Cooloola, Burwilla (Greenslade, P.J.M.); Cooloola, Kabali E (Greenslade, P.J.M.); Dingo Ck., 1km E Traveston, 80 m (Taylor, R.W. & Kohout, R.J.); Enoggera (Wheeler); foot of Blackall Ra. 30km W Kilcoy (Lowery, B.B.); Gold Ck. Reservoir, 140 m (Burwell, C.J.); Gold Ck. Reservoir, 140 m (Queensland Museum Party); Ithaca Creek, Brisbane (Lowery, B.B.); Mapleton Falls NP, 3km W Mapleton, 450 m (Lucky, A.); Mt. Coot-tha, 200 m (Ward, P. S. ); Mt. Coot-tha, 6km W Brisbane, 230 m (Lucky, A.); Mt. Coot-tha, Brisbane (general) (Lowery, B.B.); Noosa NP, coastal track nr. Tea Tree Bay, 70 m (Lucky, A.); Walkabout Creek, 8km W Brisbane, 163 m (Lucky, A.). **Dubious locality records: Queensland:** Cairns NQ (Bourne, E.N.); **New South Wales:** N. Sydney (Froggatt, W.W.).

*Worker measurements* (n = 9)

HL 2.32–2.45, HW 1.29–1.39, MFC 0.30–0.34, IOD 0.70–0.80, SL 4.05–4.36, EL 0.45–0.51, WL 4.30–4.56, PW 1.13–1.19, DPW 0.46–0.51, HTL 5.23–5.67, HTWmin 0.15–0.18, HTWmax 0.21–0.24, CI 0.55–0.57, SI 3.12–3.24, OI 0.13–0.14, HTC 0.64–0.86.

*Worker description*

As in *L. rufipes*: Medium sized species head long and slender, excluding mandibles nearly twice as long as broad. Head widest just anterior to eye level. Sides of head subparallel, narrowing anteriorly, genae slightly concave. Head posterior to eyes narrowing abruptly to dorsoventrally flattened neck-like constriction, projecting posteriorly. Masticatory margin of mandible with 15 to 20 teeth and denticles interspersed. Anterior clypeal margin flat to weakly concave. Eyes positioned posterior to midline of head, relatively elongate, hairless, not surpassing margins of head. Antennae not compressed, scapes surpassing posterior margin of head by 2/3 their length.

Pronotum slender, elongate. Propodeum short, dorsal face slightly impressed transversely at anterior end, declivitous face short and convex, angle very rounded. Petiole triangular in profile, anterior and posterior faces with median longitudinal impression, dorsum lacking an impression, posterior face longer than anterior face. Ventral surface of petiole nearly flat. Gaster elongate-elliptical. Legs very long and slender, not compressed.

Surface very finely shagreened and somewhat shining throughout. Mandibles with a coarse row of punctures along margin. Pubescence pale, sparse. Hairs minimal, confined to clypeus, venter and gaster. Body coloration dark, generally mottled brown and rufotestaceous, with antennae uniformly dark brown and antennae uniformly rufotestaceous. Femora solid dark brown, with proximal portion pale and coxae mottled dark and light. Tibiae and tarsi pale yellow. Pronotum dark brown, mottled, with the remainder of thorax rufotestaceous with variable brown mottling. Gaster solid black with terminal gastral segments yellow.

## Queen

UNKNOWN.

## Male measurements (n = 4)

HL 1.76–1.91, HW 1.27–1.33, SL 0.44–0.51, EL 0.65–0.73, HTL 4.49–4.89, CI 0.69–0.72, SI 0.35–0.39, SI2 0.71–0.82.

## Discussion

*Leptomymex rothneyi* bears a distinctively narrowed, dorsoventrally flattened constriction at the posterior margin of the head. This necklike structure is also present, but less exaggerated, in the closely related species *L. ruficeps* and *L. rufipes*. Coloration can help to distinguish these three: *L. rothneyi* has a black gaster, a pale orange mesosoma and a dark head which is a mottled brown rather than uniformly black, and often the pronotum and forecoxae are also dark and mottled. In contrast, *L. ruficeps* is black with a red head, and *L. rufipes* is pale with a black gaster. *L. rothneyi* can be distinguished from other *Leptomymex* based on head shape and geographic range; this species occurs only in the southeast corner of Queensland.

*L. rothneyi* has been recorded in rainforest, open rainforest, wet sclerophyll, dry sclerophyll and coastal sclerophyll. Nests occur in soil and in or under logs.

## *Leptomymex ruficeps* Emery, stat. nov.

(Figs 16a–c, 24l)

*Leptomymex varians* var. *ruficeps* Emery, 1895: 352.

*Leptomymex varians* var. *ruficeps* Emery; Forel, 1915: 84. Description of male.

*Leptomymex varians* var. *ruficeps* Emery; Wheeler, 1915: 261. Description of larva.

*Leptomymex varians* subsp. *ruficeps* Emery; Wheeler 1934: 102.

## Type material examined

*L. varians ruficeps* Emery. Syntypes, 5 workers, **Australia**, Queensland: Mt. Bellendenker (Podenzana) [MSNG]

## Other material examined.

**AUSTRALIA: Queensland:** 2.7km W of Cape Tribulation (Site 5A) 400 m (Monteith, G.B.); 2km E Crawfords Lookout [Palmerston NP] (Taylor, R.W.); 2km SE Mt. Spurgeon via Mt. Carbine, 1100 m (Monteith & Thompson); 4.5km NNW Cape Tribulation, 10 m (Ward, P.S.); 4.5km NNW Cape Tribulation, 10 m (Wild, A.L.); 4mi W Babinda (Darlingtons); 6km SSE Atherton, 720 m (Ward, P.S.); Atherton (Darlingtons); Atherton (Taylor, R.W.); Babinda (Wilke, J.); Barrine NP, 760 m (Taylor, R.W.); Barron Falls N.P. (Hebert, P.); Bartle Frere Track, 17km W Malanda, 700 m (Monteith & Thompson); Bellenden Kerr (c.u.); Bellenden Kerr Range, Cable tower 3, 1054 m (Earthwatch/Queensland Museum); Bellenden Kerr Range, Cable tower 7, 500 m (Earthwatch/Queensland Museum); Black Mt. Rd., v. Kuranda (Darlingtons); Black Mtn, 17 km ESE Julatten, 800–1000 m (Monteith, Yeates and Cook); Boulders N.P., Babinda, 1000 ft (Taylor, R.W.); Cairns (Bourne, E.H.); Cairns (general) (Hill, G.F.); Cairns (Hill, G.F.); Cairns, dist. (Lea, A.M.); Cape Tribulation (general) (Waight, G.); Cape Tribulation, 10 m (Ward, P.S.); Clohesy R. (Greaves, T.); Clump Pt. NP (Lowery, B.B.); Cooktown (Staudinger); Coolooloa Natl. Pk., rainforest (Greenslade, P.J.M.); Crawfords Lookout, Milaa to Innisfail, 1–3000 ft (Darlingtons); Crystal Cascades, nr Cairns, 200 ft (Taylor, R.W.); Crystal Cascades, v. Cairns (Darlingtons); Daintree NP, Mt. Sorrow, 200 m (Lucky, A.); Danbulla [Forestry Reserve] (Greenslade, P.J.M.); Davies Ck. Rd., Atherton Tableland (Darlingtons); Emerald Ck, Lamb Range, 950 m (Monteith, Yeates and Thompson); Evelyn Tableland (Greaves, T.); Gadgarra (Greenslade, P.J.M.); Gold Hill, McDowall Range, 550 m (Taylor, R.W. & Weir, T.A.); Henrietta Crk., Palmerston N.P., 350 m (Ward, P.S.);



Herberton Ra, Atherton Tableland, 4000 ft (Taylor, R.W.); Hinchinbrook Is., Gayundah Ck., 10 m (Monteith, Thompson & Cook); Hinchinbrook Is., Gayundah Ck., 10 m (Thompson, G.); Innisfail nr. Josephine Falls (Lowery, B.B.); Josephine Falls NP (Lowery, B.B.); Josephine Falls, Bellenden Kerr N.P., 180 m (Ward, P.S.); Kirrama Forest (Greenslade, P.J.M.); Kirrama Ra. (Kennedy, E. & Taylor, R.W.); Kirrama Ra. (Mt. Hosie summit), 930 m (Monteith, Thompson & Hamlet); Kirrama Ra. Douglas Ck. Rd., 850 m (Monteith, Thompson & Hamlet); Kirrama Ra. Douglas Ck. Rd, 800 m (Monteith, Thompson & Hamlet); Kirrama Rge, v. Cardwell, 2–3000ft (Darlingtons); Kuranda (Brown, W.L.); Kuranda (Dodd, F.F.); Kuranda (Filewood, P.); Kuranda (general) (Matthews, R.W.); Kuranda (Greaves, T.); Kuranda (Holldobler, B.); Kuranda (Wheeler); Kuranda, 1000ft (Taylor, R.W.); Kuranda, 3000 ft (Wheeler); Lake Barrine (Greaves, T.); Lake Barrine (Lowery, B.B.); Lake Eacham Nat. Pk., 750 m (Ward, P.S.); Lake Eacham NP, 800 m (Taylor, R.W.); Lake Eacham, 760 m (Taylor, R.W.); Lake Eacham, Atherton Tableland (Darlingtons); Lake Plaad, Cairns (Lowery, B.B.); Lake Tinaroo (Lowery, B.B.); Longlands Gap, Atherton Tablelands, 3000 ft (Darlingtons); Malanda (Hill, G.F.); Malanda Falls Environmental Park (Cutter, A.D.); McNamee Ck., 15km SW Innisfail, 320 m (Taylor, R.W.); Mt Windsor Tableland, 1000 m (R.W. Taylor and T.A. Weir); Mt Windsor Tableland, 950 m (Taylor, R.W.); Mt. Alexander, NW of Daintree (Darlingtons); Mt. Lewis, 960 m (Taylor, R.W. & Weir, T.A.); Mt. Lewis nr Julatten, 3000ft (Taylor, R.W.); Mt. Lewis Rd., Julatten (Walford-Huggins, A.); Mt. Lewis, 7km NW Julatten, 700 m (Lucky, A.); Mt. Lewis, 7km NW Julatten, 850 m (Lucky, A.); Mt. Lewis, 7km NW Julatten, 950 m (Lucky, A.); Mt. Mackay nr Tully, 80 m (Taylor, R.W.); Mt. Tiptree nr. Mareeba, 760 m (Taylor, R.W. & Feehan, J.); Mt. Windsor Tablelands, 950 m (Taylor, R.W.); Mts. nr Mossman (Darlingtons); Mulgrave Forestry Rd., 100 m (Ward, P.S.); N. Mission Beach, nr Tully (Taylor, R.W.); North Bell Peak, 20km S Cairns [Bell Peak North], 1000 m (Monteith, G.B. & Cook, D.); nr Kuranda, 430 m (Taylor, R.W. & Feehan, J.); nr Babinda, Boulders N.P. (Taylor, R.W. & Feehan, J.); nr. Curtain Fig Tree via Yungaburra (Kojima, J.); nr. Mareeba, Mt. Tiptree (Taylor, R.W. & Feehan, J.); Nth Bell Peak, 20km S Cairns, 900–1000 m (Monteith and Cook); Palmerston NP, 1km SE Crawford Lookout, 300 m (Taylor, R.W.); Palmerston NP, 1000ft (Taylor, R.W.); Palmerston NP, Cooligan Crk, 170 m (Taylor, R.W.); Ravenshoe, Atherton Tab., 3000 ft (Darlingtons); Saddle Mtn., 3km N Kuranda (Katz, D.); Scraggy Pt., Hinchinbrook I., 5 m (Ward, P.S.); Smithfield Conservation Park, 70 m (Lucky, A.); Spears Ck. (Davies & Raven); The Boulders, 4km W Babinda, 70 m (Lucky, A.); The Boulders, Babinda (Lowery, B.B.); The Boulders, Bellenden Kerr N. P. (Sugden, E.A.); Thornton Ra., 150–180 m (Taylor, R.W. & Feehan, J.); Upper Mulgrave Rd., Kearneys Falls, 100 m (Monteith & Thompson); Urchie Ck., nr Innisfail [Utchee] (Greaves, T.); W McNamee Creek, 400 m (Taylor, R.W. & Feehan, J.); W of Ravenshoe, 3000 m (Darlingtons); W. McNamee Crk, 400 m (Taylor, R.W. and Feehan, J.); Waugh [Waugh Pocket] (Taylor, R.W.).

#### *Worker measurements* (n = 10)

HL 2.15–2.41, HW 1.16–1.47, MFC 0.24–0.29, IOD 0.64–0.74, SL 3.70–4.38, EL 0.38–0.51, WL 3.98–4.28, PW 1.02–1.12, DPW 0.41–0.48, HTL 4.90–5.60, HTWmin 0.13–0.17, HTWmax 0.18–0.24, CI 0.53–0.61, SI 2.83–3.64, OI 0.10–0.12, HTC 0.64–0.81.

#### *Worker description*

As in *L. rufipes*: medium sized species with head long and slender, excluding mandibles nearly twice as long as broad. Head widest at eye level, sides of head subparallel, narrowing anteriorly, genae slightly concave. Beyond eyes narrowing abruptly to dorsoventrally flattened and posteriorly projecting neck-like constriction at posterior margin. Masticatory margin of mandible with 15 to 20 teeth and denticles interspersed. Anterior clypeal margin flat to weakly concave. Eyes positioned approximately at midline of head, eyes small, convex, hairless, not reaching lateral margins. Antennae long and slender, not compressed, scapes surpassing posterior margin of head by 2/3 their length.

Pronotum slender, elongate. Propodeum short, dorsal face of propodeum with transverse impression at anterior end, declivitous face short and convex, propodeal angle very rounded. Petiole triangular in profile, posterior face with median longitudinal impression, dorsum rounded, posterior face longer than anterior face. Ventral surface of petiole nearly flat. Gaster elongate-elliptical. Legs very long and slender, not compressed.

Surface very finely shagreened and somewhat shining throughout. Mandibles with a coarse row of punctures along margin. Pubescence pale, sparse. Hairs minimal, confined to clypeus, venter and gaster. Body black with red head and antennae. Tarsi and tibiae yellow, gaster entirely black with anal orifice pale yellow.

#### *Queen*

UNKNOWN.

#### *Male measurements* (n = 4)

HL 1.86–1.94, HW 1.30–1.35, SL 0.51–0.57, EL 0.68–0.70, HTL 4.68–4.89, CI 0.67–0.71, SI 0.39–0.42, SI2 0.85–0.89.

#### *Discussion*

This species is restricted to the Australian Wet Tropics, where it can be easily distinguished from its sympatric congeners (*L. rufipes*, *L. unicolor* and *L. mjobergi*) by the neck-like constriction of the posterior margin of the head, and its distinctive coloration: black body with red head and antennae. This species is more slender than *L. unicolor* and larger than *L. mjobergi*. With the exception of coloration, this species closely resembles its sister species, *L. rufipes*, which is red with a black gaster.

*L. ruficeps* has been recorded mostly in rainforest, with one record from *Eucalyptus* open forest. Nests occur in cavities in live trees, on the ground at tree bases, in or under logs, and under rocks.

### *Leptomyrmex rufipes* Emery, **stat. nov.**

(Figs 17a–c, 23d, 24m)

*Leptomyrmex varians* var. *rufipes* Emery 1895: 352.

*Leptomyrmex varians* subsp. *rufipes* Wheeler 1934: 104.

*Leptomyrmex varians* subsp. *quadricolor* Wheeler, 1934: 104. **Syn. nov.**

#### *Type material examined*

*L. rufipes* Emery. **Neotype** worker, designated here, **Australia**: Queensland: Brisbane, Mt. Coot-tha (Lucky, A.) [ANIC, CASENT0127326]

*L. varians* subsp. *quadricolor* Wheeler. Syntypes, 18 workers, **Australia**: Queensland: Cape York, MacIlwraith [as ‘McIlthwaite’] Range, Lankelly Creek (Darlington, P.J.) [MCZ; BMNH].

#### *Type material not located*

*L. varians* subsp. *rufipes* Emery. Syntype(s), worker(s), **Australia**: Queensland: “Laidely, Brisbane” (Podenzana). Not in MSNG or MHNG.

#### *Other material examined*

**AUSTRALIA: New South Wales:** 2km WNW New Brighton, 10 m (Ward, P.S.); 5km E Woodenbong (Greenslade, P.J.M.); 7km NE Woodenbong, 520 m (Ward, P.S.); Brunswick Heads, 50 ft (Lowery, B.B.); Foot of Blue Knob Mt., Nightcap Ra., 300 ft (Lowery, B.B.); Legume (Greenslade, P.J.M.); Mt. Nullum, Murwillumbah, 100 ft (Lowery, B.B.); Murwillumbah area (Lowery, B.B.). **Queensland:** 11km SSE Miriam Vale,

120 m (Ward, P.S.); 12 Mile Scrub, Gap Ck. (Davies & Raven); 15km ESE Gympie, 100 m (Ward, P.S.); 16km W Calen (Sandery, K.J.); 2.5km E Rossville, 180 m (Ward, P.S.); 20km N Yeppoon (Bugeja, J.); 27km NNE Coen, 530 m (Ward, P.S.); 27km NNE Coen, 530 m (Wild, A.L.); 3–4 mi SE Paluma, 650–800 m (Wilson, E.O.); 3km S Eungella, 780 m (Taylor, R.W.); 3mi E Mt. Fox (Dowse, J.E.); 4km SW Cairns (Cavanaugh, J.); 50mi. W Mackay, Eungella NP, 3000 ft (Lowery, B.B.); 6km S Eungella, 700 m (Ward, P.S.); 6km SSW North Tamborine, 500 m (Ward, P.S.); 7km NNW North Tamborine, 490 m (Ward, P.S.); 8km N Finch Hatton, 200 m (Ward, P.S.); 8km NE Landsborough, 10 m (Ward, P.S.); 8km SW Kuttabul, 120 m (Ward, P.S.); Barron Gorge (Bugeja, J.); Beandesert Road, Brisbane (Greaves, T.); Beaudesert (Greaves, T.); Beaudesert (Parlett, S.); Benarkin (Darlingtons); Blackall Ra. (Borch, C.H.); Boombana, 24km WNW Brisbane, D'Aguilar NP, 470 m (Lucky, A.); Brisbane (c.u.); Brisbane (general) (F.S.L.); Brisbane (Taylor, F.H.); Brisbane (Wheeler); Brisbane Mt. Coot-tha, 230 m (Lucky, A.); Broken R., 6 km S Eungella, 700 m (Brown, W.L. & Brown, D.E.); Broken R., Eungella NP, 700 m (Taylor, R.W. & Weir, T.A.); Bruce Hwy, 2km S Glasshouse (Brown, W.L. & Brown, D.E.); Buhot Creek, Burbank, 21km SE Brisbane, 70 m (Lucky, A.); Buhot Crk, Burbank, 50 m (Burwell, C.J.); Burleigh Heads (Ledward, C.P.); Byfield S.F., 60 m (Ward, P.S.); Callide Ck. Mine, Biloela (Smith, A.); Cania Gorge National Park (Gush, T.); Carnarvon Gorge, 400 m (Ward, P.S.); Cedar Ck. N.P. (Taylor, R.W.); Cooligan Crk., Palmerston NP, 170 m (Taylor, R.W.); Cooloola (general) (Room, P.M.); Cooloola [Natl. Pk.], Melita (Greenslade, P.J.M.); Cooloola Natl. Park, N. end, 140 m (Ward, P.S.); Cooloola Natl. Pk., Burwilla (Greenslade, P.J.M.); Cooloola Natl. Pk., Corrida (Greenslade, P.J.M.); Cooloola Natl. Pk., Mutyi (Greenslade, P.J.M.); Cooloola Natl. Pk., Plowman (Greenslade, P.J.M.); Cooloola Natl. Pk., rainforest (Greenslade, P.J.M.); Cooloola Natl. Pk., Warrawonga (Greenslade, P.J.M.); Cooloola, Chalamban [Chalambar] (Greenslade, P.J.M.); Cooloola, Kabali E (Greenslade, P.J.M.); Crediton Ck., Eungella NP, 750 m (Taylor, R.W. & Weir, T.A.); Crystal Cascades, 80 m (Lucky, A.); Crystal Crk. NP, N of Townsville, 330 m (Lowery, B.B.); Daisy Hill SF, 24km SE Brisbane (Lowery, B.B.); Danbulla (Greaves, T.); Darra (Wheeler); Dawson Ra., Blackdown Tableland (Kohout, R.S.); Dingo Ck., 1km E Traveston, 80 m (Taylor, R.W. & Kohout, R.S.); Doongul State Forest (Gay, F.J.); Elliot Range, v. Townsville, 3000 ft (Darlingtons); Eungella Nat. Pk. (Hölldobler, B.); Eungella National Park (Bush, G.); Eungella NP, 50 mi W Kackay, 2000 ft (Lowery, B.B.); Eungella Range, W of Mackay, 2–3000 ft (Darlingtons); foothills of Eungella NP, 50mi W Mackay, 400 ft (Lowery, B.B.); Gap Ck., 5km ESE Mt. Finnegan (Feehan, J.E.); 'Gwinganna', 6km SW by S Talebudgera (Rentz, D., Lee, W. & Upton, M.); Henrietta Crk., Palmerston NP, 350m (Ward, P.S.); Hinchinbrook Is., Gayundah Ck., 10 m (Monteith, Thompson & Cook); Ithica [sic] Ck, Brisbane (Lowery, B.B.); ellenden Ker NP, 180m (Ward, P.S.); Forest (Greenslade, P.J.M.); Kirrama Rge, v. Cardwell, 2–3000 ft (Darlingtons); Landsborough (Lowery, B.B.); Lankelly Creek, McIlwraith Range, C. York (Darlington); Mackay (Turner); Main Range NP, Bellbird Lookout nr Cunninghams Gap, 8km E Maryvale, 480 m (Lucky, A.); Mapleton Falls (Taylor, R.W.); Mapleton Falls NP, 3km W Mapleton, 450 m (Lucky, A.); McIlwraith Ra. (Filewood, P.); Mt. Coot-tha, 160 m (Ward, P.S.); Mt. Coot-tha, 200 m (Ward, P.S.); Mt. Coot-tha, 6km W Brisbane, 230 m (Lucky, A.); Mt. Coot-tha, Brisbane (general) (Lowery, B.B.); Mt. Coot-tha, Brisbane (Taylor, R.W.); Mt. Gibraltar, Shoalwater Bay (Greenslade, P.J.M.); Mt. Nebo (Warwick, E.); Mt. Spec NP, 200 ft (Lowery, B.B.); Mt. Spec Plateau, c. 40mi N Townsville, 2–3000 ft (Darlingtons); Mt. Tambourine (Lea, A.M.); Mt. Webb NP (Feehan, J.E.); N of Yeppoon (Darlingtons); N. Tamborine (Upton, M.S.); Noosa NP, Coastal Track nr. Tea Tree Bay, 70 m (Lucky, A.); Obi Obi Ck, Blackall Ra., 500 m (Taylor, R.W.); Palm Park, 3.5 mi. ESE Byfield (Campbell, T.G. & Jealous, R.); Palmerston N.P.(Lowery, B.B.); Palmerston NP, Cooligan Crk., 170 m (Taylor, R.W.); Paluma (general) (Gray, M.); Ransome Reserve, 10 m (Queensland Museum Party); Rocky R., Cape York (Darlingtons); Russel R. at Bellenden Kerr Landing, 5 m (Earthwatch/Queensland Museum); Seaview Ra. (Mt. Fox Rd.), 600 m (Hamlet, S.); Scraggy Pt., Hinchinbrook I., 5m (Ward, P.S.); Shipton's Flat (S of Cooktown) (Darlingtons); South Johnston (Conleth, S.); Stanthorpe (Sutton, E.); State Forest 958 Bauple (House, A.P.N. & Vanderwoude, C.); Stradbroke Island [North Stradbroke Island] (Hacker, H.); Tamborine Mt. (Brown, W.L.); Toowoomba (Barnard, W.B.); Toowoomba (general)

(Barnard, W.B.); Toowoomba (Greaves, T.); Upper Lankelly Ck., Coen District (Monteith, G.B.); Ugly Gully, 11km SW Brisbane (Katz, D.); W. McNamee Ck, 400 m (Taylor, R.W. & Feehan, J.); Walkabout Creek, 8km W Brisbane, 163 m (Lucky, A.); Wallaman Falls Rd, 600 m (Monteith, Thompson & Hamlet); Wallaman Falls Road, 600 m (Hamlet, S.); Wallum, Cooloola (Room, P.M.); Warwick, Emu Ck. (Greenslade, P.J.M.).

#### *Worker measurements* (n = 11)

HL 1.94–2.43, HW 1.08–1.39, MFC 0.24–0.34, IOD 0.59–0.78, SL 3.62–4.35, EL 0.40–0.46, WL 3.61–4.52, PW 0.96–1.26, DPW 0.37–0.51, HTL 4.52–5.67, HTW<sub>min</sub> 0.14–0.19, HTW<sub>max</sub> 0.16–0.25, CI 0.54–0.64, SI 2.75–3.35, OI 0.11–0.13, HTC 0.61–0.88.

#### *Worker description*

Medium sized species (HL 1.94–2.43, HW 1.08–1.39) with head long and slender, excluding mandibles head less than twice as long as broad (CI 0.54–0.64). Head widest at eye level, sides of head subparallel, narrowing anteriorly, genae slightly concave. Posterior to eyes, head narrowing abruptly to dorsoventrally flattened neck-like constriction. Masticatory margin of mandible with 15 to 20 teeth and denticles interspersed. Anterior clypeal margin flat to weakly concave. Eyes positioned approximately at midline of head, eyes small, convex, hairless, not reaching lateral margins. Antennae long and slender, not compressed, scapes surpassing posterior margin of head by 2/3 their length.

Pronotum slender, elongate. Propodeum short, dorsal face of propodeum flat or with transverse impression at anterior end, declivitous face short and convex, propodeal angle very rounded. Petiole triangular in profile, posterior face with slight median longitudinal impression, dorsum rounded, posterior face longer than anterior face. Ventral surface of petiole nearly flat. Gaster elongate-elliptical. Legs very long and slender, not compressed.

Surface very finely shagreened and somewhat shining throughout. Mandibles with a coarse row of punctures along margin. Pubescence pale, sparse. Hairs minimal, confined to clypeus, venter and gaster, 0–5 brown bristles on hind tibiae. Body rufotestaceous with black gaster. Head and antennae rufotestaceous. Femora pale at base and sometimes throughout, but often the distal 1/4 to 3/4 of the femur is black. Tibiae and tarsi yellow, gaster black with the anterior portion of first segment and anal orifice pale yellow.

#### *Queen description*

Head broader than in worker. Three ocelli deeply set into head in triangular formation, the anteriormost one largest, the posterior two smaller. Pronotum, mesonotum and propodeum more voluminous than in worker. Dorsal face of propodeum convex, lacking transverse impression. Petiole broader than high, with flat dorsal face. Gaster globose, larger than in worker. Scapes, femora and tibiae robust.

Queen coloration similar to that of worker, but with only the first one or two segments of the gaster black, and the remainder rufotestaceous.

#### *Male measurements* (n = 11)

HL 1.57–1.92, HW 1.14–1.37, SL 0.38–0.50, EL 0.59–0.71, HTL 4.61–4.95, CI 0.68–0.77, SI 0.33–0.37, SI2 0.65–0.78.

#### *Discussion*

This species occupies the widest geographic range of all the *Leptomymex* species, extending from the base of the Cape York Peninsula in north Queensland to the northern border of New South Wales. Workers are slender and long-limbed. The black gaster and (usually) dark distal portions of the femora contrast with the otherwise pale orange head, mesosoma and appendages. In body size and coloration, this species resembles *L. cnemidatus* and *L. varians*. The pale tibiae of *L. rufipes* easily distinguish it from the others, which have dark

tibiae. The necklike constriction at the posterior margin of the head is also distinctive - this margin is broadly rounded in *L. cnemidatus*. In *L. varians* the head narrows beyond the eyes, but does not project into a dorsoventrally compressed 'neck'. Head shape is sufficient to distinguish *L. rufipes* from all congeners with the exception of its sister species, *L. ruficeps* and *L. rothneyi*. These species can be separated from *L. rufipes* based on color patterns and geographic range: *L. ruficeps* is black with a red head and restricted to the Wet Tropics and *L. rothneyi* is a mottled, dark species confined to the southeast corner of Queensland.

One *rufipes*-like worker from Callide Ck. Mine, Biloela (TERC) is exceptional in that the gaster is also pale orange, giving the specimen a unicolorous appearance. This might represent a distinct species but in the absence of any additional material we provisionally treat it as conspecific with *L. rufipes*.

Emery (1895) described *L. rufipes* from Laidley [as "Laidely"], Brisbane, but we have been unable to locate any type specimens. In the MSNG, which contains type material of all other *Leptomyrmex* described by Emery, there are three workers labeled "Kamerunga/Queensland" and "*L. varians* var. *rufipes*" in Emery's handwriting but these do not agree with the original description nor with the stated type locality. Emery's (1895) description of *L. rufipes*—with its reference to the posteriorly elongate head, rufotestaceous mesosoma and legs, and distally infuscated femora—eliminates all but one species of *Leptomyrmex* occurring in the vicinity of Laidley, Brisbane, and we have designated a neotype belonging to that species, from a location close to Laidley.

*L. rufipes* has been recorded in rainforest, mesophyll vine forest, *Eucalyptus* open forest, and wet and dry sclerophyll. Nests occur in cavities in live trees, on the ground at tree bases, in large open mounds, in or under logs, and under rocks.

### ***Leptomyrmex rufithorax* Forel, stat. nov.**

(Figs 18a–c, 23e, 24n)

*Leptomyrmex erythrocephalus* var. *rufithorax* Forel 1915: 83.

*Leptomyrmex erythrocephalus* subsp. *rufithorax* Forel; Wheeler 1934: 91. Description of male.

*Leptomyrmex erythrocephalus* subsp. *basirufus* Wheeler, 1934: 90. **Syn. nov.**

#### *Type material examined*

*L. erythrocephalus rufithorax* Forel. Syntypes, 3 workers, **Australia**, Queensland: Blackall Range (Mjöberg, E.) [MHNG; ANIC32-001986].

*L. erythrocephalus basirufus* Wheeler. Syntypes, 2 workers, **Australia**, Queensland: Buderim (Hacker, H.) [MCZ].

#### *Other material examined*

**AUSTRALIA: Queensland:** 15km ESE Gympie, 100 m (Ward, P.S.); 8km NE Landsborough, 10 m (Ward, P.S.); Buderim (Hacker, H.); Bundaberg (Lea, A.M.); Cania Gorge National Park (Gush, T.); Cooloola (general) (Room, P.M.); Cooloola [Natl. Pk.], Melita (Greenslade, P.J.M.); Cooloola Natl. Park, N. end, 140 m (Ward, P.S.); Cooloola Natl. Pk., Burwilla (Greenslade, P.J.M.); Cooloola Natl. Pk., Como Forestry HQ (Greenslade, P.J.M.); Cooloola Natl. Pk., Mutyi (Greenslade, P.J.M.); Cooloola Natl. Pk., Plowman (Greenslade, P.J.M.); Cooloola Natl. Pk., rainforest (Greenslade, P.J.M.); Cooloola Natl. Pk., Warrawonga (Greenslade, P.J.M.); Cooloola, Chalamban [Chalambar] (Greenslade, P.J.M.); Cooloola, Kabali E (Greenslade, P.J.M.); Coomिंगla SF, 12mi. NW Monto [Coominglah State Forest] (Lowery, B.B.); Coomिंगla St.For., N of Monto (Brown, W.L. & Brown, D.E.); Dingo Ck., 1km E Traveston, 80 m (Taylor, R.W. & Kohout, R.); Doongul State Forest (Gay, F.J.); Eumundi, 80 m (c.u.); Expedition Ra, Blackdown Tableland (Kohout, R.); Frazer Island (Dick, M. & Hunt, P.); Horseshoe Lookout, Blackdown Tableland, ESE Blackwater (Balderson & Vickery); Mapleton Falls (Taylor, R.W.); Mapleton Falls NP, 3km W Mapleton, 450 m (Lucky, A.); Monto

(Darlingtons); Montville, Blackall Rge. (Brown, W.L.); Mt. Tambourine (Lea, A.M.); Noosa NP, coastal track nr. Tea Tree Bay, 70 m (Lucky, A.); SW Biggenden (Darlingtons); Womalah State Forest (Gush, T.). **Dubious locality record: Queensland:** 8km W Bambaroo, Jourama Nat. Pk. (Meyer, R.P.).

*Worker measurements* (n = 10)

HL 2.17–2.36, HW 1.34–1.56, MFC 0.28–0.37, IOD 0.81–0.92, SL 3.73–4.07, EL 0.38–0.46, WL 4.04–4.35, PW 1.12–1.34, DPW 0.41–0.51, HTL 4.67–5.13, HTW<sub>min</sub> 0.14–0.21, HTW<sub>max</sub> 0.26–0.30, CI 0.61–0.66, SI 2.60–2.86, OI 0.09–0.11, HTC 0.47–0.77.

*Worker description*

Larger species (HL 2.17–2.36, HW 1.34–1.56) with broad head (CI 0.61–0.66). Head widest at eyes, sides of head convex around eyes, genae concave, posterior to eyes rounding to slightly narrowed flat postocular margin. Posterior portion of head lacking neck-like constriction. Masticatory margin of mandible with approximately 15 teeth and denticles interspersed. Anterior clypeal margin medially concave. Eyes positioned toward posterior part of head. Eyes small, round, hairless, not surpassing lateral margins of head. Antennal scapes not compressed, extending beyond the posterior margin less than 2/3 of their length.

Pronotum short. Declivity of propodeum about half the length of the dorsal face, dorsal face with transverse impression at anterior end, propodeal angle very rounded. Petiolar node triangular in profile, summit convex and rounded, with slight longitudinal impression on dorsum, anterior and posterior faces, anterior face slightly shorter than posterior face, ventral surface of petiole concave. Gaster elliptical-elongate. Legs somewhat compressed.

Body surface slightly shining, finely shagreened. Mandibles with a row of coarse punctures along margin. Pubescence fine. Greyish pilosity minimal, confined to clypeus, venter and gaster. Body and head rufotestaceous, with legs and gaster black. Head and antennae deep reddish orange, femora and tibiae dark brown, joints and tarsi yellow. Gaster black, but first segment rufotestaceous with dark outer margin.

*Queen description*

Head broader than in worker. Three ocelli deeply set into head in triangular formation, the anteriormost one largest, the posterior two smaller. Pronotum, mesonotum and propodeum voluminous, convex. Dorsal face of propodeum high, convex. Petiole broader than high, with distinct medial impression. Gaster globose, larger than in worker. Scapes, femora and tibiae broad, robust. Surface of body appearing dusty, not shining. Queen coloration as in workers.

*Male measurements* (n = 3)

HL 1.70–1.80, HW 1.26–1.33, SL 0.38–0.44, EL 0.62–0.63, HTL 4.26–4.50, CI 0.73–0.76, SI 0.29–0.33, SI2 0.66–0.76.

*Discussion*

Workers of *L. rufithorax* are large with a broad head that is round to flat at the postocular margin, and lacking a necklike constriction. The coloration of this species is distinctive: the head, mesosoma and first gastral tergite (3<sup>rd</sup> abdominal segment) are red, the distal 2/3 of the gaster and the legs, including the coxae, are black. This species occurs in central- and south-east Queensland, where its dark coxae in combination with pale mesosoma distinguish it from sympatric congeners. *L. rufithorax* may resemble some dark forms of *L. erythrocephalus* (in northern New South Wales), but in these forms the gaster is uniformly black and the femora are often pale basally. In *L. rufithorax* workers the femora and tibiae are entirely black, with joints and tarsi showing the only hint of orange.

*L. rufithorax* has been recorded in rainforest, wet sclerophyll and dry sclerophyll. Nests occur in soil, in and under logs, and under rocks.

*LeptomyrmeX tibialis* Emery, **stat. nov.**

(Figs 19a–c, 23f, 24o)

*LeptomyrmeX nigriventris* var. *tibialis* Emery, 1895: 351.

*LeptomyrmeX nigriventris* var. *tibialis* Emery; Wheeler, 1934: 96. Description of queen and male.

*LeptomyrmeX nigriventris* subsp. *tibialis* Emery; Wheeler, 1934: 96.

*LeptomyrmeX nigriventris* subsp. *hackeri* Wheeler 1934: 99. **Syn. nov.**

*Type material examined*

*L. nigriventris tibialis* Emery. Syntypes, 2 workers, **Australia**, Queensland: Laidley [as “Laidely”] (Podenzana) [MSNG]. One syntype here designated **lectotype** (CASENT0127374).

*L. nigriventris hackeri* Wheeler. Syntypes, 2 workers, **Australia**, Queensland: Stradbroke Island (Hacker, H.) [MCZ].

*Other material examined*

**AUSTRALIA: New South Wales:** 15km W Urbenville (Greenslade, P.J.M.); 1 mi. N Eungella, Murwillumbah, 500 ft (Lowery, B.B.); 25km NW Kyogle (Greenslade, P.J.M.); 7km NE Woodenbong, 520 m (Ward, P.S.); Acacia Plateau (McAreevey, J.); Acacia Plateau (Armstrong, J.); Acacia Plateau (Bugeja, J.); Boonoo SF (Bugeja, J.); Brooklana (Froggatt, W.W.); Brunswick Heads, 50 ft (Lowery, B.B.); Bruxner Pk, Coffs Harbour, 70 m (Taylor, R.W.); Cambridge Plateau (Bugeja, J.); Coffs Harbour dist., Pine Creek State Forest (Taylor, R.W.); Cyder Mountain (Hangay, G.); Dorrigo (Heron, W.); Dorrigo (Froggatt, W.W.); Dorrigo (Heron, W.); Dorrigo, 3000 ft (c.u.); Dorrigo Natl Park, 600 m (Ward, P.S.); Dorrigo NP, 4km SSE Dorrigo, 610 m (Lucky, A.); Dorrigo NP, E. end Blackbutt track, 710 m (Newton, A. & Thayer, M.); Forest Tops, Border Ranges NP, 850 m (Edwards, E.D.); Lismore (c.u.); Moobal SF, 500 ft (Lowery, B.B.); Mt. Warning (Williams, G. & Williams, T.); Murwillumbah area (Lowery, B.B.); N.E. Nat. Park [New England NP] (Harrington, S.); National Park Dorrigo, nr. Picnic Ground [Dorrigo National Park] (Giles, E.T.); New England Natl. Pk., 900 m (Olson, D.M.); Pine Creek State Forest, Coffs Harbour Dist. (Taylor, R.W.); Sheepstation Crk, Wiangaree S.F., 600 m (Newton, A. & Thayer, M.); The Dorrigo (Darlington); The Dorrigo, 3000 ft (Harvard Exp. Darlington); Yabba State Forest (Greenslade, P.J.M.). **Queensland:** 15 km ESE Gympie, 100 m (Ward, P.S.); 6km SSW North Tamborine, 500 m (Ward, P.S.); 7km NNW North Tamborine, 490 m (Ward, P.S.); 8km ESE North Tamborine, 500 m (Ward, P.S.); Binna Burra, 2800–3000 ft (Taylor, R.W.); Binna Burra, Lamington NP (Kohout, R.); Boombana NP, 440 m (Burwell, C.J.); Boombana NP, 440 m (Queensland Museum Party); Boombana NP, Brisbane, 1000 ft (Taylor, R.W.); Boombana, 24km WNW Brisbane, D'Aguiar NP, 420 m (Lucky, A.); Coomera R., Lamington N.P., 1200ft (Liepa, Z.); Cunninghams Gap (Greenslade, P.J.M.); Cunninghams Gap (Darlingtons); Cunningham's Gap, Mt. Cordeaux, 3000 ft (Taylor, R.W.); 'Gwinganna', 6km SW by S Talebudgera (Rentz, D., Lee, W. & Upton, M.); Gwongorella N.P. (Hebert, P.); Lamington [National Park] (Barnard, W.B.); Lamington Plateau, 800 m (Ward, P.S.); Lyon's Crossing, Nerang R., nr Numinbah (Campbell, T.G.); Maiala NP (Taylor, R.W.); Mary Cairn–Cross Pk, nr Maleny, 400 m (Ward, P.S.); Mt Glorious, 630 m (Taylor, R.W. & Kohout, R.); Mt Nebo (Taylor, R.W.); Mt. Glorious (general) (Hiller, A.); Mt. Nebo, Brisbane, 2000ft (Lowery, B.B.); Mt. Nebo, Mt. Tamborine & Mt. Coot-tha, 2000 ft (Lowery, B.B.); Mt. Tamborine (general) (Lowery, B.B.); Mt. Tambourine (Lea, A.M.); "National Park", 2500–4000ft (Hacker, H.); nr Kenilworth, 150 m (Taylor, R.W. & Kohout, R.); Obi Obi Crk. (Taylor, R.W.); Obi Obi R., Blackall Ra. (Brown, W.L.); O'Reilley's, Lamington NP, 920 m (Taylor, R.W. & Kohout, R.); Ravensbourne NP, 33km W Esk, 760 m (Lucky, A.); Ravensbourne NP, N of Toowoomba (Lowery, B.B.); SE Queensland (Lowery, B.B.); Stanthorpe (Sutton, E.); SW of Biggenden (Darlingtons); Tamborine Mts (Froggatt, W.W.); Tomewin (Lowery, B.B.); Toowoomba (Greaves, T.); Toowoomba (general) (Barnard, W.B.); v. Woodenbong (Darlingtons); Warrie N.P. (Hebert, P.). **Dubious locality record: New South Wales:** Myall Lakes (Greenslade, P.J.M.).

#### *Worker measurements* (n = 10)

HL 2.31–2.63, HW 1.68–1.96, MFC 0.37–0.47, IOD 0.98–1.16, SL 3.77–4.30, EL 0.43–0.52, WL 4.51–5.13, PW 1.46–1.64, DPW 0.53–0.68, HTL 4.96–5.89, HTW<sub>min</sub> 0.12–0.21, HTW<sub>max</sub> 0.35–0.43, CI 0.71–0.79, SI 2.02–2.26, OI 0.09–0.11, HTC 0.34–0.49.

#### *Worker description*

As in *L. nigriventris*, but generally larger (HW 1.68–1.96; WL 4.51–5.13 vs. *L. nigriventris* HW 1.49–1.76; WL 4.32–4.98), with head broader (CI 0.71–0.79 vs. CI 0.66–0.75). Tibiae are dark (vs. rufotestaceous) and more distinctly compressed (HTC 0.34–0.49 vs HTC 0.52–0.66).

#### *Queen description*

Head broader than in worker. Three ocelli deeply set into head in triangular formation, the anteriormost one largest, the posterior two smaller. Pronotum, mesonotum and propodeum voluminous, convex. The anterior portion of the mesonotum elevated, the posterior portion with a narrow impression before rising to the metanotal suture. Dorsal face of propodeum slightly concave. Petiole broader and higher than long, with a longitudinally grooved summit. Gaster nearly as high as long, somewhat laterally compressed, larger than in worker. Scapes, femora and tibiae broad, robust.

Surface of body subopaque, shagreened. Queen coloration similar to that of worker ; distal portions of femora deep black.

#### *Male measurements* (n = 4)

HL 1.77–1.98, HW 1.39–1.61, SL 0.72–0.78, EL 0.68–0.79, HTL 4.74–5.14, CI 0.74–0.82, SI 0.47–0.54, SI2 1.26–1.46.

#### *Discussion*

The largest of the *Leptomyrmex* species, *L. tibialis* can be identified by its large body size (HW 1.68–1.96; WL 4.51–5.13), broad head (CI 0.71–0.79), the 10+ standing hairs on the posterior face of the hind tibia, and its distinctive coloration. The majority of the body is rufotestaceous, with only the gaster, tibiae and distal portions of femora black. This species can be distinguished from its sister species by tibial coloration (pale in *L. nigriventris*; dark in *L. tibialis*) and by more pronounced tibial compression in *L. tibialis* (HTC 0.34–0.49 vs. HTC 0.52–0.66 in *L. nigriventris*). These two species co-occur in the region of Dorrigo, New South Wales.

In the original description of *L. tibialis* Emery (1895) stated that it was “recolté dans le nord du Queensland par M. Podenzana” but this is an evident error since this species does not occur in north Queensland. Moreover, the apparent syntype series in MSNG is from Laidley, in southern Queensland. The series comprises two workers of what is here interpreted as *L. tibialis* (agreeing with the original description, particularly with regard to tibial compression) and three workers of *L. cnemidatus*. To fix the identity of this species we have designated one of the non-*cnemidatus* workers as the lectotype.

*L. tibialis* has been recorded in rainforest, wet sclerophyll and dry sclerophyll. Nests occur in cavities in live or dead trees, and in soil at tree bases.

### *Leptomyrmex unicolor* Emery

(Figs 20a–c, 24p)

*Leptomyrmex unicolor* Emery, 1895: 352, fig. 3.

*Leptomyrmex unicolor* Emery; Wheeler & Wheeler, 1951: 180. Description of larva.

See also: Wheeler 1915: 261; Wheeler 1934: 108.



*Type material examined*

*L. unicolor* Emery. Syntypes, 4 workers, **Australia**, Queensland: Cairns (Podenzana) [MSNG]

*Other material examined.*

**AUSTRALIA: Queensland:** 1.5km NW Cape Tribulation (site 1) (Monteith, G.B.); 2.0km WNW Cape Tribulation (site 2), 50 m (Monteith, G.B.); 2.5km W Cape Tribulation (site 5), 180 m (Monteith, G.B., Yeates & Thompson); 2.7km W Cape Tribulation (site 5A), 400 m (Monteith, G.B.); 2.7km W Cape Tribulation (site 5A), 400 m (Monteith, G.B., Yeates & Thompson); 3.0km W Cape Tribulation (site 6), 500 m (Monteith, G.B.); 3.0km W Cape Tribulation (site 6), 500 m (Monteith, Yeates & Thompson); 3.5km W Cape Tribulation, 600 m (Ward, P.S.); 3.5km W Cape Tribulation, 600 m (Wild, A.L.); 3.5km W Cape Tribulation (site 7), 680 m (Monteith, G.B.); 3.5km W Cape Tribulation (site 7), 680 m (Monteith, Yeates & Thompson); 3.0mi. W of Mossman (Common, I.F.B. & Upton, M.S.); 7km SSW Cape Tribulation, 10 m (Ward, P.S.); 8km SSW Cape Tribulation, 30 m (Ward, P.S.); Barron Falls N.P. (Hebert, P.); Barron Falls N.P., 350 m (Ward, P.S.); Black Mt. Rd., Kuranda, 1200 ft (Taylor, R.W.); Black Mt. Rd., v. Kuranda (Darlingtons); Cairns (Bourne, E.H.); Cairns (general) (c.u.); Cairns Dist. (Dodd, F.D.); Cape Tribulation (Furth, D.G.); Cooper Creek, nr. Daintree (Taylor, R.W. & Feehan, J.E.); Daintree NP, Mt. Sorrow, 700 m (Lucky, A.); Daintree NP, Mt. Sorrow, 450 m (Lucky, A.); Daintree NP, Mt. Sorrow, 350 m (Lucky, A.); Emmagen Creek, 5.0 km N Cape Tribulation (Monteith, Yeates & Thompson); Gap Ck., 5km ESE Mt. Finnegan (Naumann, I.D.); Gap Ck., 5km ESE Mt. Finnegan (Feehan, J.E.); Henrietta Ck., Palmerston NP [Wooroonooran NP], 350 m (Ward, P.S.); Kuranda (Filewood, P.); Kuranda (Greaves, T.); Kuranda (Bourne, E.H.); Kuranda, 1000 ft (Taylor, R.W.); Kuranda (Wheeler, W.M.); Kuranda (Brown, W.L.); Kuranda (Dodd); Kuranda (Darlingtons); Kuranda (Hölldobler, B.); Kuranda (general) (Lowery, B.B.); Malanda (Bourne, E.H.); Moses Creek, 4km NE Mt. Finnegan (Cardale, J.); Mossman Bluff Track, 5–10km W Mossman, 360 m (Monteith, Thompson & ANZSES); Mossman Bluff Track, 5–10km W Mossman, 480 m (Monteith, Thompson & ANZSES); Mossman Bluff Track, 5–10km W Mossman, 600 m (Monteith, Thompson & ANZSES); Mossman Gorge (Lowery, B.B.); Mossman Gorge, 3 mi. E Mossman [prob. W] 200 ft (Taylor, R.W.); Mt. Alexander, NW of Daintree (Darlingtons); Mt. Lewis, 7km NW Julatten, 900 m (Lucky, A.); Mt. Webb NP (Feehan, J.E.); Mt. Windsor Tableland, 950 m (Taylor, R.W.); Mts. nr Mossman (Darlingtons); nr. Kuranda, 430 m (Taylor, R.W. & Feehan, J.E.); Shipton's Flat (Feehan, J.E.); Shipton's Flat, S of Cooktown (Darlingtons); Spear Creek (Davies & Raven); Stony Creek (Feehan, J.E.); Stony Creek, nr. Shipton's Flat (Feehan, J.E.); Thornton Range, 150–180 m (Taylor, R.W. & Feehan, J.E.). **Dubious locality records: Queensland:** Blackall Ranges [Range] (Feehan, J.E.); **Victoria:** Heathcote Junction (Dixon, J.E.).

*Worker measurements* (n = 10)

HL 1.79–1.99, HW 1.37–1.51, MFC 0.25–0.31, IOD 0.67–0.77, SL 3.54–3.91, EL 0.39–0.44, WL 3.27–3.73, PW 1.05–1.21, DPW 0.34–0.40, HTL 3.99–4.84, HTWmin 0.12–0.17, HTWmax 0.23–0.27, CI 0.72–0.80, SI 2.58–2.74, OI 0.08–0.10, HTC 0.45–0.70.

*Worker description*

Large species (HL 1.79–1.99; HW 1.37–1.51) with broad head (, CI 0.72–0.80), excluding mandibles head width 3/4 of length. Head widest at eye level, sides of head broadly convex with concave genae. Postocular margin broadly rounded. Masticatory margin of mandible with approximately 7 large teeth interspersed with 10 denticles. Anterior clypeal margin concave. Eyes positioned posterior to midline of head, small, not surpassing margin of head. Pilosity on eyes distinct. Antennal scapes somewhat flattened, extending beyond posterior margin nearly 3/5 of their length.

Pronotum rather short, less than 1.5 times as long as broad. Dorsal face and declivity of propodeum subequal in length, dorsal face convex in profile, angle broadly rounded. Petiole narrow, with low rounded node,

posterior and anterior slopes subequal, ventral surface of petiole feebly convex. Gaster slender, more than three times as long as broad. Legs slender, tibiae very slightly flattened.

Surface subopaque, finely and densely shagreened. Mandibles smooth and shining along apical borders and at tips, with a few coarse punctures. Pilosity mostly on clypeus, mandibles and venter, prominent black hairs on coxae, abundant minute oblique black hairs on scapes and legs. Eyes distinctly hairy. Body, femora and tibiae black, with bluish-green reflections. Mandibles and labium brownish yellow, antennal scapes black, with apical 1/4th brown. Metatarsi white, remaining tarsal joints, tibial spurs and funiculi yellowed.

#### *Queen*

UNKNOWN.

#### *Male measurements* (n = 2)

HL 1.67–1.68, HW 1.03–1.09, SL 0.41–0.43, EL 0.69–0.71, HTL 3.98–4.07, CI 0.62–0.65, SI 0.39–0.40, SI2 1.07–1.08.

#### *Discussion*

This species is restricted to the Australian Wet Tropics, where it can be easily distinguished from its sympatric congeners (*L. rufipes*, *L. ruficeps* and *L. mjobergi*) by its large body and broad head, which are covered with dense pubescence. The eyes are distinctly hairy, and the coloration is uniformly black, with contrasting white tarsi.

*L. unicolor* has been recorded in rainforest and wet sclerophyll. Nests occur in soil, in or under logs, and in leaf litter at base of live trees.

### *Leptomyrmex varians* Emery

(Figs 21a–c, 24q)

*Leptomyrmex varians* Emery, 1895: 352, fig. 3.

*Leptomyrmex erythrocephalus* var. *decipiens* Wheeler, 1915: 268. **Syn. nov.**

*Leptomyrmex erythrocephalus* subsp. *decipiens* Wheeler; Wheeler, 1934: 90. Description of male.

*Leptomyrmex varians* st. *angusticeps* Santschi, 1929: 93, fig. 3. **Syn. nov.**

#### *Type material examined*

*L. varians* Emery. Syntypes, 2 workers, **Australia**: Queensland: Rockhampton (probably E. Dämel) [MSNG]. One syntype here designated **lectotype** (CASENT0127378).

*L. erythrocephalus decipiens* Wheeler. Syntypes, 6 workers, **Australia**: Queensland: Gin Gin (Froggatt, W.W.) [MCZ].

*L. varians angusticeps* Santschi. Syntypes, 3 workers, **Australia**: Queensland: Byfield (Barrett, C.) [NHMB]. [Note that Santschi (1929) described workers; the male symbol at the beginning of the description is apparently a typographical error].

#### *Other material examined*

**AUSTRALIA: Queensland:** 10 km N Taroom (Lowery, B.B.); 14 km WSW Yeppoon, 40 m (Ward, P.S.); 18 km SW Walkerston (Lowery, B.B.); 20 km N Yeppoon (Bugeja, J.); 25 mi. NNW Taroom (Dowse, J.E.); 30 mi. W Emerald (Lowery, B.B.); 34 mi. NE Clermont (Lowery, B.B.); 5 km NE Mt. Morgans, 300 m (Taylor, R.H. & Weir, T.A.); 50 mi W Rockhampton (Darlingtons); 6 mi. N Taroom (Dowse, J.E.); 8 km SW Kuttatbul, 120 m (Ward, P.S.); 80–100 mi S Sarina (Darlingtons); Anakie, 30 mi W Emerald (Lowery, B.B.);

Biloela (c.u.); Bundaberg (Cudmore, F.A.); c. 20–50mi NW Gayndah (Darlingtons); c. 40 mi S Mackay (Darlingtons); c. 55mi N Marlborough (Darlington); Calliope (Harrington, S.A.); Canns Camp Ck., White Mountains NP (Andersen, A.); Carnarvon Gorge (c.u.); Carnarvon Gorge, 400 m (Ward, P.S.); Clermont (c.u.); Dawes, 20 mi SE Biloela (Lowery, B.B.); Dawson R. (c.u.); Expedition Ra, Blackdown Tableland (Kohout, R.); Gayndah (c.u.); Gin Gin (Beaglehole); Gympie (c.u.); Isla Gorge N. P. 50km N Taroom (Lowery, B.B.); Miles (Lowery, B.B.); Nanago (c.u.); Nanago (Lowery, B.B.); nr. Marlborough (Rakemann, D.); nr. Nebo, 50 mi SW Mackay (Lowery, B.B.); Palm Park, 3.5 mi ESE Byfield (Campbell, T.G. & Jealous, R.); Sarina (Beaglehole); St. Lawrence (c.u.); St. Lawrence (Cudmore, F.A.); Taroom (Lowery, B.B.); Wandoan (Lowery, B.B.); Woodgate N.P., 5 m (Ward, P.S.); Yeppoon (Carter, H.J.); Yeppoon (Lowery, B.B.). **Dubious locality record: New South Wales:** 1 mi. N Eungella, Murwillumbah, 600ft (Lowery, B.B.).

#### *Worker measurements* (n = 9)

HL 1.92–2.18, HW 1.04–1.19, MFC 0.22–0.28, IOD 0.61–0.70, SL 3.89–4.28, EL 0.36–0.43, WL 3.78–4.29, PW 1.01–1.18, DPW 0.37–0.52, HTL 4.77–5.53, HTWmin 0.13–0.16, HTWmax 0.20–0.31, CI 0.53–0.59, SI 3.31–3.82, OI 0.10–0.15, HTC 0.44–0.64.

#### *Worker description*

Medium sized species (HL 1.92–2.18; HW 1.04–1.19) with a distinctly narrow head (CI 0.53–0.59) excluding mandibles, nearly twice as long as broad. Head widest at eyes, sides of head nearly straight and parallel, posterior to eyes narrowing with straight sides toward posterior margin, forming a slightly constricted ‘neck’. Masticatory margin of mandible with approximately 25 small teeth mostly of uniform size, with larger teeth confined to anterior half. Anterior clypeal margin weakly convex. Eyes positioned approximately at midline of head, small, convex, hairless, surpassing margins of head. Antennal scapes very slender and terete, extending beyond posterior margin by nearly 2/3 of their length.

Pronotum slightly more than 1.5 times as long as broad. Declivity of propodeum very convex, about half the length of the dorsal face, which is flat to weakly concave in profile. Petiolar node triangular in profile with faint longitudinal impression on dorsal face of petiole. Posterior face of petiole longer than anterior face, angle rounded, ventral surface concave. Gaster narrow, elliptical. Legs very slender, tibiae mildly compressed.

Surface subopaque, very finely shagreened. Mandibles with a row of coarse punctures along apical border. Pubescence whitish, extremely short and fine hairs on mandibles and clypeus feebly developed. Long, coarse black hairs on venter sparse. Generally, head, thorax and antennae rufotestaceous, with antennal scapes and tips of mandibles dark brown, and with legs, including coxae, black. Tarsi yellow. Gaster, pronotum and sometimes a spot on the mesonotum black. Some series, however, are brownish-black, with a slight bluish sheen, and only the antennae, tarsi and anterior third of head are lighter (e.g. specimens from Isla Gorge NP, 50km N Taroom and White Mountains NP).

#### *Queen*

UNKNOWN

#### *Male measurements* (n = 4)

HL 1.53–1.58, HW 1.12–1.16, SL 0.34–0.37, EL 0.55–0.61, HTL 4.22–4.71, CI 0.72–0.75, SI 0.30–0.32, SI2 1.01–1.11.

#### *Discussion*

*L. varians* is a distinctly slender and elongate species that occurs in southeastern to central Queensland, from approximately Brisbane to Mackay, in a broad arc that sweeps inland. This species tolerates drier habitat than most other species in the genus. Coloration is usually pale orange with contrasting black legs, including

coxae but excluding tarsi, and dark brown antennal scapes and tips. This species may be confused with two other pale-bodied congeners with which it is sympatric in southeast Queensland, *L. cnemidatus* and *L. rufipes*. Distinguishing *L. varians* from these species are the entirely dark coxae, femora and tibiae; in *L. cnemidatus* the coxae and proximal portion of femora are pale and in *L. rufipes* the tibiae are pale. Furthermore, the narrowed, but not constricted or projecting posterior margin of the head in *L. varians* is unlike that in *L. cnemidatus* (broadly rounded) or *L. rufipes* (constricted and projecting).

*L. varians* has been recorded in dry sclerophyll and *Eucalyptus*, *Casuarina*, *Melaleuca* and *Callitris* open forests. Nests occur as large or small craters in soil, in the open, or at the base of live trees.

***Leptomymex wiburdi* Wheeler**  
(Figs 22a–c, 23g, 24r)

*Leptomymex wiburdi* Wheeler, 1915: 272, fig. 7.

*Leptomymex wiburdi* var. *pictus* Wheeler, 1915: 273. **Syn. nov.**

*Leptomymex wiburdi* subsp. *pictus* Wheeler; Wheeler, 1934: 101.

*Leptomymex wiburdi* Wheeler; Wheeler, 1934: 99. Description of male.

*Leptomymex pictus* Wheeler; Wheeler & Wheeler, 1966: 728. Description of larva.

*Type material examined*

*L. wiburdi* Wheeler. Syntypes, 14 workers, **Australia**: New South Wales: Jenolan Caves (Wiburdi, J.C.) [LACM, MCZ].

*L. wiburdi pictus* Wheeler. Syntypes, 5 workers, **Australia**: New South Wales: Bulli Pass (Wheeler, W.M.) and Katoomba (Wheeler, W.M.) [MCZ].

*Other material examined*

**AUSTRALIA: New South Wales:** 12km W Wombeyan Caves, 3100 ft (Lowery, B.B.); 15km W Wombeyan Caves, 3000 ft (Lowery, B.B.); 1km NNW Mt. Keira, 380 m (Ward, P.S.); 2 mi E Berry, 100ft (Lowery, B.B.); 2km N Mt. Keira, 360 m (Ward, P.S.); 2km N Mt. Keira, on Mt. Keira Rd 0.7km S of jct. with Mt. Ousley Rd., 360 m (Shattuck, S.O.); 3km SSW Blackheath, 800 m (Ward, P.S.); 3km W of Mt. Keira (Gush, T.); 4 km W Durras (Lowery, B.B.); 4km N Moruya (Lowery, B.B.); 4km NE Bulahdelah, 100 m (Ward, P.S.); 5km SSW Blackheath, 680 m (Ward, P.S.); 9km NE Bateman's Bay, 20 m (Ward, P.S.); 9km NE Batemans Bay, West Side Hwy 1, ca. 0.5km N Durras Rd., 20 m (Shattuck, S.O.); Bouddi NP, Maitland Bay (Lowery, B.B.); Bulli (Hill, G.F.); Cambewarra Mountain, 2000 ft (Lowery, B.B.); Chain Bay (Imai, H.T.); Clarence (Gush, T.); Colo Vale, nr. Mittagong (Gush, T.); Currowan SF, W of Nelligen (Lowery, B.B.); Dorrigo (Darlington); Dorrigo (Heron, W.); Dorrigo NP, 600 m (Ward, P.S.); Dorrigo NP (Nauman, I. & Cardale, J.); Dorrigo NP 4km SSE Dorrigo, 610 m (Lucky, A.); Doyles River State Forest, 620 m (Ward, P.S.); Durras (Shattuck, S.O.); Durras Lakes, Batemans Bay (Greaves, T.); Eastern Foothills, Clyde Mt (Riek, E.F.); Eastern slopes, Clyde Mt (Lowery, B.B.); Echo Pt. Katoomba, 700 m (Ward, P.S.); Echo Pt. Katoomba, 940 m (Ward, P.S.); Flat Rock State Forest (Gush, T.); Forest Path, Royal National Park, 35km SW Sydney, 123 m (Lucky, A.); Kangaroo Valley (Riek, E.F.); Katoomba (Wheeler, W.M.); Kioloa Rest Area, Boyne S.F., 30 m (Ward, P.S.); Kurrajong (Taylor, F.H.); Lake Durras, 10 mi N Bateman's Bay (Lowery, B.B.); Merrica hut, Nadgee Reserve (Sugden, E.A.); Misty Mountain (Billen, J.); Mittagong, 2400 ft (Lowery, B.B.); Mossvale Rd., Cambewarra Range, 1km NE Beaumont, 178 m (Lucky, A.); Mt. Cambewarra, nr Nowra (Lowery, B.B.); Mt. Keira, 460 m (Ward, P.S.); Mt. Keira, 300 m (Ward, P.S.); Mt. Keira nr. Wollongong, 300 m (Ward, P.S.); Mt. Ousley nr. Wollongong, 350 m (Ward, P.S.); Mt. Tomah, 900 m (Ward, P.S.); Mt. Tomah, 900 m (Shattuck, S.O.); Mt. Wilson, 980 m (Ward, P.S.); Mt. Wilson, 3500 ft (Darlington); Mt. Wilson nr. Cathedral of Ferns, 980 m (Shattuck, S.O.); Ourimba State Forest, Wyong, 300ft (Lowery, B.B.); Perry's Lookdown to Blue Gum Forest, nr Blackheath (Lowery, B.B.); Rosedale beach (Lowery, B.B.); Rosedale, nr Bateman's bay (Lowery,

B.B.); Royal N.P., nr Garie Beach (Lowery, B.B.); Royal NP, Garie Beach, 150 ft (Lowery, B.B.); Saddleback Mountain, Kiama, 1000 ft (Lowery, B.B.); Wentworth Falls, 2800 ft (Wheeler, W.M.); Wentworth Falls NP, 2km SW Wentworth Falls, 850 m (Lucky, A.). **Dubious locality records: Queensland:** Cardstone (Carne & Britton); Forest Rd., nr. Ingham (Straatman, R.); **Victoria:** Millgrove (c.u.).

#### *Worker measurements* (n = 12)

HL 1.65–1.94, HW 1.15–1.33, MFC 0.27–0.36, IOD 0.70–0.86, SL 2.74–3.3, EL 0.36–0.45, WL 3.06–3.65, PW 0.94–1.15, DPW 0.30–0.43, HTL 3.32–3.88, HTW<sub>min</sub> 0.13–0.17, HTW<sub>max</sub> 0.22–0.26, CI 0.66–0.70, SI 2.29–2.64, OI 0.09–0.12, HTC 0.56–0.69.

#### *Worker description*

Relatively small species (HL 1.65–1.94; HW 1.15–1.33) with broad head (CI 0.66–0.70), excluding mandibles head width more than 3/5 of length. Head widest posterior to eyes, sides of head straight, narrowing anteriorly, genae slightly concave. Beyond eyes head broadly and distinctly rounding into posterior margin. Masticatory margin of mandible with approximately 20 teeth and denticles interspersed. Anterior clypeal margin medially concave. Eyes positioned posteriorly to midline of head, relatively large, hairless, not surpassing margins of head. Antennal scapes relatively short, not compressed, surpassing posterior margin of the head by less than 2/3 their length.

Pronotum stout, very convex. Dorsal face of propodeum more than twice as long as declivity, angle joining the two very broadly rounded. Propodeum with distinct transverse impression at anterior end. Petiole triangular in profile, dorsum with medial longitudinal impression, anterior face not much longer than posterior face, ventral surface of petiole distinctly projecting. Gaster elliptical. Legs relatively short, tibiae distinctly compressed.

Surface subopaque, very finely and densely shagreened. Mandibles slightly shining, coarsely punctate along apical border. Pubescence extremely fine, giving the body a pruinose appearance. Hairs few, confined to clypeus, mandibles and venter.

Coloration extremely variable; ranging from *erythrocephalus*-like to *rufipes*-like coloration, with many intermediate states apparently co-occurring. A common color pattern presents a rufotestaceous head obfuscated toward the postocular margin, mottled dark brown to black mesosoma and legs with joints and sutures pale, black gaster, and mandibles, antennae and tarsi rufotestaceous.

#### *Queen description*

Head broader than in worker. Three ocelli deeply set into head in triangular formation, the anteriormost one largest, the posterior two smaller. Pronotum, mesonotum and propodeum voluminous, convex. The anterior portion of the mesonotum with a slight medial bump. Dorsal face of propodeum raised, convex. Petiole broader than high. Gaster globose, larger than in worker. Scapes, femora and tibiae broad, robust. Surface of body appearing dusty, shagreened.

#### *Male measurements* (n = 4)

HL 1.39–1.48, HW 1.09–1.15, SL 0.48–0.54, EL 0.54–0.61, HTL 3.14–3.42, CI 0.76–0.81, SI 0.42–0.49, SI2 1.10–1.33.

#### *Discussion*

This species can be distinguished by its broad head, which is widest posterior of the eyes, short scapes and generally small size. *L. wiburdi* can be easily mistaken for *L. cnemidatus* or *L. erythrocephalus*, as the general body shape and round postocular portion of the head are similar amongst these three species which co-occur in New South Wales. There is no 'typical' color pattern that characterizes *L. wiburdi* workers, rather they take

on a variety of color patterns, including the typical patterns seen in *L. cnemidatus* and *L. erythrocephalus*; workers with different color forms have even been observed in a single nest. Many individuals possess mottled brown-black coloration on the head and mesosoma, which is not seen in either *L. cnemidatus* or *L. erythrocephalus*. *L. wiburdi* workers evidently mimic workers of co-occurring species of *Leptomyrmex*.

*L. wiburdi* has been recorded in rainforest, wet sclerophyll and dry sclerophyll. Nests occur in soil, in standing or fallen trees or snags, in stumps, and under rocks.

### † *Leptomyrmex neotropicus* Baroni Urbani

*Leptomyrmex neotropicus* Baroni Urbani, 1980: 4, fig. 1–5.

*Camponotus neotropicus* Wilson, 1985: 34. Combination in *Camponotus*

*Leptomyrmex neotropicus* Baroni Urbani & Wilson 1987: 2. Combination in *Leptomyrmex*

#### *Type material not examined*

*L. neotropicus* Baroni Urbani. Holotype [Do-996-K-1] and paratypes, totaling 10 workers from a single block of Dominican amber [SMNS].

#### *Other material examined*

**Dominican Amber:** 2 workers [PSWC, MCZ].

These amber specimens resemble *Leptomyrmex* in the following characters: hypostomal notch present and u-shaped, scapes exceeding the postocular margin by approximately half their length, many teeth and denticles, integument thin and lacking sculpture, limbs long and slender, body overall gracile, elongate. These characters suggest an affinity with the extant *Leptomyrmex* species, but given the disjunct distribution of the fossils and the living species it is likely that *L. neotropicus* belongs to a stem lineage of this genus, a fact which should be taken into account when using the fossils for age calibrations in phylogenetic studies. The sister group of *Leptomyrmex* is a clade comprised of the two Neotropical genera, *Forelius* and *Dorymyrmex*, and it has been suggested that *L. neotropicus* might represent a stem species in the latter clade (Ward *et al.* 2010).

### **Micro-*Leptomyrmex***

The following six species currently comprise the recently described micro-*Leptomyrmex*. All occur in eastern Australian rainforests. Further species belonging to this group are expected to occur in Australia and New Guinea. Details of these species, including descriptions, known geographic distributions, and a key to the identification of all known species can be found in Smith and Shattuck (2009).

#### ***Leptomyrmex aitchisoni*-group:**

*L. aitchisoni*

*L. burwelli*

*L. dolichoscapus*

*L. garretti*

*L. pilosus*

*L. ramorniensis*

## General Comments

The extant *Leptomyrmex* species are currently confined to eastern Australia and several nearby Pacific islands. However, the discovery of fossil specimens from the Dominican Republic (20my) and a supposedly related genus, *Leptomyrmula*, from Sicily (30my) led Wilson to describe the evolutionary history of this genus as a “considerable biogeographic anomaly” (Wilson, 1985). The assertion that extant species of *Leptomyrmex* are relicts of a lineage once widespread across the globe that have survived in the tropical refuges of Australasia (Wilson 1985; Baroni Urbani 1980; Baroni Urbani and Wilson 1978), is compelling, and similar biogeographic patterns are seen in other so-called ‘relictual’ lineages in Australia, New Guinea and New Caledonia (among them the ant subfamily Myrmeciinae (Ward and Brady, 2003)).

The sister group relationship of the winged micro-*Leptomyrmex* to the wingless macro-clade suggests that the loss of wings may have occurred relatively recently in this lineage, and that stem lineages (possibly including the fossil taxa mentioned above) may not necessarily have been wingless. These observations, in addition to the fact that the sister group of *Leptomyrmex* (i.e., (*Forelius* + *Dorymyrmex*)) also has winged queens, may help explain the proposed widespread former distribution. On the other hand a recent molecular phylogenetic analysis of the Dolichoderinae places *Leptomyrmex* firmly within a clade of species (tribe Leptomyrmecini) whose origins appears to be in the Neotropics, with two main dispersal events to Australia (Ward *et al.* 2010). This suggests that the Sicilian fossil *Leptomyrmula* is not part of this group.

## Conclusion

The macro-*Leptomyrmex* species represent a lineage of ants with great potential for future study. They are colorful, diurnal, fairly large, limited in geographic distribution and in number of species. They are now easily identifiable using the illustrated keys published in this revision. Because they are confined to intact rain forest and sclerophyll habitats, these ants are ideal candidates to serve as habitat indicators and are likely to be useful in establishing conservation priorities. There is also great potential to utilize these taxa in phylogeographic studies as the dispersal-limitations of the wingless queens, in combination with the highly dispersive males, are a rare combination in study systems.

Unfortunately, these same qualities that make the *Leptomyrmex* species favorable study subjects also render them highly vulnerable to habitat loss and the biotic changes that are expected to accompany climate change associated with global warming. It is our hope that the taxonomic clarification brought about by this revision will draw greater attention to and encourage study of this lineage of remarkable ants.

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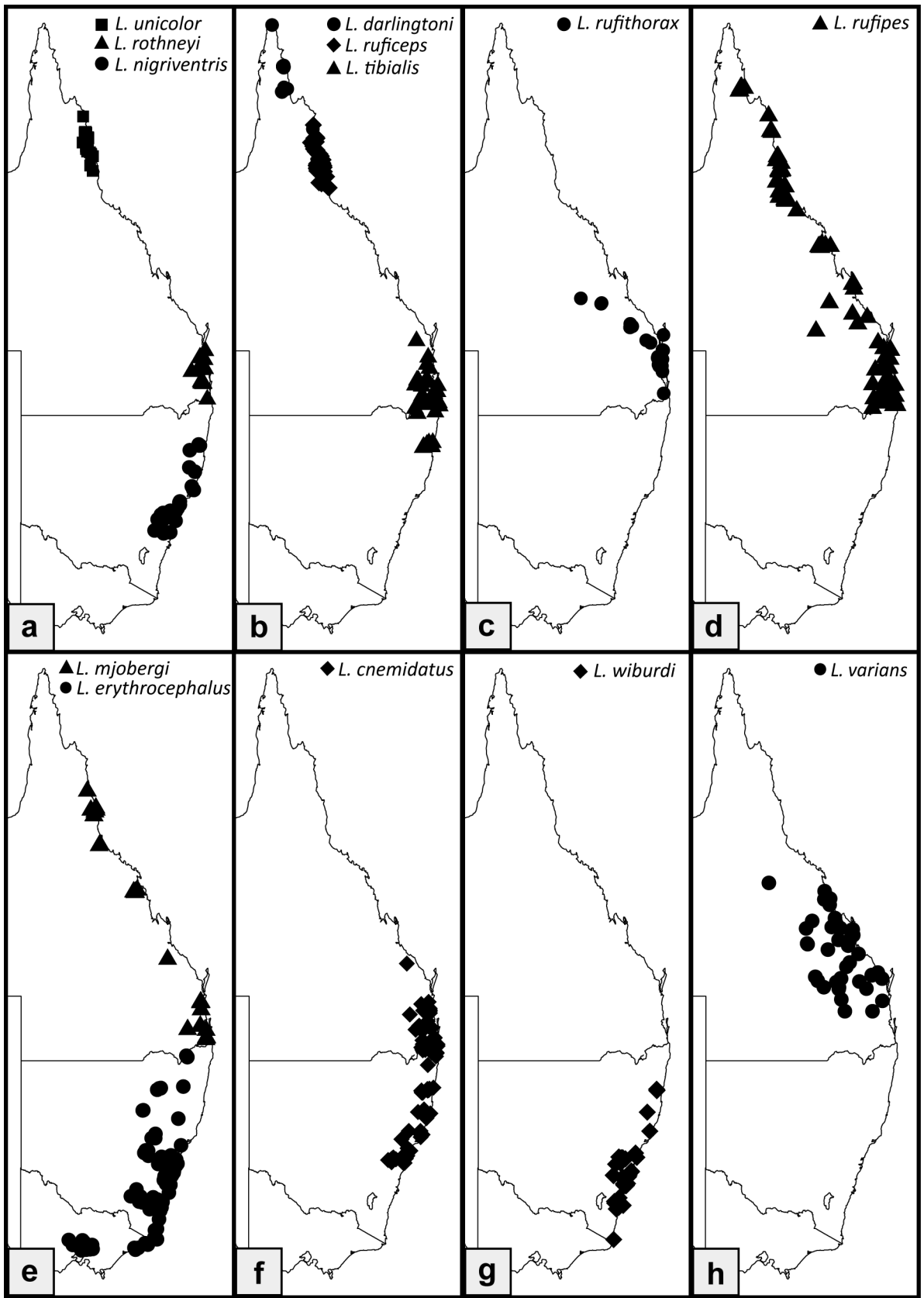


FIGURE 44. Geographic distribution of Australian macro-*Leptomyrmex*.



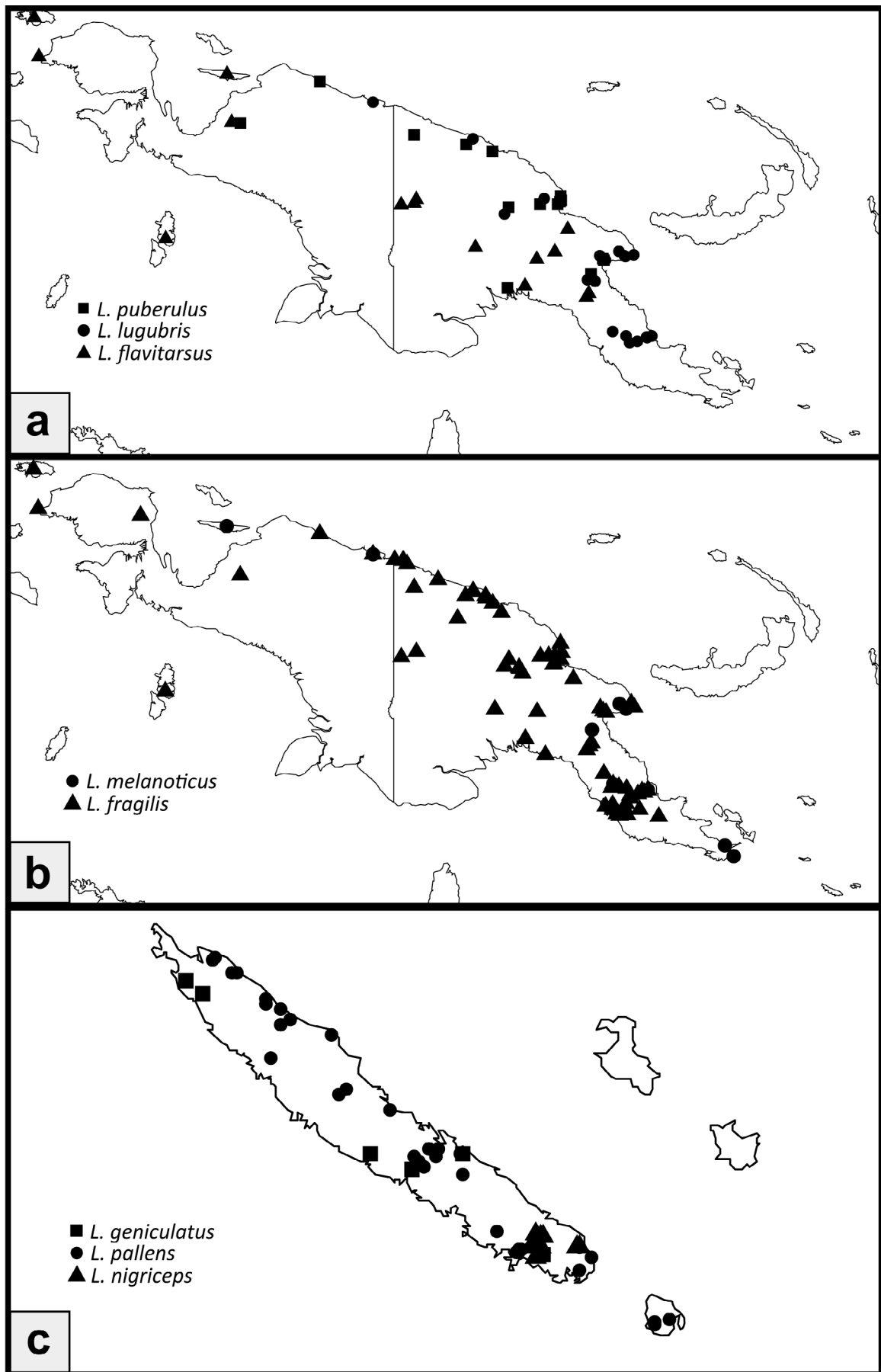


FIGURE 45. Geographic distributions of *Leptomyrmex* in New Guinea (a, b) and New Caledonia (c).

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