*Zootaxa* 903: 1–20 (2005)
www.mapress.com/zootaxa/


ISSN 1175-5326 (print edition)
**ZOOTAXA**
ISSN 1175-5334 (online edition)

**903**

# Review of the *Camponotus aureopilus* species-group (Hymenoptera, Formicidae), including a second *Camponotus* with a metapleural gland

STEVE SHATTUCK
*CSIRO Entomology, P.O. Box 1700, Canberra, ACT 2601, Australia*

## Abstract

The *Camponotus aureopilus* species-group is defined for the first time and revised at species level. The group contains nine known species: *aureopilus* Viehmeyer (with its new junior synonym, *velutinus* Stitz), *cyrtomyrmodes* Donisthorpe, *densopilus* new species, *flavocrines* Donisthorpe, *mussolinii* Donisthorpe, *posteropilus* new species, *subpilus* new species, *thadeus* new species and *xanthopilus* new species. All species are limited to Papua New Guinea except for *thadeus*, which is found in Queensland, Australia. The distinctive species *C. thadeus* is only the second in this large and widespread genus to possess a metapleural gland.

**Key words**: Taxonomy, Hymenoptera, Formicidae, *Camponotus*, metapleural gland, Australia, Papua New Guinea

## Introduction

*Camponotus* is the world's largest and most widespread ant genus. It contains over 1500 described species and subspecies (Bolton 1995) and occurs in essentially all terrestrial habitats where ants are found. Individual species range in size from moderately small to large, and from highly abundant and visible to rare and cryptic. The genus is certainly one of nature's great success stories.

The species examined here form a small group of distinctive species limited to Papua New Guinea and neighboring Queensland, Australia. They share a number of characters (see below) suggesting a close relationship, and one of them (*C. thadeus*, new species) is only the second species in the genus with a metapleural gland. This gland, one of the autapomorphies uniting the family Formicidae, has been lost in a handful of genera (Bolton 2003) including all but two known species of *Camponotus* (*C. gigas* and *C. thadeus*). While *C. gigas* is morphologically unusual for the genus (and is currently placed in the

*Accepted by J. Longino: 21 Feb. 2005; published: 18 Mar. 2005*

monotypic subgenus *Dinomyrmex* (Bolton 1995)), *C. thadeus* is very similar to the other species considered here, suggesting an independent reversal in the loss of this gland. Clearly a detailed phylogenetic analysis will be required to address this hypothesis critically, an undertaking well outside the current study.

These appear to be rare ants with most species known from very limited material or occurring in very limited geographic areas (in the case of *C. thadeus*). This currently restricts our ability to assess intraspecific variation as would be possible if additional material were available. However, the characters used in this study are based on those found to be useful in recognizing species of this genus occurring in Australia where extensive collections have been made and intraspecific versus interspecific variation can be assessed in detail (for example, Shattuck and McArthur 2002). A conservative approach has also been taken, with "solid" differences needed for species recognition. It is hoped that these factors will combine to provide a solid foundation for the taxonomy of these ants. Having said that, it is extremely likely that this study represents only a small fraction of the taxa occurring in this species-group and additional collecting in Papua New Guinea and eastern Indonesia will undoubtedly reveal many more species.

## Abbreviations of morphological terms

Size and shape characters were quantified and are reported as lengths or indices. Measurements were made with a stereo microscope using a dual-axis stage micrometer wired to digital readouts. The following measurements and indices are reported: CI, cephalic index (HW/HLx100); HL, maximum head length in full face view, measured from the anteriormost point of the clypeal margin to the midpoint of a line drawn across the posterior margin of the head; HW, maximum head width in full face view excluding the eyes; ML, mesosomal length measured from the anterior margin of the pronotal collar to the posterior extension of the propodeum lobes when viewed laterally; MTL, maximum length of mid tibia, excluding the proximal part of the articulation which is received into the distal end of the femur; SI, scape index (SL/HWx100); SL, length of the scape (first antennal segment) excluding the basal neck and condyle.

## Acronyms of museums

ANIC, Australian National Insect Collection, Canberra, ACT, Australia; BMNH, The Natural History Museum, London, UK; LACM, Natural History Museum of Los Angeles County, Los Angeles, California, USA; MCZC, Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA; QM, Queensland Museum, Brisbane, Queensland, Australia.

  

**The *Camponotus aureopilus* Species-Group**

Members of this species-group can be separated from most other species in the genus, and from all Old World species, by having either or both of the following characters: (1) head with an angle, ridge or strong inflection line running between the compound eye and the posterolateral corner, the area immediately below this ridge varying from weakly to strongly concave (Fig. 6); (2) the presence of numerous enlarged, closely spaced, elongate, finely barbed white or yellow hairs on the dorsum of the pronotum, mesonotum and/or gaster (Figs 24, 25). These hairs are found in dense groups and are present in all species with the exception of *cyrtomyrmodes* (in this species the posterolateral section of the head is strongly ridged dorsally and concave laterally). When present, these hairs will immediately identify these taxa among Old World *Camponotus*. A few New World species in the subgenera *Manniella*, *Myrmaphaenus* and *Myrmeurynota* share these characters (for example, *C. personatus* and *C. sphaericus*), but there is no evidence of close phylogenetic relationship between these two sets of taxa.

Donisthorpe (1936, 1941a, b), who described three of the species treated here, placed his species in the subgenus *Myrmophyma* and, as noted below, Emery (1925) considered *aureopilus* as belonging here as well. This is a South-east Asian and Australian subgenus containing just over 30 species (Bolton 1995). While not currently defined in any rigorous manner, all species share a similar head shape (straight-sided and either parallel or converging anteriorly) and either a compact, highly arched mesosoma (as in the *aureopilus* group) or an elongate body with a low propodeum (as in *ephippium* (Smith) and relatives). The *aureopilus* species-group, as treated here, is known to contain the following species:

*aureopilus* Viehmeyer
    *velutinus* Stitz, new synonym
*cyrtomyrmodes* Donisthorpe
*densopilus*, new species
*flavocrines* Donisthorpe
*mussolinii* Donisthorpe
*posteropilus*, new species
*subpilus*, new species
*thadeus*, new species
*xanthopilus*, new species

**Key to species of the *Camponotus aureopilus* Group based on major and minor workers**

1. Dorsum of mesosoma with fewer than 6 scattered hairs and lacking patches of enlarged hairs (Figs 5, 6); anterolateral pronotum projecting as a narrow ridge (Fig. 4) ..... *cyrtomyrmodes*

- Dorsum of mesosoma and/or gaster with at least a small patch of enlarged hairs (Fig. 9); anterolateral pronotum rounded, not ridged (Fig. 1) ..... 2
2. Metapleural gland present above the hind leg (Figs 24, 26); enlarged hairs on dorsum of mesosoma bright yellow (Figs 23, 24) (Australia) ..... *thadeus*
- Metapleural gland absent (Fig. 9); enlarged hairs on dorsum of mesosoma white (Figs 14, 15) or pale yellow-white (Figs 8, 9) (Papua New Guinea) ..... 3
3. Enlarged hairs absent from pronotum (but thin erect hairs present) (Figs 2, 3, 17, 18) 4
- Enlarged hairs present on pronotum (Figs 14, 15, 19, 20) ..... 6
4. Enlarged hairs on gaster limited to a small central cluster (Figs 2, 3) ..... *aureopilus*
- Enlarged hairs on gaster covering entire dorsal surface (or nearly so) (Figs 17, 18)... 5
5. Erect hairs on dorsum of mesosoma abundant (Fig. 18); dorsal surface of head reticulo-punctate and with a matte appearance; enlarged hairs on gaster more extensive (Fig. 17)..... *posteropilus*
- Erect hairs on dorsum of mesosoma fewer (Fig. 29); dorsal surface of head with very fine leather-like sculpturing and relatively shiny; enlarged hairs on gaster less numerous (Fig. 28) ..... *xanthopilus*
6. Enlarged hairs on pronotum covering the entire dorsal surface (Figs 14, 15) ..... 7
- Enlarged hairs on pronotum limited to a band along the central 1/3 of its width (Fig. 20) ..... 8
7. Enlarged pronotal hairs white (Figs 14, 15); pubescence on dorsum of head abundant and closely spaced (Fig. 13)..... *mussolinii*
- Enlarged pronotal hairs pale (but distinctly) yellow (Figs 8, 9); pubescence on dorsum of head thin and widely spaced (Fig. 7) ..... *densopilus*
8. Dorsal surface of head with abundant, closely spaced pubescence; mesonotum strongly arched and dorsum of mesosoma forming a strong arch with the propodeum relatively low (similar to Fig. 6); dorsum of gaster golden yellow, lighter in color than mesosoma ..... *flavocrines*
- Dorsal surface of head with scattered, widely spaced pubescence (Fig. 19); mesonotum weakly arched and dorsum of mesosoma forming a shallow arch with the propodeum relatively high (Fig. 21); dorsum of gaster the same colour as the mesosoma ..... ..... *subpilus*

### *Camponotus aureopilus* Viehmeyer (Figs 1–3)

*Camponotus* (*Myrmogonia*) *aureopilus* Viehmeyer 1914: 531. Worker syntypes from Rawlinson Mountains, Papua New Guinea (not examined).

*Camponotus* (*Myrmophyma*) *aureopilus* var. *velutina* Stitz 1938: 120. Two worker syntypes from north-eastern Papua New Guinea (specific locality unknown) (not examined). **New synonym**.

**Diagnosis (minor worker)**. Enlarged hairs absent from pronotum (but thin erect hairs present); enlarged hairs on gaster limited to a small central cluster.

  

Fig. 1

Fig. 2

Fig. 3

**FIGURES 1–3**. *C. aureopilus* Viehmeyer, minor worker. Fig. 1, front of head; Fig. 2, dorsum of mesosoma; Fig. 3, side of body.

**Description (minor worker)**. Posterolateral margin of head angular, the dorsal surface weakly convex, the lateral surface weakly concave, a ridge running from just below the eye to the posterolateral corner. Petiolar node tapering dorsally into a blunt angle. Individual erect hairs scattered on dorsum of mesosoma, petiole and gaster; enlarged yellow hairs present on central region of the gastral dorsum; pubescence abundant on entire body. Colour black, gaster dark red-black, legs dark red.

**Measurements**. Minor worker (n=2): CI 92–94, HL 1.80–2.21mm, HW 1.65–2.08mm, ML 2.78–3.19mm, MTL 2.06–2.25mm, SI 120–139, SL 2.29–2.50mm.

**Material Examined**. **Papua New Guinea**: Mt. Lina, Cyclops Mountains, 3,500ft. (Cheesman,L.E.) (LACM).

**Comments**. Emery (1925) transferred this species from the subgenus *Myrmogonia* (where it was originally placed) to *Myrmophyma*, with Santschi (1928) subsequently transferring it to *Thlipsepinotus*. Unfortunately the subgeneric classification within *Camponotus* is currently rather confused and subgeneric placements are difficult to assess rigorously. The queen was described by Stitz (1938), but little else is known about this species.

Stitz (1938) described *velutinus* as a subspecies of *aureopilus*, citing differences in the shape of the petiolar node to justify his new taxon. However, even with the limited material currently available this difference is slight and there appears to be little justification for recognising this taxon as distinct from *aureopilus*. Because of this *velutinus* is here treated as a synonym of *aureopilus*.

### *Camponotus cyrtomyrmodes* Donisthorpe (Figs 4–6)

*Camponotus* (*Myrmophyma*) *cyrtomyrmodes* Donisthorpe 1941a: 139. Two worker syntypes and one male syntype from Mafulu, Wharton Range, Papua New Guinea (BMNH, examined).

**Diagnosis (minor worker)**. Dorsum of mesosoma with fewer than 6 scattered hairs and enlarged hairs absent; anterolateral corners of pronotum strongly ridged.

**Description (minor worker)**. Posterolateral margin of head strongly concave with a strong ridge running between the eye and the posterolateral corner, the head widest at this ridge, slightly narrower just above the mandibular insertions and narrowest just below the eyes, the area between the ridges (the upper part of the head behind the eyes) forming an essentially flat surface, this surface extending onto the laterally expanded pronotum and flattened anterior mesonotum to form a single, broad "shield." Antennal scape long. Petiolar node low, block-like, the dorsal surface broadly convex. Pronotum, mesonotum, propodeum and petiole each with 2–4 erect hairs, hairs more abundant on head and gaster, enlarged hairs absent; pubescence present but thin and scattered. Colour red-black with legs yellow-red.

  

Fig. 4

Fig. 5

Fig. 6

**FIGURES 4–6.** *C. cyrtomyrmodes* Donisthorpe, minor worker. Fig. 4, front of head; Fig. 5, dorsum of mesosoma; Fig. 6, side of body.

**Measurements**. Minor worker (n=4): CI 93–98, HL 1.40–1.53mm, HW 1.37–1.45mm, ML 2.30–2.42mm, MTL 1.64–1.76mm, SI 152–158, SL 2.11–2.20mm.

**Material Examined**. **Papua New Guinea**: *Northern District*: 8km S Kokoda (Taylor, R.W.) (ANIC).

**Comments**. As noted by Donisthorpe (1941a), the worker of this unusual species superficially resembles species of *Polyrhachis* (*Cyrtomyrma*), especially in the overall shape of the mesosoma. However this shape is also shared by other members of this species-group as well as the apparently unrelated Australian *C. postcornutus* Clark (Shattuck and McArthur 2002) and is clearly convergent with *Polyrhachis*.

### *Camponotus densopilus* new species (Figs 7–12)

**Diagnosis (minor worker)**. Enlarged hairs on pronotum present, yellow and covering the entire dorsal surface; pubescence on dorsum of head thin and widely spaced.

**Description (minor worker)**. Posterolateral margin of head angular, the dorsal surface weakly convex, the lateral surface weakly concave (more so in smaller workers, less so in larger workers), a ridge running from the eye to the posterolateral corner. Petiolar node tapering dorsally into a blunt angle. Individual erect hairs scattered on dorsum of mesosoma, petiole and gaster; enlarged yellow hairs present on dorsal surface of pronotum; pubescence thin and scattered across entire body. Colour black, legs red-black.

**Description (major worker)**. Differing from minor worker in the enlarged head, higher, more angular propodeum and overall larger size. Other characters as in minor worker.

**Measurements**. Minor worker (n=3): CI 90–93, HL 1.73–2.06mm, HW 1.56–1.91mm, ML 2.87–3.00mm, MTL 1.99–2.17mm, SI 128–146, SL 2.27–2.45mm. Major worker (n=2): CI 101–105, HL 2.54–3.16mm, HW 2.56–3.31mm, ML 3.19–4.47mm, MTL 2.17–2.28mm, SI 71–90, SL 2.31–2.36mm.

**Material Examined**. Holotype worker and 17 worker paratypes from PT. Freeport Concession, Wapoga camp, 3,800ft., 3°14’S 136°57’E, Irian Jaya, Indonesia, 20 April 1998, R. R. Snelling, montane primary rainforest, foragers running on log (holotype and 11 paratypes in LACM, 2 paratypes in ANIC, 2 paratypes in BMNH, 2 paratypes in MCZC).

**Comments**. This species, known from a single collection, was found in rainforest where the workers were foraging on a log.

  

Fig. 7

Fig. 8

Fig. 9

**FIGURES 7–9.** *C. densopilus* new species, intermediate worker. Fig. 7, front of head; Fig. 8, dorsum of mesosoma; Fig. 9, side of body.

Fig. 10

Fig. 11

Fig. 12

**FIGURES 10-12.** *C. densopilus* new species, major worker. Fig. 10, front of head; Fig. 11, dorsum of mesosoma; Fig. 12, side of body.

  

### *Camponotus flavocrines* Donisthorpe

*Camponotus* (*Myrmophyma*) *flavocrines* Donisthorpe 1941b: 207. Holotype worker from Madew, St. Joseph River, Papua New Guinea (BMNH, examined).

**Diagnosis (minor worker)**. Enlarged hairs on pronotum present, limited to a band along the central 1/3 of its width; dorsal surface of head with abundant, closely spaced pubescence; mesonotum strongly arched and dorsum of mesosoma forming a strong arch with the propodeum relatively low (similar to Fig. 6); dorsum of gaster golden yellow, lighter in color than mesosoma.

**Description (minor worker)**. Lateral surface of head strongly concave with a strong angle or ridge running between the eye and the posterolateral corner, the head widest slightly above the eyes, slightly narrower just above the mandibular insertions and narrowest just below the eyes. Antennal scape very long, surpassing posterior margin of head by about three-fourths its length. Petiolar node low, block-like (the dorsal surface flat) and with a slight anterior tilt. Individual erect hairs scattered on dorsum of mesonotum, propodeum and gaster; enlarged yellow-white hairs present on central one-third of pronotum; pubescence abundant on head and dorsum of mesosoma, sparse on lateral mesosoma and gaster. Colour black with the posterior two-thirds of the gastral dorsum dark yellow.

**Comments**. This species is so far known only from the single type specimen.

### *Camponotus mussolinii* Donisthorpe (Figs 13–15)

*Camponotus* (*Myrmophyma*) *mussolinii* Donisthorpe 1936: 528. Two worker syntypes from Kokoda, Papua New Guinea (BMNH, examined).

**Diagnosis (minor worker)**. Enlarged hairs on pronotum present, white and covering the entire dorsal surface; pubescence on dorsum of head abundant and closely spaced.

**Description (minor worker)**. Posterolateral surface of head essentially flat and with a weak angle running between the eye and the posterolateral corner; a slight concavity is present just below this ridge near the posterolateral corner. Antennal scape long, surpassing posterior margin of head by about one-half its length. Petiolar node low, forming a blunt, rounded angle dorsally and with a slight anterior tilt. White erect hairs abundant on pronotum (but not as dense as the enlarged hairs found in other species), those on the mesonotum, propodeum, petiolar node and gaster less abundant but still numerous; appressed pubescence abundant on entire body. Colour black with legs red-brown.

**Measurements**. Minor worker (n=4): CI 90–92, HL 1.86–1.94mm, HW 1.68–1.77mm, ML 2.80–2.95mm, MTL 2.13–2.19mm, SI 139–163, SL 2.40–2.47mm.

**Material Examined**. **Papua New Guinea**: *Northern District*: Managalase plateau, ca. 30mi S Popondetta (Pullen,R.) (ANIC).

Fig. 13

Fig. 14

Fig. 15

**FIGURES 13–15.** *C. mussolinii* Donisthorpe, minor worker. Fig. 13, front of head; Fig. 14, dorsum of mesosoma; Fig. 15, side of body.

  

**Comments**. This species is similar to *C. thadeus* but differs in the colour of the erect body hairs and the abundant pubescence (the hairs are yellow and the pubescence sparse in *thadeus*) as well as in lacking the metapleural gland. It is so far known from only a limited number of collections, all from Papua New Guinea.

### *Camponotus posteropilus* new species (Figs 16–18)

**Diagnosis (minor worker)**. Dorsum of head finely reticulo-punctate and with a matte appearance; enlarged hairs absent from pronotum (but thin erect hairs present); entire dorsal surface of gaster covered with enlarged pale yellow hairs.

**Description (minor worker)**. Posterolateral surface of head rounding gradually from the dorsal to lateral surfaces. Petiolar node forming a sharp angle dorsally. Individual erect hairs abundant on dorsum of mesosoma, petiole and gaster; enlarged yellow hairs present on dorsal surface of first three gastral tergites; pubescence thin and sparse across entire body. Colour black, legs and gaster dark red-black.

**Measurements**. Minor worker (n=4): CI 91–97, HL 2.04–2.25mm, HW 1.85–2.18mm, ML 3.08–3.27mm, MTL 2.20–2.35mm, SI 110–132, SL 2.32–2.49mm.

**Material Examined**. Holotype worker and 18 worker paratypes from Mt. Kaindi, Wau District, Papua New Guinea, 28 May 1982, J.O. and P.J. Schmidt (holotype and 11 paratypes in LACM, 3 paratypes in ANIC, 2 paratypes in BMNH, 2 paratypes in MCZC). Additional material: **Papua New Guinea**: 6mi. W Aiyura, 5,300ft. (Emerson,A.) (ANIC, LACM); *Eastern Highlands District*: Awande (Wylie,F.R.) (ANIC).

**Comments**. The Aiyura specimens were collected from a beech tree crevice while the Awande specimens were in a rotten log in a rainforest.

### *Camponotus subpilus* new species (Figs 19–21)

**Diagnosis (minor worker)**. Enlarged hairs on pronotum present but limited to a band along the central 1/3 of its width; dorsal surface of head with scattered, widely spaced pubescence; mesonotum weakly arched and dorsum of mesosoma forming a shallow arch with the propodeum relatively high; dorsum of gaster the same colour as the mesosoma.

**Description (minor worker)**. Posterolateral margin of head angular, the dorsal surface weakly convex, the lateral surface weakly concave, a ridge running from the eye to the posterolateral corner. Petiolar node low, block-like, its dorsal surface broadly convex. Individual erect hairs scattered on dorsum of mesosoma, petiole and gaster; enlarged yellow hairs present on central one-third of pronotum; pubescence thin and sparse across entire body. Colour black, gaster black with a small pale yellow spots on the anterolateral corners of the second tergite, legs dark red-black.

Fig. 16

Fig. 17

Fig. 18

**FIGURES 16–18.** *C. posteropilus* new species, minor worker. Fig. 16, front of head; Fig. 17, dorsum of mesosoma; Fig. 18, side of body.

  

Fig. 19

Fig. 20

Fig. 21

**FIGURES 19–21.** *C. subpilus* new species, minor worker. Fig. 19, front of head; Fig. 20, dorsum of mesosoma; Fig. 21, side of body.

**Measurements**. Minor worker (n=3): CI 87–89, HL 1.89–2.07mm, HW 1.67–1.85mm, ML 3.20–3.30mm, MTL 2.21–2.24mm, SI 131–151, SL 2.43–2.57mm.

**Material Examined**. Holotype worker and 2 worker paratypes from PT. Freeport Concession, Wapoga camp, 3,800ft., 3°14'S 136°57'E, Irian Jaya, Indonesia, 29 April 1998, R. R. Snelling, montane primary rainforest, foragers on vegetation (holotype and 1 paratype in LACM, 1 paratype in ANIC).

**Comments**. The single known collection of this species consisted of workers foraging on vegetation in a rainforest. It is presumably arboreal nesting.

### *Camponotus thadeus* new species (Figs 22–26)

**Diagnosis (minor worker)**. Dorsum of mesosoma with abundant, bright yellow enlarged hairs; metapleural gland present.

**Description (minor worker)**. Posterolateral surface of head rounding gradually from the dorsal to lateral surfaces, the lateral surface weakly concave in smaller workers, convex in larger workers. Petiolar node forming a sharp angle dorsally and with a slight anterior tilt. Enlarged bright yellow hairs abundant on pronotum (except extreme anterior edge), mesonotum and gaster, those on the propodeum limited to near the angle; appressed pubescence present but sparse. Colour dark red-black to black.

**Measurements**. Minor worker (n=4): CI 84–92, HL 1.86–2.29mm, HW 1.57–2.08mm, ML 3.04–3.63mm, MTL 2.43–2.78mm, SI 162–194, SL 2.61–2.94mm.

**Material Examined**. Holotype worker and 11 worker paratypes from Mt. Finnigan summit, via Helenvale, 15°49'S 145°17'E, Australia, 16 May 2004, A.J.Shuetrim and M.Guzik (holotype and 5 paratypes in ANIC, 2 paratypes in BMNH, 2 paratypes in LACM, 2 paratypes in MCZC). Additional material: **Australia**: *Queensland*: 2.5km SW Mt. Hartley, 35km S Cooktown (Monteith, Yeates & Cook) (ANIC); Mt. Finnigan, 37km S Cooktown (Monteith, Yeates & Cook) (ANIC, LACM); Mt. Finnigan summit, via Helenvale (Monteith, Cook & Roberts) (ANIC); Mt Misery road, 15°53'S 145°13E, 730m (ANZSES Expedition) (QM); Mt Misery road, 15°53'S 145°13E, 500–850m (ANZSES Expedition) (QM).

**Comments**. This species is unusual in that it is only the second species of *Camponotus* known to have a metapleural gland, the other being the South-east Asian *C. gigas*. The opening to the gland is large and highly visible, in fact as large as any known in the ants. This is especially noteworthy as none of the other species examined here show any indication of a metapleural gland being present. Also, *thadeus* is morphologically distinct from *gigas*, sharing few characters with it and with little indication that they are closely related. It is therefore highly likely that this gland has reappeared independently in these two taxa.

The following observations were made by Angela Shuetrim (pers. comm.) while collecting the type series on Mt. Finnigan, Queensland:

  

Fig. 22

Fig. 23

Fig. 24

**FIGURES 22–24.** *C. thadeus* new species, minor worker. Fig. 22, front of head; Fig. 23, dorsum of mesosoma; Fig. 24, side of body.

"These ants are arboreal based on the nest I found. Nests are very difficult to locate but I was lucky enough to find one in a hollow cavity in a tree. The locality was in rainforest at high elevation, the lowest elevation where I found them being approximately 880m, and I never came across them in lowland rainforest areas. The vegetation changes frequently as you walk up the mountain and when you get to the right spot, and weather conditions are good, they can be found in high numbers running up trees along trails, and scattered across the rainforest floor."

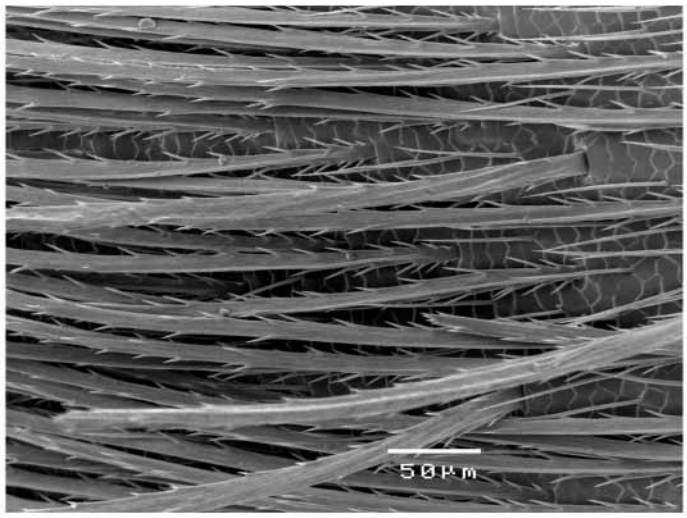


Fig. 25

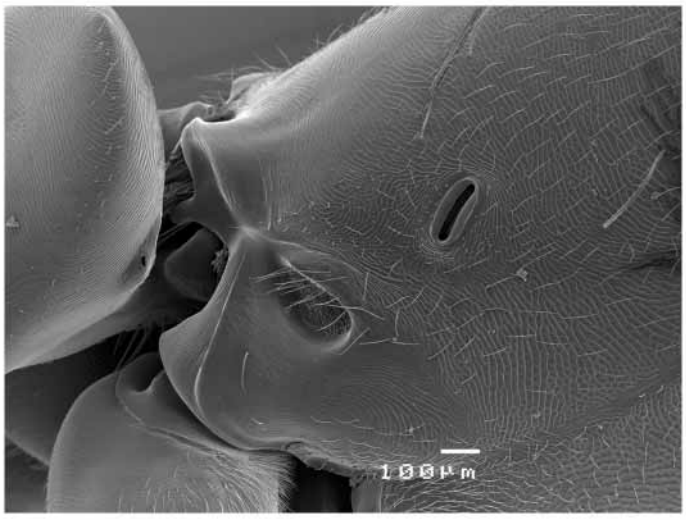


Fig. 26

**FIGURES 25–26.** *C. thadeus* new species, minor worker. Fig. 25, enlarged hairs on dorsum of gaster; Fig. 26, lateral view of propodeum showing propodeal spiracle and metapleural gland opening.

### *Camponotus xanthopilus* new species (Figs 27–29)

**Diagnosis**. Dorsum of head with very fine leather-like sculpturing and relatively shiny; enlarged hairs absent from pronotum (but thin erect hairs present); entire dorsal surface of gaster covered with enlarged pale yellow hairs.

  

Fig. 27

Fig. 28

Fig. 29

**FIGURES 27–29.** *C. xanthopilus* new species, major worker. Fig. 27, front of head; Fig. 28, dorsum of mesosoma; Fig. 29, side of body.

**Description (minor worker, damaged, with cracked pronotum)**. Posterolateral surface of head rounding gradually from the dorsal to lateral surfaces, the posteroventral surface very weakly concave. Petiolar node forming tapering dorsally into a blunt angle. Individual erect hairs scattered on dorsum of mesosoma, petiole and gaster; enlarged yellow hairs present on dorsal surface of first three gastral tergites; pubescence thin and sparse across entire body. Colour black, legs and gaster dark red-black.

**Description (major worker)**. Differing from minor worker in the typically broader head and more abundant hairs. Other characters as in minor worker.

**Measurements**. Minor worker (n=1, paratype): CI 95, HL 2.00mm, HW 1.89mm, ML 2.89mm, MTL 2.05mm, SI 124, SL 2.35mm. Major worker (n=1, holotype): CI 100, HL 2.31mm, HW 2.33mm, ML 2.97mm, MTL 2.04mm, SI 95, SL 2.21mm.

**Material Examined**. Holotype and paratype worker from Managalase area, 2500–3000ft., Northern District, Papua New Guinea, August 1965, R. Pullen (ANIC).

**Comments**. This species is known from a single collection of two workers. It was collected at a relatively high elevation in the same general area as *C. mussolinii*.

## Acknowledgments

I would like to thank B. Bolton for his kindness during my many visits to The Natural History Museum, Roy Snelling (LACM) for generously making material in his care freely available, Natalie Barnett (ANIC) for expertly preparing the full-colour illustrations, Simon Robson and Kevin Blake (James Cook Univ.) for preparing the SEM illustrations, Chris Burwell (Queensland Museum) for examining material in his care, and especially Angela Shuetrim (James Cook Univ.) for successfully tracking down *C. thadeus* on Mt. Finnigan. Helpful comments on the manuscript were received from Natalie Barnett, John LaPolla, Jack Longino, Bill Mackay, Archie McArthur, Angela Shuetrim, Roy Snelling and Phil Ward.

## References

Bolton, B. (1995) *A New General Catalogue of the Ants of the World*. Cambridge, Mass, 504 pp.

Bolton, B. (2003) Synopsis and classification of Formicidae. *Memoirs of the American Entomological Institute*, 71, 1–370.

Donisthorpe, H. (1936) Five new species of ants from various localities. *Annals and Magazine of Natural History*, (10) 18, 524–530.

Donisthorpe, H. (1941a) Descriptions of new species of ants from New Guinea. *Annals and Magazine of Natural History*, (11) 7, 129–144.

Donisthorpe, H. (1941b) Descriptions of new ants from various localities. *Annals and Magazine of Natural History*, (11) 8, 199–210.

Emery, C. (1925) Hymenoptera, Fam. Formicidae, subfam. Formicinae. *Genera Insectorum*, 183, 1–302.

Santschi, F. (1928) Nouvelles fourmis d'Australie. *Bulletin de la Société Vaudoise des Sciences Naturelles*, 56, 465–483.

Shattuck, S.O. & McArthur, A.J. (2002) A taxonomic revision of the *Camponotus wiederkehri* and *perjurus* species-groups (Hymenoptera: Formicidae). *Transactions of the Royal Society of South Australia*, 126, 63–90.

Stitz, H. (1938) Neue Ameisen aus dem indo-malayischen Gebiet. *Sitzungsberichte der Gesellschaft Naturforschender Freunde zu Berlin*, 1938, 99–122.

Viehmeyer, H. (1914) Papuanische Ameisen. *Deutsche Entomologische Zeitschrift*, 1914, 515–535.

  