*Zootaxa* 4105 (6): 501–545
http://www.mapress.com/j/zt/
Copyright © 2016 Magnolia Press

**Article**

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

http://doi.org/10.11646/zootaxa.4105.6.1
http://zoobank.org/urn:lsid:zoobank.org:pub:DCB6A5BB-46C9-4D05-8B4A-C6E4CBABB6F5

# The myrmicine ant genus *Metapone* Forel (Hymenoptera: Formicidae): a global taxonomic review with descriptions of twelve new species

ROBERT W. TAYLOR[1, 2] & GARY D. ALPERT[3]

[1] *Research School of Biological Sciences, Australian National University, Canberra, ACT, 2600, Australia*
[2] *Honorary Research Fellow, CSIRO National Collections, Canberra, ACT, 2601, Australia. E-mail: robert.taylor@anu.edu.au*
[3] *Entomology Department, Museum of Comparative Zoology, Harvard University, 26 Oxford Street, Cambridge, MA 02138, U.S.A. E-mail: gary_alpert@post.harvard.edu*

## Table of contents



*Accepted by J. Longino: 27 Jan. 2016; published: 27 Apr. 2016*

## Abstract

The 28 known species of *Metapone* are monographed and illustrated. Twelve are described as new: *M. africana,* Gabon; *M. balinensis*, Bali, Indonesia; *M. enigmatica*, northeast New Guinea; *M. hoelldobleri*, northeast Queensland, Australia; *M. javana,* Java, Indonesia; *M. manni*, Viti Levu, Fiji; *M. mathinnae*, Flinders Island, Tasmania, Australia; *M. philwardi*, northeast New Guinea; *M. salomonis*, Guadalcanal, Solomon Islands; *M. tecklini*, northeast Queensland; *M. titan*, New Ireland, Papua New Guinea; *M. wallaceana*, Lombok, Indonesia; **spp.n**. New synonymies include *M. greeni* Forel = *M. johni* Karavaiev (Sri Lanka) **syn.n**, and *M. jacobsoni* Crawley (Sumatra) = *M. nicobarensis* Tiwari & Jonathan (Great Nicobar Island) **syn.n**.


**Key words:** Ants, taxonomy, Madagascar, Africa, Taiwan, Australia, Micronesia, Melanesia, Isoptera, termites, social parasitism, predation

## Introduction

*Metapone* is a genus of myrmicine ants known from tropical Africa, Madagascar, Sri Lanka, the Philippines, archipelagic Southeast Asia, Melanesia east to Fiji and Eastern Australia. Until recently it was the sole genus of tribe Metaponini to which it was allocated when first described. Its taxonomic history, including spurious past assignments to subfamilies Ponerinae and Cerapachyinae (Emery, 1912; Kusnezov, 1960) was reviewed by Bolton (2003: 267).

The current phylogenetically-based myrmicine reclassification of Ward *et.al* (2014) subsumed the Metaponini (among other tribes) into a greatly expanded tribe Crematogastrini. There *Metapone* is sister to the monotypic Southeast Asian genus *Liomyrmex* Emery, and these genera form a clade with the Australasian *Podomyrma* Fr. Smith and the New Zealand endemic *Huberia* Forel.

*Metapone* is readily identified using the keys of Hölldobler and Wilson (1990), Bolton (1994) and Shattuck (1999). Bolton (2003: 71) cites the following diagnostic apomorphies for the genus within subfamily Myrmicinae: (1) Procoxa smaller than mesocoxa and metacoxa; (2) Metafemur extremely anteroposteriorly compressed, extremely deep in anterior view; (3) metatibia and basitarsi of all legs with traction spines; (4) presclerites of abdominal segment IV very large; and (5) articulation of abdominal segments III and IV very broad.

*Metapone* is now known to range at least from Gabon and Madagascar, eastwards to Sri Lanka and the Nicobar Islands, Sumatra, Borneo, Java, Bali and Lombok, and from Taiwan, south through the Philippines and Micronesia to New Ireland, New Guinea and New Britain, thence eastwards to the Solomon Islands and Fiji, and southwards through eastern Australia, at least to the vicinity of Adelaide, South Australia, and Flinders Island, Tasmania. We have seen specimens (unavailable here) from New Caledonia. There are no known records from sub-continental India, Western Australia, mainland Southeast Asia, China, Japan or New Zealand. One-quarter of the known taxa are Australian and the highest known species-density is in tropical north Queensland.

## Bionomics

*Metapone* is distinctive largely due to features related to adaptation for life associated with termite hosts. Its species seem universally to be termite predators and all reported nests were located in logs or rotting wood, usually within, adjacent to, or contiguous with termite nests. *Liomyrmex* is also termitophilous (Rigato & Bolton, 2001). Wheeler (1914) reported *L. gestroi* ( as *L. aurianus* Emery) “living in entire amity” with its hosts in nests of the common southeast Asian/Philippines mound-building termite *Macrotermes gilvus* (Hagen). Specialized association with termites has never been reported for *Podomyrma* or *Huberia*, nor has it been observed by the senior author in many field encounters with both genera.

Association between *Metapone* and termites has frequently been observed by collectors and authors and was first reported with the original description of *M. greeni,* when Forel (1911) quoted Sri-Lankan field notes by the first known collector, M.E. Green. Alpert (2007) reported *Metapone* associations with *Cryptotermes kirbyi* (Kalotermitidae) and *Coptotermes truncatus* Wasmann (Rhinotermitidae) on Madagascar and *Prorhinotermes* (Rhinotermitidae) in Australia. A colony of the Australian *M. tillyardi* Wheeler is reported below to have been collected in joint association with species of both *Kalotermes* and *Glyptotermes* (both Kalotermitidae) in a diseased living willow trunk (termite identifications by J.A.L. Watson). Two species of termites were also involved at the initial collection of *M. greeni* (Wheeler, 1919b).

It is not known (1) whether any individual *Metapone* species are obligate associates of particular termite species, let alone involved in more catholic associations at multispecies, genus or higher taxonomic level; (2) whether there is size correlation between *Metapone* species and their termite hosts; (3) whether the constructed nests of mound-building termites or subterranean-nesting grass-eating termites are ever parasitized by *Metapone* (though see below under *M. tricolor*); or (4) whether the nests of alien, introduced pestiferous termites can be parasitized by local resident *Metapone* species.

In the absence of known relations between particular *Metapone* species and individual termite taxa distributional correlations can sometimes imply possible associations, notably in the well-documented Australian termite fauna, especially where there are few candidate termite species known from *Metapone* collection sites, as discussed below under *M. tricolor* and *M. mathinnae.*

Putative associations involving the termite families Termopsidae, Kalotermitidae, Rhinotermitidae and Termitidae are cited in these pages, excluding only the northern Australian endemic family Mastotermitidae (namely, its sole extant species *Mastotermes darwiniensis* Froggatt).

It is notable that several of the *Metapone* worker or gyne specimens examined here have characteristically damaged antennae or limbs. Sections of legs or apical portions of funiculi or scapes + funiculi appear to have been cleanly severed and subsequently to have healed in a manner very seldom observed in any other ants we have studied (see e.g. Figs 1, 4, 8). We presume such damage to be the result of termite mandibular attack.

The biology of several Madagascan species was reviewed by Hölldobler, Leibig *et.al* (2002) and Hölldobler, Oldham *et.al* (2002). They confirm the role of *Metapone* species as specialist predators nesting in association with termites, and demonstrate the presence of gamergates (mated reproductive workers) in colonies of *M. madagascarica* and *M. vincimus*, in which all investigated workers were found to have functional ovarioles and spermathecae. Some individuals had previously mated, as evidenced by sperm in their spermathecae. No morphological differences between mated and non-mated workers were noted. Field observations and laboratory studies indicated that queenless colonies of these species containing gamergates are almost certainly able to reproduce. Also, prey termites stung by *Metapone* workers became paralysed and remained alive for extended periods while stored in the ant nests. Workers deposited chemical trails using one of seven compounds identified in the venom.

Alpert (2007) recognised worker-queen intermorphs and ergatoid males present in low numbers in *M. madagascarica* nests which also contained normal members of both reproductive castes. He remarked that "The presence of both winged and ergatoid males in the same colony is exceptional in ants and warrants further study". We suggest that the ergatoids could possibly be males of a second species inquiline in *M. madagascarica* nests. See the Antweb site (http://www.antweb.org/ ) for illustrations of these specimens.

*Metapone* collections sometimes include long series of alate gynes, usually taken at flight intercept traps. We assume that they were engaged at collection in mating-flight or post-mating dispersal activity. The problems faced by newly-fertilised females in locating suitable host termite nests for colony foundation might have been adaptively addressed in part by the seasonal release of very large numbers from parental colonies, contributing to the frequency of such collections. Specimen labels indicate that alates of both sexes are attracted to light. Gynes have been collected from pitfall traps, presumably indicating that their post-flight search for termite host colonies might be partly pedestrian.

Workers have never been reported foraging epigaeically, no doubt because they seldom if ever leave the confines of their own nests or those of host termites, and are almost always encountered only when such nests have been breached by happenstance or by entomological collectors. Records of workers or dealate gynes are unknown from Berlese funnels, Winkler extractors or other soil/litter sampling devices.

*Metapone* nests are rarely encountered by myrmecologists. In a lifetime tally of almost two years of accumulated daily field work in north Queensland, New Guinea, West Malaysia and Borneo, featuring dissection of many rotting logs, the senior author encountered only four colonies: *M. truki* in the Gogol Valley, Papua New

Guinea; *M. hoelldobleri* and *M. mjobergi* (twice) in tropical north Queensland—the last three records during 11 days of intense ant collecting in 1977 in company with former CSIRO colleague John Feehan.

## Methods

*Measurements and indices*: Measurements are in mm. Those with a separating comma (HL 0.87, 0.93) specify the smallest and largest specimens in the subject series, their rank established initially by survey of HW in the full series. The following dimensions apply:

**TL** = Aggregate total length (aggregate of: head and mandibles + mesosoma (or mesosoma and waist nodes) + gaster (or mesosoma + waist nodes and gaster) measured in lateral view.
**HL** = Head Length measured from the *occipital midline* to the limits of any clypeal projection(s) (frontal view, maximized).
**HW** = Head width (frontal view, maximized) (across eyes when applicable, notably for gynes).
**CI** = Cephalic Index (HWX100/HL).
**CpL** = Clypeal length measured from the anterior to posterior clypeal borders, the specimen positioned so as to maximize the measurement.
**CpI** = Clypeal index (CpLX100/HL).
MSL = Length of mesosoma in lateral view. Measured from the anterodorsal point of the pronotal profile to the posterior limit of the propodeum (along a line approximately parallel to the dorsal profile of the mesosoma).
**PML** = Promesonotal length at dorsal midline, excluding anterior declivity, maximized.
**PMW** = Promesonotal width, measured across the anterolateral shoulders (dorsal view, maximized).
**PMI** = Promesonotal index (PMLX100/MSL).
**PDW** = Maximum width of propodeum, dorsal view.
**PetL** = Maximum length of petiolar dorsum, including posterolateral extensions etc. when present.
**PetW** = Maximum dorsal width of petiolar node, including posterolateral extensions etc. when present.
**PetH** = Maximum height of petiolar node measured *directly* between its dorsal and ventral extremities in side view, including the subpetiolar extension.
**PpetL** = Maximum length of postpetiolar dorsum, including antero- or posterolateral extensions when present.
**PPetW** = Maximum width of postpetiolar dorsum, dorsal view.
**PpetH** = Maximum height of postpetiole measured *directly* between its dorsal and ventral extremities.
**GW** = Maximum width of first gastral segment measured in dorsal view.

*Additional measurements applicable to the gyne mesosoma are*:
**PnL** = Pronotal length, dorsal view, midline, excluding anterior declivity.
**PnW** = Pronotal width. By convention this measurement is taken across the pronotum at the level of the anterior edge of the scutum.
**ScL** = Scutum length, dorsal view, midline.
**ScW** = Scutum width. Measured across the widest part of the sclerite, always immediately anterior to the wing bases.

The wings usually obscure dorsal views of the petiole and postpetiole, so a jig was devised to enable them to be separated for measurement of PetW and PpetW in gynes.

Eguchi (1998) used equivalent measurements with different coding. His AL = MSL used here; CL = CpL; PDW = PpdW; PPNW = PetW; PNL = PetL; PNH = PetH; G1W = GW; PPL = PpetL; PPW = PpetW; G1W = GW.

**Distribution and collection records.** Localities are listed by country or state in numerical order of geographical coordinate values. Coordinates without brackets were copied from specimen labels; those with brackets were estimated (using Australian National Mapping Service online facilities and other sources) or taken from other labels of the same provenance. Some estimated citations use `short' 1-degree mapping coordinates without minutes, following Taylor (1987) (e.g. 21S, 148E indicates the grid cell 21°Sx148°E, and is cited for all samples lacking precise collection coordinates collected in that grid cell). Collection dates are formatted as on the specimen labels.

Abbreviations used for institutions, and the names of corresponding curators are:

ANIC = Australian National Insect Collection, CSIRO, Canberra (Dr S. Shattuck).
CASC = California Academy of Sciences, San Francisco, USA (Dr B. Fisher).
LACMNH = Los Angeles County Museum, California, USA (Dr R. Snelling).
MCZC = Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts (Stefan Cover).
MHNG = Museum d'Histoire Naturelle, Geneva, Switzerland (Dr Claude Besuchet).
IZUK = Institute of Zoology of the Ukrainian National Academy of Sciences, Kiev, Ukraine (Dr A. Radchenko).
QMBA = Queensland Museum, Brisbane, Australia (Drs G.B. Monteith, C. Burwell).
SAMA = South Australian Museum, Adelaide (Archie McArthur).
USNMNH = United States National Museum, Washington (Dr Ted R. Schultz).

**Abbreviations for the names of collectors or collecting expeditions *etc*:** ANZSES = Australia and New Zealand Exploration Society; BL = B.B. Lowery; DC = D. Cook; DKY = D.K. Yeates; ES = E. Schmidt; FPD = F.P. Dodd; GBM = G.B. Monteith; GDA = G.D. Alpert; GIT = G.I. Thompson; GL = G. Lambkin; HJ = H. Janetzki; IBISCA = Investigations of the Biodiversity of Soil and Canopy Arthropods Program; JDF = J.D. Feehan; JH = J. Hasenpusch; JOS = J.O. Schmidt; MS = M. Shaw; NS = N. Staric; PJMG = P.J.M. Greenslade; PSW = P.S. Ward; PZ = P. Zborowski; RM = R. Menendez; RWT = R.W. Taylor; TEW = T.E. Woodward; Australian states and territories: ACT; NSW; NT; Qld; SA; Vic; WA.

*Illustrations* were prepared by RWT using a copy-stand-mounted Olympus E330 digital SLR camera with Olympus pre-digital OM series bellows and Zuico 38mm, 3.5 macro lens, above a custom-built electronically controlled motorized stepper-stage designed to move subject specimens in minute concentric steps along the Z optical axis. Images were processed using “Combine-Z” software (www.microscopy.uk.org.uk). Figs 5–7 of *M. emersoni* are the work of April Nobile of CASC (used courtesy of the AntWeb website).

The standard gallery usually comprises: (1) frontal view of head; (2) lateral view of whole animal or its mesosoma and pedicel (= waist nodes); (3) dorsal view of mesosoma and pedicel; (4) diagonal ”three-quarter” view of head (as in portraiture). Except for the latter, structures have generally been depicted in square view. This was sometimes not possible with subpetiolar and subpostpetiolar details, because of the mounted orientation of subject specimens, or obstruction by overlapping hind leg segments. Likewise, the three-quarter views are not always taken from the same side of the head.

Scale in the Figures is indicated by citation of a specific specimen measurement for each.

Several previously described species are known only from their holotypes or original type-series. Although often in poor condition, dirty and/or damaged, their illustrations are used here because there is no alternative (see e.g. *M. greeni* and *M. sauteri*). When types of previously described species are in poor condition or restrictively mounted and more recently-collected specimens exist the latter are illustrated. Full sets of Alpert’s original (2007) illustrations of *M. emersoni*, *M. madagascarica* and *M. vincimus* are accessible on the Harvard Museum of Comparative Zoology (MCZC) website.

We unconventionally describe below a number of new species based solely on gynes. This is considered acceptable because (1) gynes collected in association with worker holotypes are known and have been characterized for 7 of the formerly-described *Metapone* species recognized here; (2) there are more prior species for which gynes are known (15 of 17) than there are species with known workers (10 of 17); (3) in most cases it seems likely that workers of gyne-based species collected in future will be confidently identified by comparison with their gyne holotypes, given the close similarity of cephalic, petiolar, postpetiolar, sculptural and other details between gynes and workers in species where both are known; (4) adequate documentation of the geographical distribution of *Metapone* requires the listing of gyne records, and (5) some of the gyne-based species, such as the relatively very large *M. titan,* are exceptionally configured, and thus attract description.

The African-Madagascan, Asian, Micronesian/Melanesian, and Australian faunas are keyed and discussed separately below. Previously described species in each set are reviewed in order of original publication (and thus of nomenclatorial priority), followed by the alphabetically-listed new species. Australia possibly has the most comprehensively represented fauna, although several of its species are known from fewer than 3 records, and the worker caste is not known for two of them. Overall, it is clear that there must be many more *Metapone* species-in-nature awaiting first collection.

## General and taxonomic characters

Structural details of the clypeus and petiolar node, relative size, cephalic and other proportions, mandibular dentition and sculptural differences have been used traditionally to distinguish *Metapone* species. We have determined that comparison of subpetiolar and clypeal structures alone can usually enable rapid initial assessment of likely conspecific status between compared specimens.

**General characteristics.** These include the following features: (1) All known workers are light golden to medium brown in colour. (2) All known gynes are black or blackish- brown in colour (sometimes with the gaster reddish-brown), generally darker than conspecific workers. (3) There is substantial interspecific variation in the size of the eyes of workers—in *M. africana* they are vestigial, represented by minute dark cuticular pigment spots without surface structure. In other species maximum diameters range from about the width of the second funicular segment to that of the scape. *Metapone tillyardi* workers are evidentially polymorphic with eyes sometimes lacking, otherwise varying intranidally in size. Where both female castes are known: (4) The clypeal structure in conspecific workers and gynes is similar. (5) The petiole in dorsal view is generally more narrowed and bears more distinct posterolateral denticles in gynes than in workers, and (6) the subpetiolar process is less well developed in gynes than workers, though usually conforming to the same general descriptive parameters. (7) Wing venation, when known, is similar throughout in both gynes and males (see Fig 61). (8) The dissected worker palpal formula in *M. mathinnae* is maxillary 1: labial 3, as reported also for the worker of *M. greeni* Forel by Forel (1911) and Wheeler (1919b). The relativities of size between workers and gynes are not well understood, though it appears that the two castes usually do not differ greatly in conspecific dimensions.

**The subpetiolar process.** In "ground plan" the petiolar sternite is basically an elongate, forwardly-directed tetrahedron with one of its long faces contiguous with the underside of the petiole-proper, leaving 3 exposed faces: a longitudinal pair of elongate isosceles-triangular *ventrolateral faces*, and a smaller transverse, approximately equilaterally-triangular *posterior subpetiolar face* (the base of the tetrahedron) the surface of which may be more-or-less flat or concave. The ventrolateral faces meet along a median longitudinal *ventral subpetiolar edge*, which in lateral view contributes to the subpetiolar profile. The three faces form a posteroventral *subpetiolar angle* at their point of intersection, behind which the profile of the posterior face completes the lateroventral subpetiolar profile (Fig 150 *et.al.*).

This basic structure is variously elaborated among *Metapone* species. (1) The ventral subpetiolar edge is usually appended ventrally to form a longitudinal, generally partly translucent, sometimes fully-opaque, often plate-like *subpetiolar extension* (which is referred to as the *subpetiolar lamella* when that is appropriate). This may be small, large, broadly rounded, equilaterally triangular, scalene with a posterolateral apex, opaque or translucent, narrowly digitate or hooked, or in one case lacking. It usually occupies the anterior section of the ventral subpetiolar edge, but may extend further back towards the subpetiolar angle (Figs 55, 105, 112, 120, 164). (2) The posterior subpetiolar face may be inclined so as to slope steeply forwards from its base, so that the subpetiolar angle is strongly obtuse in lateral view (Figs 70, 130). (3) The subpetiolar angle may be variously extended to form a strong point or *subpetiolar tooth* or *spine*. In such cases the posterior face in oblique view is a ventrally-directed isosceles triangle, and the profile of the ventral subpetiolar edge is usually curved downwards to meet the apex of the subpetiolar spine (Figs 32, 115). (4) The subpetiolar angle may be transversely blunted or rounded, so that the posterior subpetiolar face in oblique view is essentially semicircular and the posteroventral edge of the sclerite correspondingly rounded, at least posteriorly (Figs 70, 105). (5) The apex of the subpetiolar angle may be further reduced nearly to elimination, with loss to the triangularity of the ventrolateral faces. The ventral subpetiolar edge is broadly, transversely rounded, and the posterior face loses its apex to present as a rectangle in oblique view (or is even further vestigially reduced (Fig 107). (5) The outer edge(s) of the posterior face may be minutely carinate or obliquely extended to form a thin translucent *framing lamella*, and this, in lateral view, can cause a visual "doubling" of the line of profile of the posterior face (Figs 20, 55). The posterior face here forms a framed recess which encloses the anterior part of the subpostpetiolar process when the body is rolled ventrally.

**The subpostpetiolar process.** As just implied, the anterior portion of the subpostpetiolar process is related in structure to the posterior part of the subpetiolar process, in that the two appear to be adapted to fit closely together when *Metapone* workers or gynes assume a rolled protective position, presumably when under attack from termites. In frontal view, the anterior face of the subpostpetiolar process is more-or-less equilaterally triangular to semicircular, but its apex may be extended ventrally to constitute an isosceles triangle, the apex of which is sometimes drawn to a point, and, seen on edge, may appear to be a narrow, acute spine in lateral view of specimens (Fig 5 *et.al*). Reductions in structure similar to, and evidently complimentary with, those of the posterior face of the subpetiolar process are also evidenced.

## Synopsis of world *Metapone* species

Publication details, type localities, diagnoses and new species descriptions are given in the text below under the relevant species headings. Numbers at the right margins of each entry provide an index to species order in the text below.

***M. africana*** Taylor & Alpert **sp.nov.** Gabon, 4.
***M. bakeri*** Wheeler, 1916. Philippines: Luzon, 7.
***M. balinensiis*** Taylor & Alpert sp.nov. Indonesia: Bali, 12.
***M. emersoni*** Gregg, 1958. Madagascar, 2.
***M. enigmatica*** Taylor & Alpert **sp.nov.** Papua New Guinea, 17.
***M. gracilis*** Wheeler, 1935. Philippines: Mindanao, 10.
***M. greeni*** Forel, 1912. Sri Lanka, 5.
= *johni* Karavaiev, 1933 **syn. nov**. Sri Lanka.
***M. hewitti*** Wheeler, 1919a. Malaysia: Sarawak, 8.
***M. hoelldobleri*** Taylor & Alpert **sp.nov.** Australia: Queensland, 26.
***M. jacobsoni*** Crawley, 1924. Indonesia: Sumatra, 9.
= *nicobarensis* Tiwari & Jonathon, 1986 **syn. nov.** India: Nicobar Islands.
***M. javana*** Taylor & Alpert sp.nov. Indonesia: Java, 13.
***M. krombeini*** *M.*R. Smith, 1947. Papua New Guinea, 15**.**
***M. leae*** Wheeler, 1919b. Australia: Queensland, 23.
***M. madagascarica*** Gregg, 1958. Madagascar, 1.
***M. manni*** Taylor & Alpert **sp.nov.** Fiji: Viti Levu, 18.
***M. mathinnae*** Taylor & Alpert sp.nov. Australia: Tasmania, 27.
***M. mjobergi*** Forel, 1915. Australia: Queensland, 22.
***M. philwardi*** Taylor & Alpert **sp.nov.** Papua New Guinea, 19.
***M. quadridentata*** Eguchi, 1998. Malaysia: Sabah, 11.
***M. salomonis*** Taylor & Alpert **sp.nov.** Solomon Islands: San Cristoval, 20.
***M. sauteri*** Forel, 1912. Taiwan, 6.
***M. tecklini*** Taylor & Alpert **sp.nov.** Australia: Queensland, 28.
***M. tillyardi*** Wheeler, 1919b. Australia: New South Wales, 24.
***M. titan*** Taylor & Alpert **sp.nov.** Papua New Guinea: New Ireland, 21.
***M. tricolor*** McAreavey,1949. Australia: New South Wales, 25.
***M. truki*** *M.*R. Smith, 1953. Papua New Guinea, Micronesia, 16.
***M. vincimus*** Alpert, 2007. Madagascar, 3.
***M. wallaceana*** Taylor & Alpert **sp.nov.** Indonesia: Lombok, 14.

## Genus *Metapone* Forel

### A. The African and Madagascan species

The three known Madagascan species were reviewed by Alpert (2007), with notes on their association with termites—a subject discussed further by Hölldobler and colleagues (2002, 2002). *M. africana* **sp.n.** from equatorial Gabon is the only known continental African *Metapone* species. In physiognomy, colour, sculpturation and details of the relatively unelaborated clypeal and subpetiolar structure these are apparently generalized taxa, similar to others in the Asian and Australian faunas (e.g. *M. javana*, *M. krombeini*, *M. mathinnae*, *M. truki*), and possibly somewhat archetypical in *Metapone*. *M. emersoni* appears slightly the more morphologically derived of the four.

Alpert's (2007) illustrations were published in monochrome. Colour photographs of his specimens are available on-line at the Antweb site.

## Key to African and Madagascan *Metapone* species (Workers)

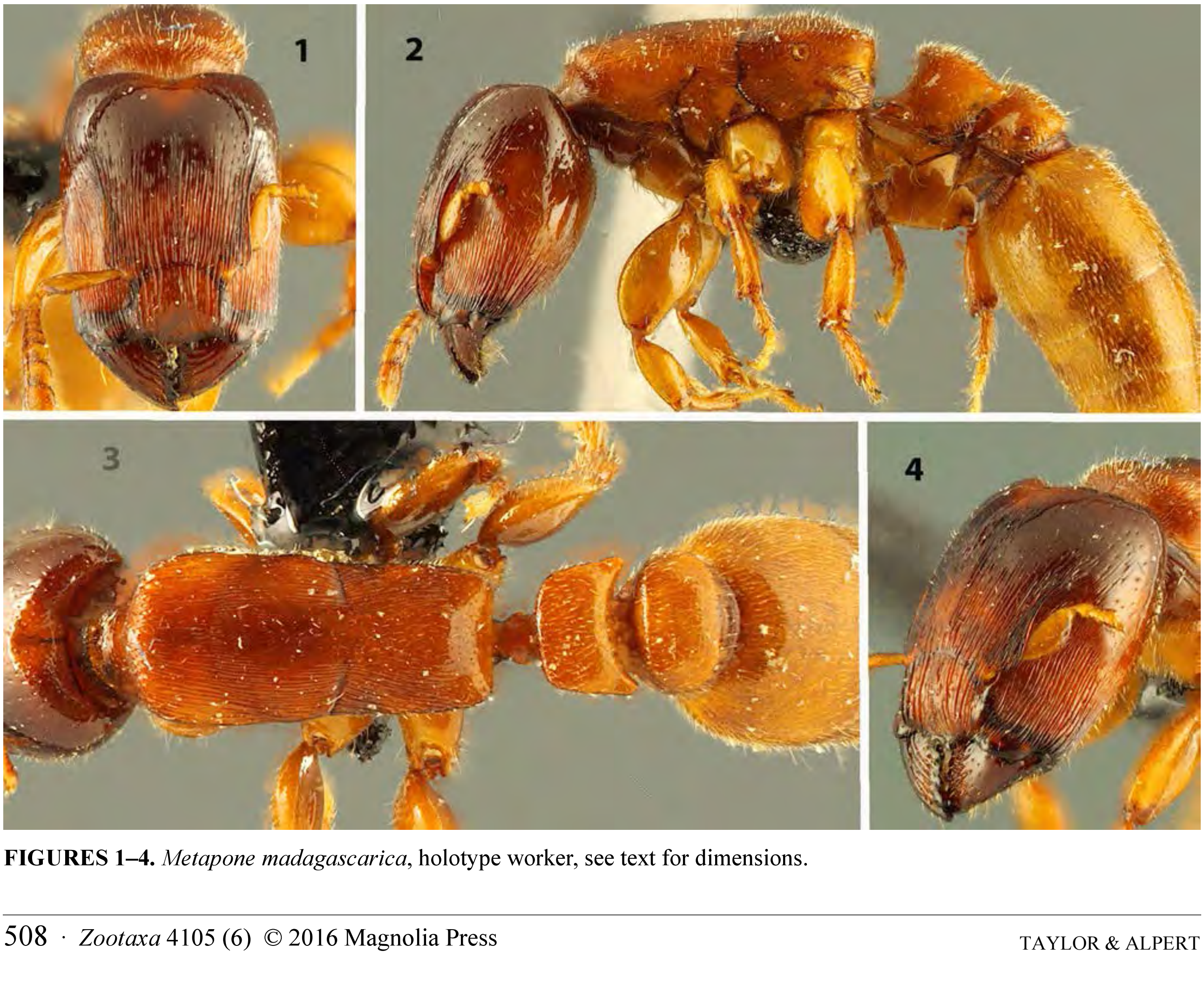
1. Lateral margins of raised median portion of clypeus markedly convergent anteriorly from the level of the antennal insertions (Fig 6). Petiolar dorsum from above approximately twice as wide as long (Fig 6). Postpetiolar sternite in profile view appearing as a long, slender process (Fig 5) (Madagascar). . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . *M. emersoni* Gregg
   Lateral margins of raised median portion of clypeus essentially parallel, at most only slightly convergent anteriorly (Fig 8). Petiolar dorsum from above quadrate to transverse, maximally only about 1.4x wider than long (Fig 3). Postpetiolar sternite in side view extended as a much shorter process; digitate or acute in lateral view (Fig 9), obtusely triangular in frontal view. . . 2

2(1) Median clypeal surface transversely flat to slightly convex; lateral borders not raised; anterior border entire, without median denticles, very slightly concave in frontal view, with a small step-like marginal excision on each side (Figs 12, 15). Smaller species, HW > 0.76mm. (Angola). . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . *M. africana* **sp.n.**
   Median clypeal surface transversely concave, the lateral borders slightly raised, subcarinate; anterior border medially bidentate, lacking anterolateral marginal excisions (Fig 1). Larger species, HW < 0.90mm. (Madagascar). . . . . . . . . . . . . . . . . . . . 3

3(2) Petiolar node from above approximately as wide as long; postpetiolar sternum in side view bluntly rounded (Figs 9, 11).. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . *M. vincimus* Alpert
   Petiole from above approximately 1.4 times as wide as long; postpetiolar sternum in side view forming a low acute point (Figs 2, 3).. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . *M. madagascarica* Gregg

## 1. *Metapone madagascarica* Gregg, 1958
(Figs 1–4)

*Metapone madagascarica* Gregg, 1958: 111, Fig.1—Worker; Type locality: 15 km east of Tulear [23°21' S, 43°40' E], Madagascar.
*Metapone madagascarica,* Alpert, 2007:11, Figs 3, 4, 9, 10—Worker.




**FIGURES 1–4.** *Metapone madagascarica*, holotype worker, see text for dimensions.

**Distribution, material examined.** The holotype (MCZC) was illustrated by Alpert (2007) and specimens listed from several localities. We have seen two further paratype workers (LACMNH, USNMNH).

**Worker diagnosis.** General and diagnostic features as illustrated and in the key to African and Madagascan species above (note paired anteromedian clypeal denticles, sub-parallel lateral clypeal margins, transverse petiolar node, and unextended postpetiolar sternite). Eyes minute, diameter of each about half the width of the second funicular antennomere; with 8–10 extremely minute, somewhat obscure facets. Mesosoma In dorsal view slightly constricted at promesonotal/propodeal junction, with accompanying short vestigial traces of the metanotal suture on each side. Subpetiolar process: (Fig 2) more-or-less basic in structure—relatively deep, the posterior face a narrow isosceles triangle, subpetiolar angle obtuse in side view, without spinose extension. Subpetiolar extension lamellate, scalene-triangular, with a short posteroventral edge, the apex posteroventral, the base almost as long as the subpetiolar edge. See also the detailed original description (Gregg, 1958).

**Illustrated specimen.** Madagascar, Andohahela, 25°46'35"S, 46°42'19"E, 320m, tropical dry forest, leg Pascal Rabeson.

### 2. *Metapone emersoni* Gregg, 1958
(Figs 5–7)

*Metapone emersoni* Gregg, 1958:115, Fig.2—Worker; Type locality: 12 miles from Perinet [18°55'S, 48°25'E], Madagascar.
*Metapone emersoni,* Alpert, 2007:10, Figs 5, 6, 11, 12—Worker.

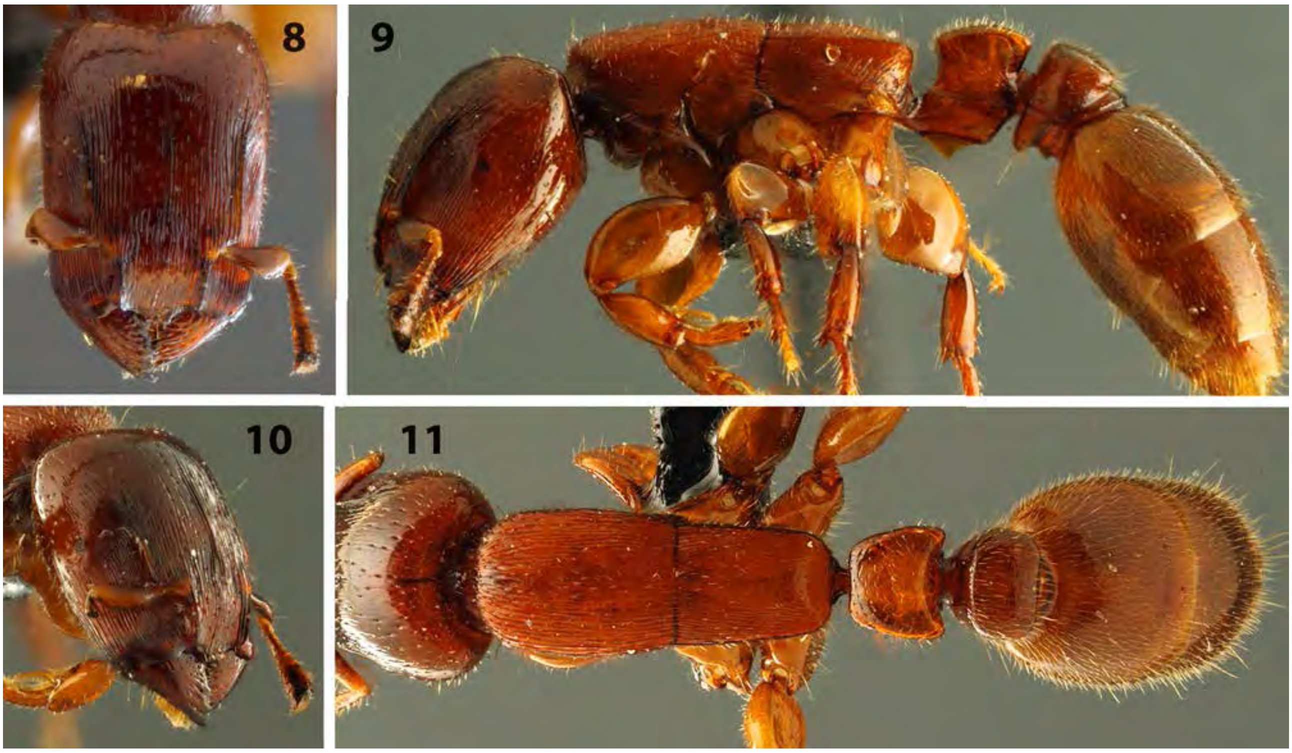

**FIGURES 5–7.** *Metapone emersoni,* worker, Perinet, Madagascar, HW 0.75, PMW 0.56, MSL 1.20.

**Worker diagnosis.** General and diagnostic features as illustrated and keyed above (note especially the entire anterior clypeal border without median denticles, anteriorly converging lateral clypeal margins, relatively very wide petiolar node, and extended postpetiolar sternite appearing spinous in lateral view). Eyes structured similarly to those of *M. madagascarica* (see above) but a little larger. Subpetiolar process (Fig 5) more-or-less basic in structure, the posterior face triangular, subpetiolar angle obtuse in side view, without spinose extension. Subpetiolar extension lamellate, approximately semi-circular, its base about two-thirds as long as the subpetiolar edge. See original description (Gregg, 1958) for further details.

**Illustrated specimen.** Madagascar, Prov Toamasina, P.N. Mantadia, 895m, 18˚ 47'5"S, 48 ˚ 25'6"E, 25 xi–1 xiii 1998, H.J. Ratsirarson (CASENT 00031.16 HJR 20).

### 3. *Metapone vincimus* Alpert, 2007
(Figs 8–11)

*Metapone vincimus,* Alpert, 2007: 11, Figs 1, 2, 7, 8—Worker, Intermorph, Gyne; Type locality: 30km N of Antalaha, 3km W to a hill near Amboangy (14˚39'53.3"N, 50˚1'26.5"E), Madagascar.




**FIGURES 8–11.** *Metapone vincimus,* paratype worker, HW 0.75, PMW 0.56, MSL 1.20.

**Worker diagnosis.** General and diagnostic features as illustrated and keyed above (note paired anteromedian clypeal denticles, sub-parallel lateral clypeal margins, petiolar node in dorsal view approximately as wide as long, and unextended postpetiolar sternite). Eyes very small, much as described for *M. madagascarica* above. Subpetiolar process (Fig 9) more-or-less basic in structure: posterior face approximately equilaterally triangular, subpetiolar angle obtuse, its apex minutely rounded in side view. Subpetiolar extension lamellate, a shallow isosceles triangle, the posterolateral edge slightly concave in side view, the base almost as long as the subpetiolar edge.

*Dimensions*: The original description gives the following measurements (Holoytpe; paratypes): HL 1.20 mm, 1.20–1.44 mm; HW 0.90 mm, 0.90–1.06 mm; ML 1.60 mm, 1.58–1.90 mm; PML 0.90 mm, 0.90–1.24 mm; PMW.64 mm, 0.60–0.76 mm; PNL 0.34 mm, 0.32–0.46 mm; PetW 0.44 mm, 0.44–0.68 mm; PPW 0.46 mm, 0.44–0.62 mm.

**4. *Metapone africana* sp.n.**
(Figs12–15)

**Type locality.** GABON: Woleu-niem Province: 31.3km, 108°ESE of Minvoul, 2°04.8'N, 12°24.4'E, 600m.

**Type deposition.** holotype CASC, paratype BMNH.

**Distribution, material examined.** Known only from the holotype and paratype, both workers, originally separately point-mounted on the same pin (B. Fisher, 8.ii.1998, Acc 1656-1, ex rotten log, rainforest).

**Worker diagnosis.** General and diagnostic features as in the key above and accompanying figures (note entire anterior clypeal border lacking median denticles, subparallel lateral clypeal margins, petiolar node in dorsal view approximately as wide as long, and slightly extended postpetiolar sternite, acute in lateral view. Eyes vestigial, represented by tiny darkly pigmented spots beneath the surface cuticle; no trace of surface structure is observable even under strongly reflective illumination. Subpetiolar process (Fig 13) more-or-less basic in structure: posterior face approximately equilaterally triangular, subpetiolar angle obtuse. Subpetiolar extension a shallow isosceles-triangular lamella, almost right angled apically, the base fully as long as the subpetiolar edge.

*Dimensions*: (holotype, paratype): TL ca: 4.3, 3.9; HL: 0.93, 0.96; HW: 0.75, 0.76; CI: 81, 79; CpL: 0.37, 0.38; CpI: 40, 39; MSL: 1.20, 1.16; PML: 0.61, 0.61; PMW: 0.56, 0.55; PMI: 51, 53; PDW: 0.48, 0.49; PetL: 0.31, 0.30; PetW: 0.44, 0.44; PetH: 0.53, 0.54; PpetL: 0.32, 0.31; PpetW: 0.46, 0.47; PpetH: 0.49, 0.49; GW: 0.77, 0.78.

**Illustrated specimen.** holotype, details above.

**Report on further material.** Barry Bolton reports (*pers. com*) that there is a further nest series of *M. africana* in the BMNH collection. The details are: GABON: La Makandé, Forêt des Abeilles, i–ii.1999, ex rotten wood (S. Lewis). The series includes worker, queen and male specimens, some of which are illustrated on the ANTWEB website (CASENT0900364 (alate queen) CASENT0900365 (male) CASENT0900366 (worker)).


**FIGURES 12–15.** *Metapone africana* sp.n., holotype worker, see text for dimensions.

## B. The species of South and South-East Asia, the Malay Archipelago and the Philippines

Nine nominal species are reported: two from Luzon, Philippines—one of them also from Negros, and one each from Sri Lanka, Taiwan, Sumatra and Great Nicobar Island, Sarawak, Sabah, Java, Bali and Lombok. *M. hewitti* (Sarawak) is male-based. *M. johni* is a new junior synonym of the Sri Lankan *M. greeni*. Gynes are known for all species, workers additionally for four. *Metapone* is not (yet) known from subcontinental India, mainland Southeast Asia or China, though it is likely present in all three areas.

## Key to the Asian species of *Metapone*

This key is of necessity based largely on the characters of gynes. It emphasizes features which we believe will also enable identification of worker specimens. The male-based *M. hewitti* is not included.

1. All body surfaces smooth, shining, very highly reflective, with at most a few extremely obscure, minute, generally ripple-like apparent vestiges of longitudinal striation (Figs 34–38). Head relatively broad (CI of only known specimen 91); clypeal outline in frontal view broadly semicircular. (Philippines: Luzon, gyne). . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . *M. bakeri* Wheeler
- Dorsal and lateral surfaces of head and mesosoma densely, finely, longitudinally striate. Known CI values less than 76. Clypeus differently structured. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 2

2(1) Median section of clypeus extended forwards beyond the lateral sections to form a more-or-less proboscis-like structure which lacks *median* denticles (well-separated denticles at either end of the anterior border may be present). . . . . . . . . . . . . . . . . . 3
- Median section of clypeus not protruding forward beyond its lateral sections, the anterior border with a pair of small approximate median denticles. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 8

3(2) Head relatively narrow (HW 1.54, CI 68). Petiolar node in dorsal view more than twice as long as wide, with strong posterolateral tooth-like projections. Subpetiolar extension a long, low subrectangular, translucent lamina extending back almost to the subpetiolar angle; the latter acutely spine-like in lateral view. (Taiwan, gyne only, Figs 28–33) . . . . . . . . . . . *M. sauteri* Forel.
- Species from distant other areas (Sri Lanka, Philippines, Indonesia). HW usually well less than in the alternative prescription and/or CI with a higher value. Petiolar proportions and subpetiolar configuration clearly dissimilar. . . . . . . . . . . . . . . . . . . . 4

4(3) Subpetiolar process unusually configured. In lateral view the much-reduced longitudinal, acutely triangular posterior face (which lacks a framing lamella) so strongly inclined forwards that its profile almost aligns with the adjacent subpetiolar edge. The subpetiolar angle extended ventrally as a relatively large, acutely erect spine-like process, well separated from the more anterior, small, vertically tabulate, translucent subpetiolar extension, the posterior apex of which is hook-like, inclined posteriorly (Indonesia: Java, worker only, Figs 62–65). . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . *M. javana* **sp.n.**
- Petiolar sternite differently constructed: subpetiolar angle usually (not always) distinct, not spinosly extended; subpetiolar extension usually differently constructed: relatively large, or small and triangular.. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 5

5(4) Posterior face of subpetiolar process relatively large, with a translucent framing lamella clearly evident in profile view. Subpetiolar angle distinct, in lateral view slightly extended as a pointed process, partly including the framing lamella. Petiolar node in dorsal view approximately subquadrate.. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 6
- Posterior face of subpetiolar process reduced; subpetiolar angle *either* rounded in lateral view, with the reduced profile of the posterior face grading smoothly into the profile of the subpetiolar edge; *or* without clear presence of a subpetiolar angle, so that the subpetiolar edge in effect continues directly to the posterior base of the sternite. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 7

6(5) Subpetiolar extension relatively large, longitudinally subrectangular with minutely rounded corners; its base almost as long as the ventral subpetiolar edge. (Sri Lanka, gyne & worker—Figs 16–27) . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . *M. greeni* Forel
- Subpetiolar extension a small, sub-rectangular, barely translucent plate with its posterolateral corner extended to form a more-or less hook-like structure; its base about half as long as the ventral subpetiolar edge (Malaysia: Sabah, gyne & worker, Figs 52–55).. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . *M. quadridentata* Eguchi

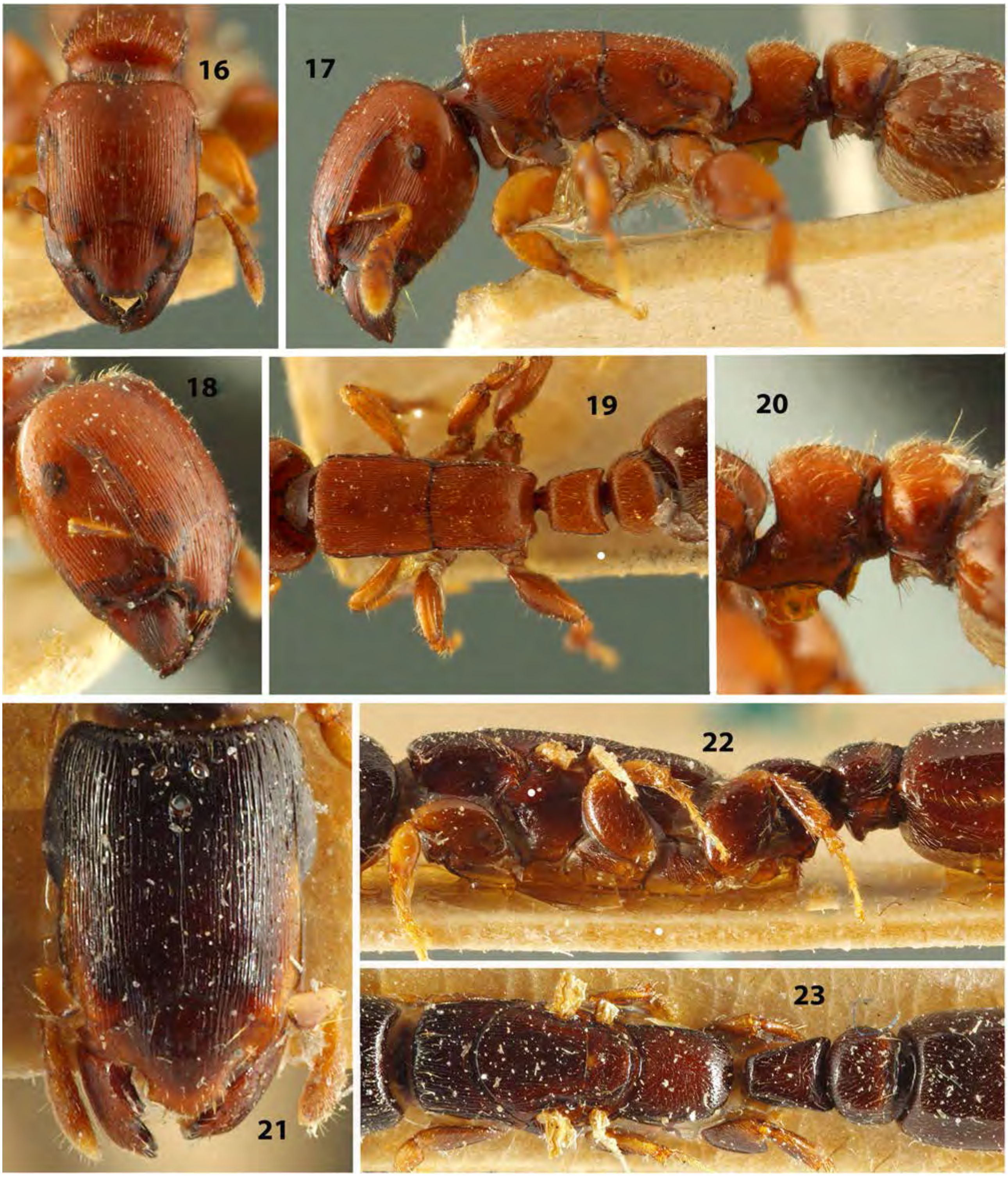
7(5) Anterior border of median clypeal projection subtended by a minute parallel groove bearing a rank of about 6 stout, forwardly-directed pale bristle-like hairs. Outline of anterior clypeal border above the groove shallowly rounded/convex in frontal view, the edge below the groove with a small tooth-like terminal angle on each side. Subpetiolar extension a dependant subrectangular, posteriorly inclined, relatively large tab, more-or-less transversely rectangular in shape. (Indonesia: Bali, gyne only, Figs 56–61) . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .*M. balinensis* **sp.n.**
- Anterior border of anteromedian clypeal process a single shallowly concave edge without an accompanying groove or hairline; anterolateral corners subdentate. Subpetiolar extension a small approximately right-angled triangle. (Indonesia: Lombok, gyne only, Figs 66–70).. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . *M. wallaceana* **sp.n.**

8(2) Larger species, HW of 2 known gynes 1.00–1.04mm. (Indonesia: Sumatra, gyne only, Figs 42–46). . . . *M. jacobsoni* Crawley
- Smaller species, HW of 2 known gynes 0.95, 0.98mm. (Philippines: Luzon, Negros, gyne only, Figs 47–51). . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . *M. gracilis* Wheeler

## 5. *Metapone greeni* Forel, 1911
(Figs 16–23, 24–27)

*Metapone greeni* Forel, 1911:449, Pl.14 Figs 1–10—Worker, Gyne, Male; Type locality: Peradeniya [07°15'N, 80°36'E], Sri Lanka (as Ceylon).

= *Metapone johni* Karavaiev, 1933:115, Fig.10 a–n—Worker, Gyne, Male; Type locality: Hantana [07°19'N, 80°34'E], Sri Lanka (as Ceylon) (NEW SYNONYMY).




**FIGURES 16–20.** *Metapone greeni*, syntype worker, HW 1.01, PMW 0.82, MSL 1.56; FIGURES 21–23 gyne (*M. johni* syntype), HW 1.74, PMW 1.02, MSL 2.90.


**FIGURES 24–27.** *Metapone johni (*a junior synonym of *M. greeni*) syntype worker, HW 1.30, PMW 1.04, MSL 2.16.

**Material examined.** Known only from the syntype series of *M. greeni,* dispersed in collections as detailed below, and the *M. johni* syntypes (IZUK). Synonymy is based on type-comparison. Worker types of both nominal taxa are illustrated here, along with a syntype gyne of *M. greeni*. Original collection localities of these taxa are a few kilometres apart in the Central Highlands of Sri Lanka, near Kandy [7°19´N, 80°37´E].

We have seen 4 pins of *M. greeni* types from MHNG, a pin of two workers from MCZC and a single worker from USNMNH. All carry Forel's distinctive handwritten multifolded thin paper labels and his characteristic red printed "Typus" tags. The first MHNG pin has 3 workers. The topmost is the largest specimen examined. It is here designated lectotype (so labelled). The second pin has 3 small workers; the topmost being the smallest examined. A male lacking wings, and the dealate gyne depicted in Figs 21–23 are separately pinned. All appropriate specimens are here designated paralectotypes and so labelled. The worker specimen illustrated (Figs 16–20) is one of the MCZC paralectotypes. Any "typus" labelled specimens at large in other collections and not examined for this revision are formally not paralectotypes.

The *M. johni* syntypes (Figs 24–27) are 2 workers and 2 alate gynes, variously damaged and individually pinned on card points. A worker is here designated lectotype; the others paralectotypes (all so labelled). All carry identical white handwritten labels reading "4238 Col. Karavaiev" and red labels with "Syntypus *Metapone johni* Karaw." The lectotype also has a white handwritten label reading "Hatana, Ceylon, O. John. 2. xii. 12" and another with "*Metapone greeni* For. DT Wheeler". The white labels are in Karavaiev's handwriting, and the red labels were added by J.A. Kostjuk when preparing his catalogue of Karavaiev types (Kostjuk, 1976) (A. Radchenko, *pers com*). The *M. greeni* determination label presumably indicates that Karavaiev consulted W.M. Wheeler regarding the identity of his specimens, and that at least one of them was seen by Wheeler, either before or after Karavaiev described them as *M. johni* (assuming that "DT Wheeler" stands for "Determined (by) Wheeler"). If before, Karavaiev presumably did not accept Wheeler's *M. greeni* identification—if after, he appears never to have indicated the synonymy suggested by Wheeler and formalized here.

**Worker diagnosis.** General and diagnostic features as in original description (Forel, 1911), the key to Asian *Metapone* species above and the accompanying figures. Clypeus anteriorly rostrate, the free lateral margins convergent apically, anterolateral corners rounded, anterior border broadly convex, no accessory denticles. Eyes relatively large; maximum diameter approximating the width of the apical antennomere, with many minute irregularly sized and arrayed unpigmented facets. Posterior face of subpetiolar process in side view almost vertical, its outline approximately aligned with posterior outline of node; framing lamella distinct, as illustrated. Subpetiolar extension rectangular, about twice as long as high, barely translucent, the antero- and posteroventral corners narrowly rounded; ventral outline shallowly convex.

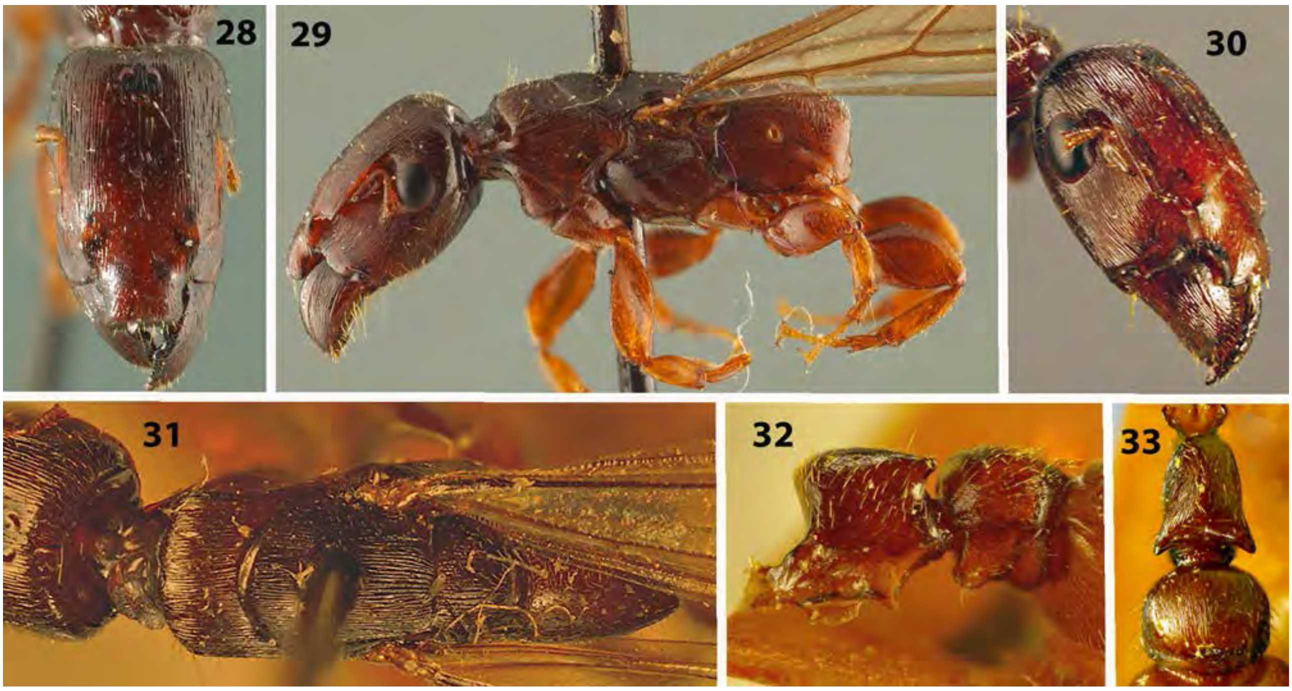
*Dimensions*: The *M. greeni* lectotype and the smallest MNHG paralectotype have the following dimensions: HL 1.41, 1.88; HW 1.01, 1.41; CI 72, 75; PMW 0.82, 1.17; MSL 1.56, 2.35. The two MCZC paralectotypes, the USNMNH paralectotype, and the *M. johni* lectotype have the following dimensions (note that the *M. johni* paralectotype has HW 1.30mm like the lectotype): TL: ca.6.4, 8.2; 6.9; 7.6; HL: 1.61, 1.91; 1.76; 1.74; HW: 1.22, 1.43; 1.37; 1.30; CI: 76, 75; 78; 75; PMW: 0.91, 1.13; 1.01; 1.04; MSL: 1.76, 2.27; 1.90; 2.16; PetL: 0.53, 0.62; 0.58; 0.60; PetW: 0.56, 0.70; 0.64; 0.66; PetH: 0.92, 1.13; 0.98; 1.04; PpetW: 0.71, 0.87; 0.75; 0.84; PpetH: 0.73, 0.89; 0.78; 0.82; GW -, -; 1.35; 1.42.

**Gyne diagnosis.** General features as in original description (Forel, 1911) and Figs 21–23 of an *M. johni* syntype. That specimen has: TL: 9.8; HL: 1.74; HW (across eyes): 1.24; Maximum eye length: 0.52 CI: 71 MSL: 2.90; PMW: 1.02; PDW: 0.84; PetL: 0.72; PetW: 0.68; PetH: 1.08; PpetL: 0.66; PpetW: 0.86; PpetH: 0.84. Dimensions are not available for the *M. greeni* syntype gyne.

**Male:** General features as in original descriptions of *M. greeni* and *M. johni* (Forel, 1911; Karavaiev, 1933).

### 6. *Metapone sauteri* Forel, 1912
(Figs 28–33)

*Metapone sauteri* Forel, 1912:763—Gyne; Type locality: Sokutsu, Banshoryo District, Taiwan.




**FIGURES 28–33.** *Metapone sauteri*, holotype gyne, see text for dimensions.

**Distribution, material examined.** Known only from the dealate holotype gyne (MHNG) examined and illustrated here. The specimen is poorly mounted and damaged, but relevant morphology is fortunately visible (see Figs).

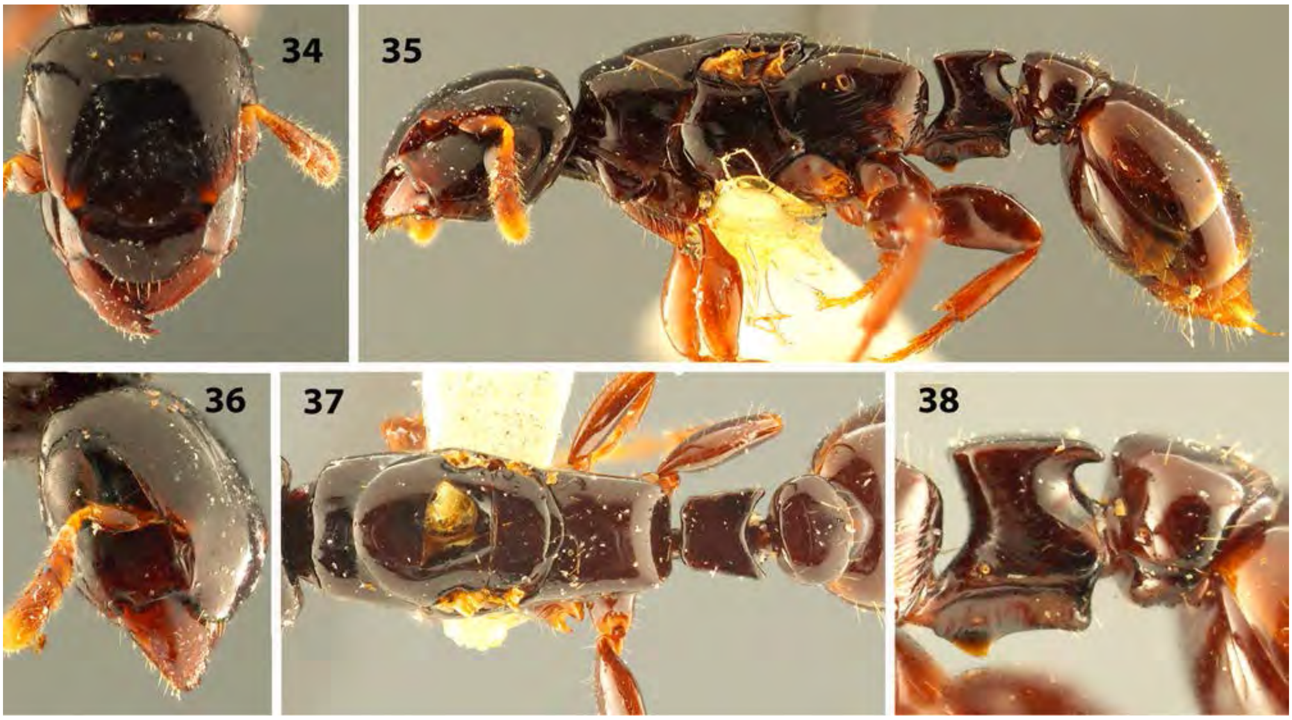
**Gyne diagnosis.** General and diagnostic features as in original description (Forel, 1912), the key to Asian species above and relevant figures. Subpetiolar extension lamellate, more-or-less evenly translucent, about twice as long as deep, very obtusely rounded-subangulate at the summit, with less-obtuse rounded angles at either shoulder; base extending back almost to the subpetiolar angle, which is drawn to an acute tooth, barely a spine. Posterior subpetiolar face acutely triangular in oblique view, with a minute barely translucent marginal carina.

*Dimensions*: HL 2.27; HW (across eyes) 1.54; CI 68; PetW 1.13; MSL 3.60.

**Remarks.** The type locality is frequently cited for Taiwanese specimens collected by Sauter; its exact location has apparently never been determined. *M. sauteri* is listed in Terayama's review of Taiwanese ants (Terayama, 2009: p 190).

### 7. *Metapone bakeri* Wheeler, 1916
(Figs 34–38)

*Metapone bakeri* Wheeler, 1916: 10, Fig.1—Alate Gyne; Type locality: Mt Banahao (= Banahaw) [14°04′N, 121°29′E], Luzon I, Philippines.
*Metapone bakeri*; Wheeler, 1919b: 180, Fig.5 a–c—Gyne.




**FIGURES 34–38.** *Metapone bakeri*, holotype gyne, see text for dimensions.

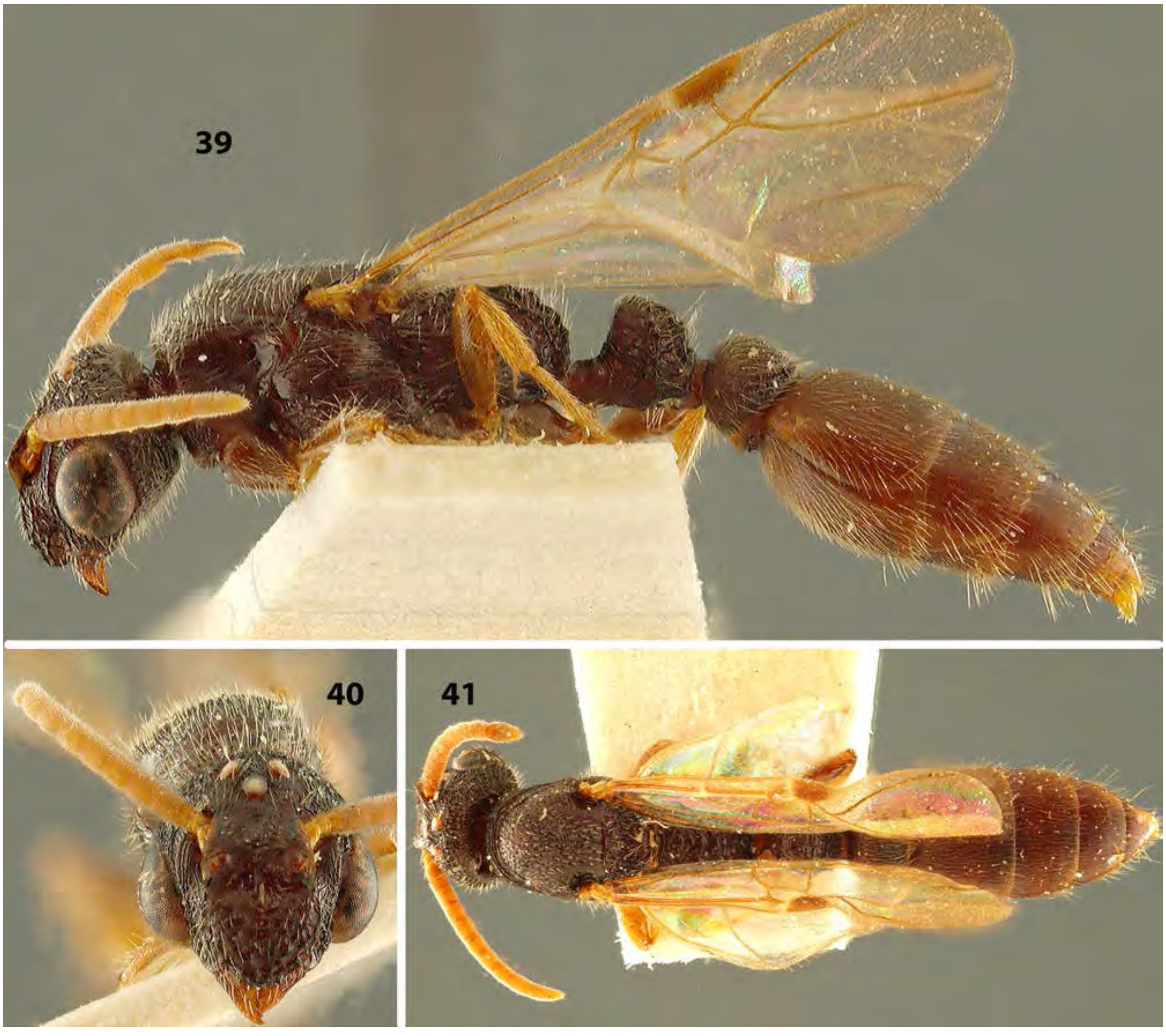
**Material examined.** Known only from the holotype gyne (MCZC). The specimen is mounted on a card point. The scutum has been damaged by a former mounting pin and a forewing is glued to a second card mount on the same pin.

**Gyne diagnosis.** General features as in original description (Wheeler, 1916), in the key to Asian species above and as illustrated here. *Metapone bakeri* is one of the most distinctive of all known *Metapone* species. Entire body, including mandibles and legs, uniquely smooth and highly reflective; almost completely without sculpturation except for a few, largely effaced, smoothed, highly vestigial longitudinal costular traces laterally on the pronotum, below the wing bases, on the extreme posteroventral areas of the mesepisternites, sides of propodeum and lower sides of petiole—all clearly visible only in appropriately reflected light. Cephalic surfaces and profiles generally more rounded, and the head more broad (CI 92) than in other species. Clypeus relatively broad, barely extended anteriorly, lacking denticles or other armament; anterior border a broad semicircle rounding continuously into frons; no trace of frontoclypeal suture. Ocelli relatively small. Very sparse pilosity on sides of pronotum and propodeum, petiole and postpetiole. Gaster more pilose than other parts of body. Pubescence lacking, except apically on antennal funiculi and parts of legs. Colour dark blackish-brown with reddish tinges, which are more distinct on postpetiole and gaster. Mandibles antennae and legs mahogany brown; mandibles slightly darker than antennae or legs. Subpetiolar extension a semi-translucent, relatively small, anteriorly-positioned blunt scalene-triangle (apex posteroventral), occupying less than one-third of the subpetiolar edge; remaining edge minutely concave, almost straight, curving very slightly ventrally at its posterior limit which is minutely rounded. Posterior subpetiolar face small, approximately semicircular in oblique view, with an entire, very slightly raised, finely carinate outer margin. Subpostpetiolar process barely inflated anteroventrally, lacking denticles or extensions.

*Dimensions*: TL: ca 7.7; HL: 1.48; HW: 1.36; CI: 92; MSL: 2.39; PMW: 1.05; PDW: 0.90; PetL: 0.60; PetW: 0.66; PetH: 0.89; PpetL: 0.54; PpetW: 0.81; PpetH: 0.73; GW: 1.50.

**8. *Metapone hewitti* Wheeler, 1919**
(Figs 39–41)

*Metapone hewitti* Wheeler, 1919a: 62—Male; Type locality: Kuching [01N, 110E], Sarawak, Malaysia.
*Metapone hewitti,* Wheeler, 1919b: 190, Fig 7—Male.




**FIGURES 39–41.** *Metapone hewitti*, holotype male, see text for dimensions.

Known only from two male specimens (MCZC—with red "Cotype" labels originally added by Wheeler). One has the postpetiole and gaster detached and glued to its mounting point, the other is undamaged. The latter is here designated lectotype, the former paralectotype (both so labelled). Their dimensions are respectively: HW (across eyes) 1.26, 1.24; MSL 2.32, 2.33. The lectotype is illustrated here.

Because it is male based, the epithet *M. hewitti* is functionally inaccessible as a species name, or a potential junior or senior synonym of other species recognized here, until males considered conspecific with the lectotype are collected with conspecific workers or gynes. The species, of course, is probably not yet represented in collections by its gyne or worker castes, so conspecificity and junior synonymy with prior species seems statistically unlikely. We consider the lectotype not to be conspecific with the male investigated phylogenetically by Ward et.al (2014), or with male types of the Sri Lankan *M. greeni*, the Bornean *M. quadridentata* or the Javanese *M. javana*, which have been examined here.

### 9. *Metapone jacobsoni* Crawley, 1924
(Figs 42–46)

*Metapone jacobsoni* Crawley, 1924: 389—Gyne; Type locality: Fort de Kok (now Bukittingii—0°18′20″S, 100°22′9″E), Sumatra, Indonesia.

= *Metapone nicobarensis* Tiwari and Jonathan, 1986:150, Fig.1—Worker, Gyne; Type locality: Rajendra Nagar, Nicobar Is [07°N, 93°E], India (NEW SYNONYMY).

**Distribution, material examined.** *M. jacobsoni* is represented here by its holotype and a single paratype, both alate gynes (BMNH). Labels: Holotype: (1) red, printed "Type"; (2) white handwritten "No 153"; (3) white, printed "Fort de Kok (Sumatra), 920m, October 1922, leg. E. Jacobson"; (4) white handwritten "*Metapone jacobsoni* Cr., Type". Paratype: (1) white handwritten "12/13"; (2) blue printed "Cotype"; (3) white handwritten "E. Jacobson, Fort de Kok, (Gad Boven I), Sumatra, iv 1914; (4) white handwritten "*Metapone jacobsoni* Crawley Cotype". Comparison confirms their conspecificity.

**Worker diagnosis.** General features as in original description (Crawley, 1924), the key above to Asian *Metapone* species and the relevant Figures. Posterior face of subpetiolar process in oblique view relatively large, triangular; subpetiolar angle in side view approximately a right angle, not spinose; subpetiolar lamella opaque, approximately equilaterally triangular (note that the petiole could not be viewed unobstructed in true profile for illustration; its somewhat obscure outline is highlighted in Fig 45). Other features are adequately illustrated here.

*Dimensions* (holotype, paratype): TL: 8.5, 8.75; HL: 1.48, 1.44; HW (across eyes): 1.00, 1.04; Maximum eye length: 0.42, 0.38; CI: 68, 72; MSL: 2.26, 2.30; PMW: 0.92, 0.94; PDW: 0.70, 0.72; PetL: 0.56, 0.60; PetW: 0.44, 0.46; PetH: 0.72, - ; PpetL: 0.44, - ; PpetW: 0.58, 0.58.

**The junior synonymy of *Metapone nicobarensis*:** The M. *nicobarensis* types were said at description to have been deposited in the entomological collection of the Zoological Survey of India, Calcutta. Curator Dr S. Sheena, searching on our behalf, has however been unable to locate them.

Dimensions of the worker holotype cited (*inter alia*) in the original description are: TL (as Body Length): 6.1; HL: 1.4; HW: 1.05; CI: 75; PMW (as Pronotum Width): 0.59; PetL (as Petiolar Node Length): 0.5; PetW (as Dorsal Petiolar Width): 0.56; PetH (as Petiole Height): 0.84; PpetL (as Postpetiolar Node length): 0.42; PpetW (as Dorsal Postpetiolar Width): 0.59; PpetH (as Postpetiole Height): 0.63. Those for the paratype gyne are: TL (as Body Length): 8.6; HL: 1.26; HW: 0.91; CI: 72; PMW (as Pronotum Width): 0.7; PetL (as Petiolar Node Length): 0.56; PetW (as Dorsal Petiolar Width): 0.49; PetH (as Petiole Height): 0.56; PpetL (as Postpetiolar Node length): 0.49; PpetW (as Dorsal Postpetiolar Width): 0.59; PpetH (as Postpetiole Height): 0.56.

*M. nicobarensis* was originally described and illustrated as having a "weak anterior (*clypeal*) lobe" (our italics), and thus to lack a rostrate median anterior clypeal projection of the type seen in workers and gynes of several other known Asian *Metapone* species. This character immediately distinguishes it from the Sri Lankan, *M. greeni* (compare Tiwari and Jonathan's figs 1a and 1c with Figs 16–20 here). Other Asian taxa lacking strong clypeal projections include the very differently sculptured Philippines taxa *M. gracilis* and *M. bakeri*.

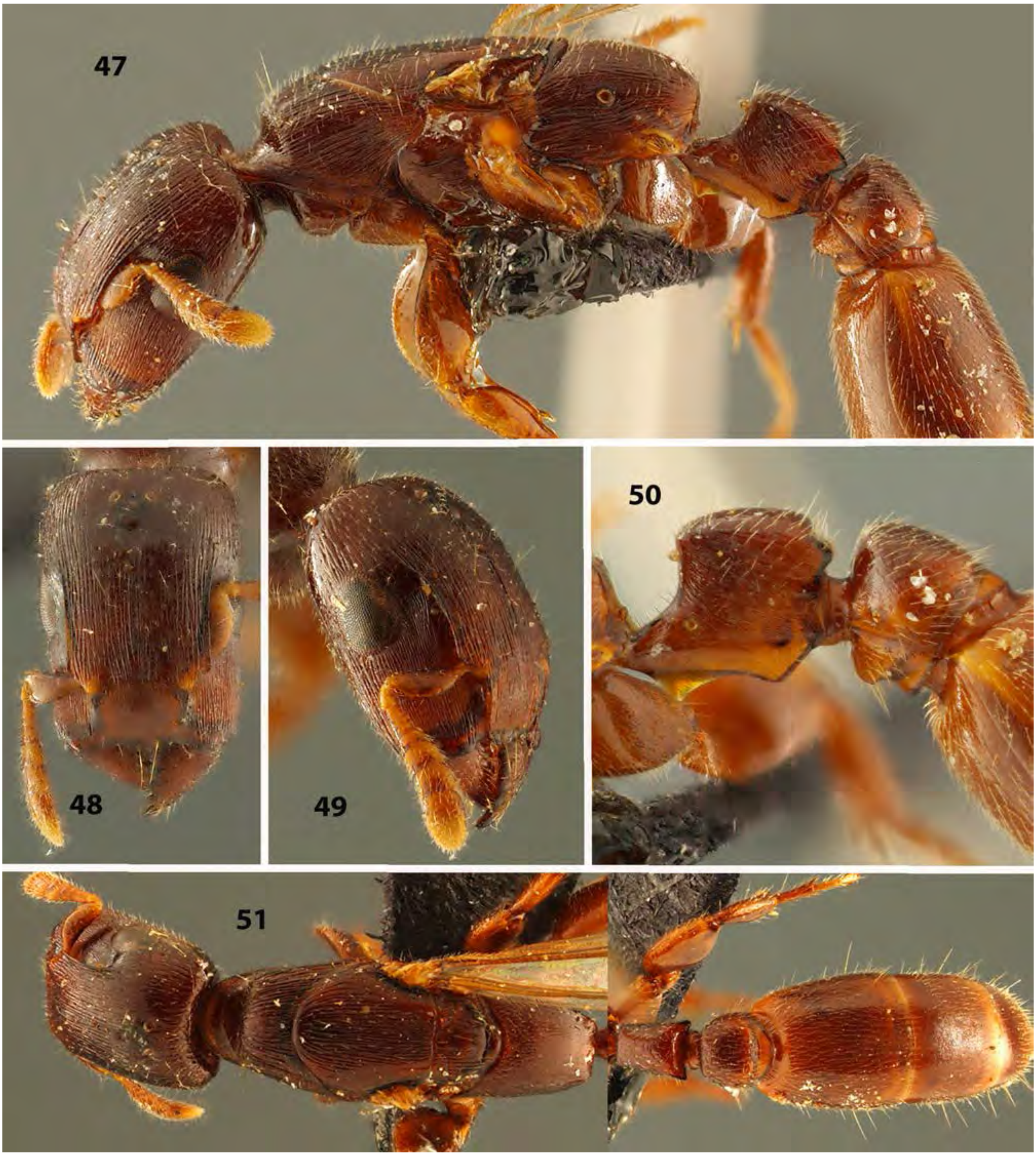
Consideration of the *jacobsoni* and *nicobarensis* descriptions and the *jacobsoni* type specimens suggests these taxa to be essentially identical. We are unable on available evidence to differentiate them, and therefore consider *M. nicobarensis* probably to be a junior synonym of *M. jacobsoni*. The discrepancy in promesonotal width measurements between their gyne types cited above are probably due to differences in the parameters used for measurement.


**FIGURES 42–46.** *Metapone jacobsoni*, holotype gyne, see text for dimensions.

If this assessment is correct, *M. jacobsoni* seems more likely to be introduced than native on Great Nicobar Island, and Sumatra is the most likely ancestral source for the island population. The two lands are separated by less than 200km of open ocean, across which there must have been much past human passage in small boats, perhaps often carrying unmilled (fire)wood, possibly facilitating introduction. The new synonymy is thus considered biogeographically plausible.

### 10. *Metapone gracilis* Wheeler, 1935
(Figs 47–51)

*Metapone gracilis* Wheeler, 1935b:38—Alate Gyne; Type Locality: Dapitan [8°35'N, 123°23'E]; Luzon I, Philippines.




**FIGURES 47–51.** *Metapone gracilis*, holotype gyne, HW 0.95, PNW 0.71, MSL 2.07.

**Material examined.** (1) the holotype gyne labelled as above (MCZC). The nodes and gaster are intact but detached and card-mounted below the incomplete point-mounted specimen; (2) a single alate gyne from Negros Island labelled "Camp 5-17-31, Dumagete P.I., J.W. Chapman" (MCZC) with the handwritten words "Heflin's house in room" on the underside of the label. Detailed matching affirms conspecificity of these specimens.

**Gyne diagnosis.** General features as in original description (Wheeler, 1935b), as illustrated here, and in the key to Asian species above. Lateral clypeal borders straight, slightly convergent anteriorly; clypeus anteriorly only slightly projected, anterior border with a pair of broad blunt teeth. Petiole and subpetiole as illustrated.

Dimensions (holotype, Dumagete specimen): TL: 6.75, - ; HL: 1.27, 1.30; HW: 0.95, 0.98; CI: 75, 75; CpL: 0.42, 0.43; CpI: 33, 33; MSL: 2.07, 2.17; PnW: 0.71, 0.72; PetL: 0.54, 0.56; PetW: 0.42, 0.44; PetH: 0.72, 0.69; PpetL: 0.45, 0.46; PpetW: 0.55, 0.55; PpetH: 0.59, 0.57; GW: 0.95, 0.98.

**Illustrations.** The Dumagete specimen, confidently identified by holotype comparison, is illustrated.

### 11. *Metapone quadridentata* Eguchi, 1998
(Figs 52–55)

*Metapone quadridentata* Eguchi, 1998: 605, Figs 1–9—Worker, Gyne, Male; Type locality: Poring [06N, 116E], Sabah, Malaysia.

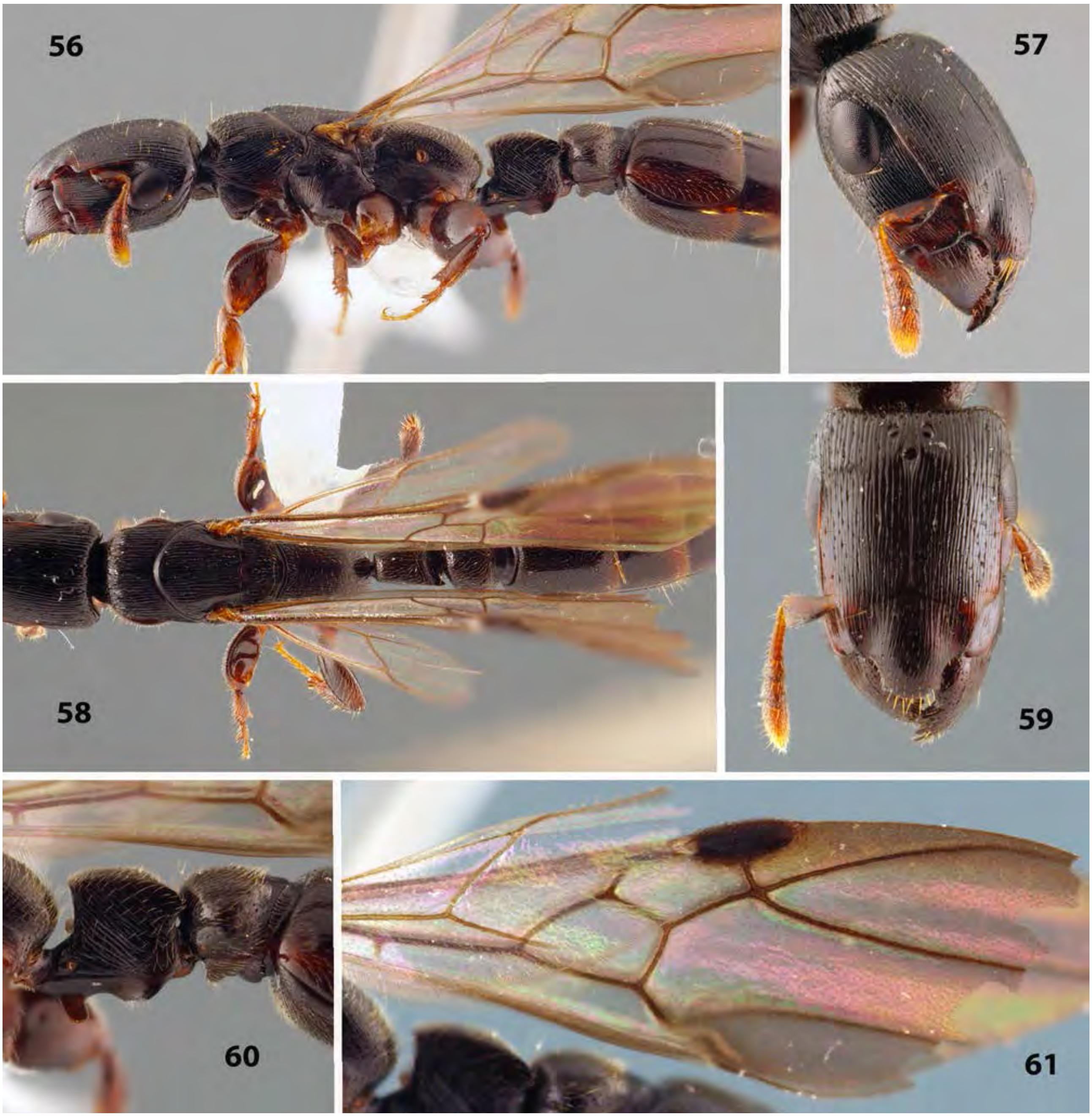

**FIGURES 52–55.** *Metapone quadridentata*, paratype worker, HW 1.21, PNW 0.57, MSL 1.42.

**Material examined.** Four worker paratypes from the Katsusuki Eguchi collection; one now deposited in ANIC. *M. quadridentata* is known only from the original series (11 workers and a gyne ) collected from a nest in rotten fallen wood, plus a single worker collected separately at the same locality (Eguchi, 1998).

**Worker diagnosis.** General features as in original description (Eguchi, 1998), the key to Asian species and illustrated here. Eyes relatively moderately large, multifaceted, maximum diameter around 2/3 the maximum width of an apical antennomere. Subpetiolar lamella in profile (Fig. 55) an anteriorly positioned, erect, translucent, posteroventrally bluntly-pointed hook-like structure, behind which the ventral subpetiolar edge curves quite strongly to meet the subpetiolar angle which encloses approximately 90°in lateral view. Posterior subpetiolar face approximately equilaterally triangular in oblique view, its outer margins with a fine raised, translucent, laminate carina which is higher towards the apex of the posterior face, and forms a distinctive translucent margin to the posterior subpetiolar profile in lateral view, visually doubling the outline. Subpostpetiolar process barely inflated anteroventrally, forming a slightly acute angle in profile; the anterior face small, sub-semicircular in oblique view.

*Dimensions*: (After Eguchi, 1998): TL 4.9–8.3; HL: 1.11–1.91; HW: 0.76–1.33; CI: 68, 70. CpL: 0.43–0.68; CpI: 39, 36; MSL: 1.30–2.44; PML: 0.63–1.26; PMW: 0.55–1.07; PMI: 48, 56; PDW: 0.48–0.88; PetL: 0.33–0.63; PetW: 0.35–0.68; PetH: 0.50–0.88; PpetL: 0.33–0.64; PpetW: 0.42–0.83; GW: 0.80–1.41. The cited indices were calculated from Eguchi's smallest and largest measurements for HL and HW (CI), HL and CpL (CpI) and MSL and PML (PMI). Cephalic proportions stated in the original description are equivalent to a CI range of 67–71, and the holotype has CI 71. Additional measurements are given with the original description. The smallest and largest of four paratype workers studied here have: HL (midline) 1.21, 1.68; HL (maximum) 1.26, 1.70; HW 0.87, 1.19; CI (based on midline HL) 72 71; PMW 0.57, 0.92. Note that Eguchi measured maximum HL so as to include the occipital lobes. Our measurements are taken from the midline of the occipital border.

**Gyne diagnosis.** See original description (Eguchi, 1998).




**FIGURES 56–61.** *Metapone balinensis*, holotype gyne, see text for dimensions.

**12. *Metapone balinensis* sp.n.**
(Figs 56–61)

**Type locality.** INDONESIA: western Bali [08°S, 115°E]. The specimen label reads "W. Bali" without further locality data.

**Distribution, material examined.** Known only from the unique holotype alate gyne collected by I.K.T. Ginarsa, 31, V, 1998.

**Type deposition.** holotype: MZBI.

**Gyne diagnosis.** General and diagnostic features as illustrated and reviewed in the key to Asian species above. Clypeus extended as a short rostrate process, narrowing slightly anteriorly; anterior border convex with subdentate anterolateral angles and an associated parallel groove beneath its leading edge bearing six anteriorly directed bristle-like setae. Posterior sections of lateral margins of clypeus (those in cranial conjunction) sub-parallel, somewhat vestigially incised. Profile of subpetiolar edge sinuate, markedly concave anteriorly, the posterior outline inflated ventrally to form a semicircular protrusion. Subpetiolar extension a small subopaque tabulate process, higher than wide and posteriorly inclined. Sculpturation essentially as described below for *M. wallaceana*.

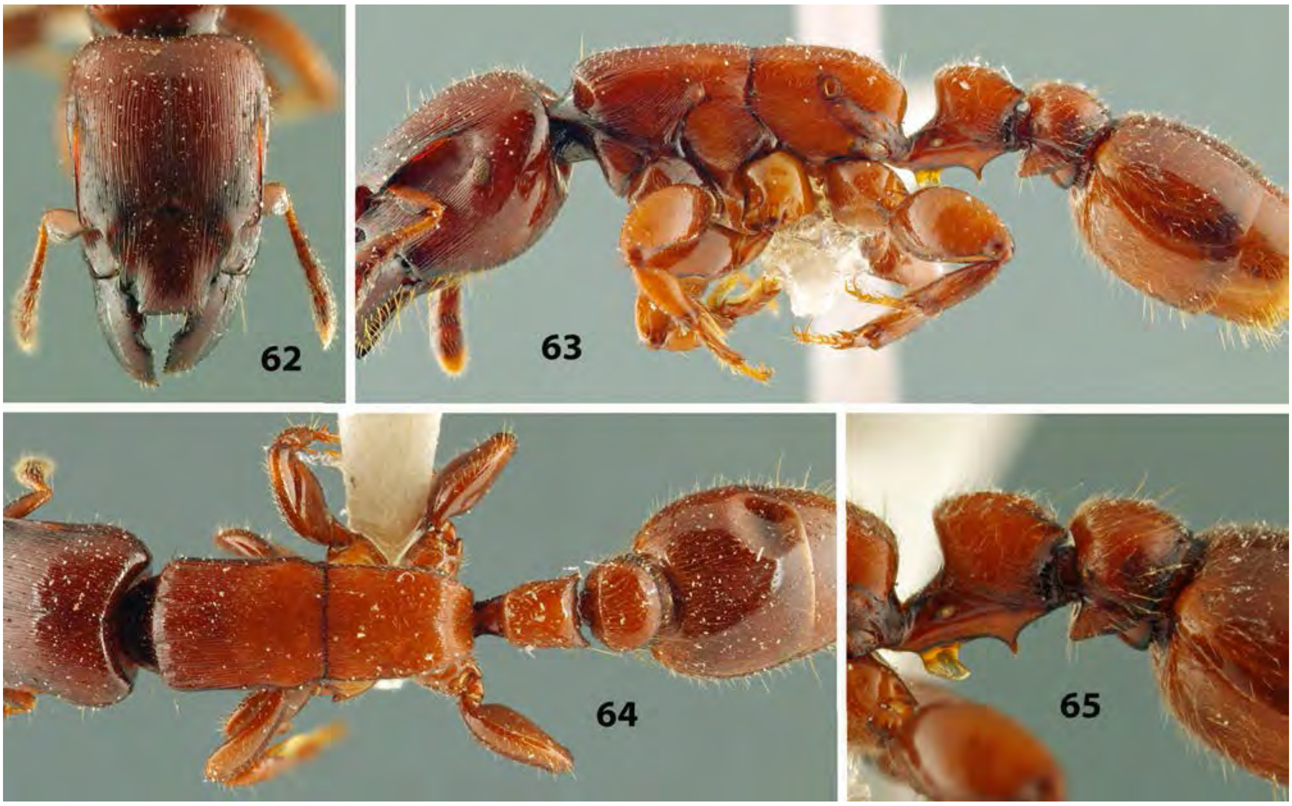
*Dimensions*: TL 8.2; HL 1.68; HW (across eyes) 1.21; CI 72; MSL 2.64; PW 0.96; PetW 0.52; PetH 1.0600; PpetW 0.81.

**Remarks.** The clypeal conformation, with its "moustache" of bristles is unique among known *Metapone* species.

**13. *Metapone javana* sp.n.**
(Figs 62–65)

**Type locality.** INDONESIA: java: *near Cibodas Botanical Garden* [6°44′S, 107°E].

**Type deposition.** MZBI: holotype worker, 6 paratype workers, paratype dealate gyne, 2 paratype males. ANIC: 2 paratype workers, 2 paratype males. Single paratype workers in BMNH, CASC, IZUK, MCZC, MHNG.




**FIGURES 62–65.** *Metapone javana*. holotype worker, see text for dimensions.

**Distribution, material examined.** Known only from the type nest series comprising the holotype worker, 18 paratype workers, a paratype dealate queen and 4 paratype males, collected by K. Yamauchi (5/Jan/2000, "nesting in a fallen tree in primary forest").

**Worker diagnosis.** General and diagnostic features as in the key to Asian species above and the accompanying Figures. Clypeus rostrate, transverse anterior border straight, without accessory denticles. Eyes relatively large, minutely multifaceted, maximum diameters subequal to the maximum width of an apical antennomere. Subpetiolar lamella a translucent, anteriorly-positioned hook-like structure, much as described above for *M. quadridentata*. Profile of subpetiolar edge behind the lamella curving posteroventrally on a longer radius than in *M. quadridentata* to meet the subpetiolar angle, which is drawn to an acute point in side view. Posterior subpetiolar surface acutely triangular in oblique view, its face minutely concave, with the outer edges distinctly margined but not carinate, sloping so strongly forwards that its ventral profile almost aligns with the subpetiolar edge. Subpostpetiolar process slightly extended, acutely triangular in lateral view.

*Dimensions*: (holotype, smallest paratype, largest paratype (ranked by HW): TL: ca. 8.95, 6.4, 9.3; HL: 2.12, 1.47, 2.13; HW: 1.52, 1.05, 1.57; CI: 72, 71, 74; PMW: 1.11, 0.72, 1.12; MSL: 2.31, 1.55, 2.40; PetL: 0.69, 0.46, 0.70; PetW: 0.60, 0.47, 0.62; PetH: 1.05, 0.75, 1.10; PpetL: 0.63, 0.46, 0.66; PpetW: 0.80, 0.58, 0.82; PpetH: 0.85, 0.60, 0.90; GW 1.58, 1.15, 1.66.

### 14. *Metapone wallaceana* sp.n.
(Figs 66–70)

**Type locality.** INDONESIA: Lombok: *Gaanga District, Rampek Village*, 08°22'S x 116°15'E.

**Type deposition.** holotype in MZBI.


**FIGURES 66–70.** *Metapone wallaceana*, holotype gyne, see text for dimensions.

**Distribution, material examined.** Known only from the unique holotype dealate gyne, collected with 2 worker pupae by Katsuyuki Eguchi (16 May 2006, ex soft rotting fallen log, edge of well-developed forest, ca 860m, colony Eg16V06-17). Eguchi's field notes recognize the series as a founding gyne with initial brood, but do not specify whether associated termites were present (K. Eguchi, *pers com*.).

**Gyne diagnosis.** General and diagnostic features as illustrated and in the key to Asian species above. Lateral borders of clypeus strongly anteriorly convergent; anterior border shallowly concave between subdentate anterolateral angles. Mesosoma (including propodeum) and head (except its underside) finely longitudinally striate; striae of mesepisternum and katepisternum dissimilar in orientation. Posterior face of subpetiolar process reduced, semicircular in oblique view. Subpetiolar angle in side-view vestigial, broadly rounded; profile of posterior subpetiolar face grading smoothly to join subpetiolar edge. Subpetiolar extension small, as illustrated, obtusely triangular, barely translucent.

*Dimensions*: TL 7.8; HL 1.34; HW (across eyes) 1.02; CI 76; MSL 2.20; PW 0.79; PetW 0.51; PetH 0.84; PpetW 0.66.

**Etymology.** Named for the biogeographic province of Wallacea.

## The Micronesian, Melanesian and Pacific species

Seven species are reported, with five described as new; four are from mainland New Guinea (one known also from New Britain and Micronesia) and one each from New Ireland, Guadalcanal (Solomon Islands), and Viti Levu (Fiji). Gynes and workers are known for one species, gynes alone for 4 and workers alone for 2. All Pacific records east of New Guinea are based on gyne specimens. *M. truki* is a possible tramp species, reported here from scattered localities in Micronesia, Indonesian West Papua, mainland Papua New Guinea and New Britain. This set includes both the gyne-based largest and smallest known *Metapone* species: *M. titan* and *M. salomonis*.

## Key to the Micronesian, Melanesian and Pacific species of *Metapone*

1. Subpetiolar extension a narrow, hook-like process, its base occupying less-than one-quarter of the subpetiolar edge in lateral view. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 2
- Subpetiolar extension an expansive triangular or rounded/subrectangular process, its base occupying at least half the subpetiolar edge in lateral view. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 3

2(1) The largest known *Metapone* species (gyne HW 2.3–2.5 mm, TL ca. 14–16 mm). Clypeal rostrum relatively very large and broad, projecting ca 0.68x its apical width beyond the lateral sections of the clypeus in frontal view (Papua New Guinea: New Ireland, gyne only, Figs 111–115). . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . *M. titan* **sp.n.**
- Smaller species (known HW 1.28mm, TL ca 7.5 mm). Clypeal rostrum smaller, projecting ca 0.44x its apical width beyond the lateral sections of the clypeus in frontal view. (mainland Papua New Guinea, worker only, Figs 101–105). . *M. philwardi* **sp.n.**

3(1) Clypeus apically rostrate, with a strong proboscis-like median extension projecting well beyond its lateral sections. . . . . . . . 4
- Clypeus projecting but barely rostrate, median apical section only slightly advanced beyond lateral sections, anterior border with an apical median, tab-like projection, a little narrower than the body of the sclerite, to which it is stepped on either side. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .6

4(3) Smaller species (HW 0.87mm). (Solomon Islands: San Cristobal, gyne only, Figs 106–110). . . . . . . . . . . . .*M. salomonis* **sp.n.**
- Generally larger species HW 0.85–1.22mm (Micronesia, New Guinea, New Britain). . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 5

5(4) (In gynes & workers) Frons, cheeks, clypeus, promesonotal dorsum and sides of pronotum and petiole distinctly and regularly longitudinally or diagonally finely striate (Figs 71–80). Clypeal projection relatively a little shorter and narrower than in the alternative (Figs 71, 73, 76, 78). Petiolar node relatively short and narrow (Figs 72, 74, 75, 77, 79, 80). Apex of subpetiolar extension inclined posteriorly, broadly rounded (Figs 72, 75, 77, 80) (Micronesia, mainland New Guinea, New Britain, gyne and worker). . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . *M. krombeini* M.R. Smith
- (In gynes & workers) Striae in relevant areas less-strongly developed and less-regular; partly effaced, especially on frons and cheeks (Figs 81–90). Clypeal proboscis relatively short and broad (Figs 81, 83, 86, 88). Petiole relatively short in lateral and dorsal view (Figs 82, 84, 85, 87,89). Subpetiolar extension similar to alternative, but with its apex acutely pointed (Figs 82, 85, 87, 90) (mainland New Guinea, gyne and worker). . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . *M. truki* M.R. Smith

6(3) Larger species (HW 1.48 mm, TL ca 8.8mm (N=1). Subpetiolar extension subrectangular, ca twice as long as deep, the outer corners minutely rounded (New Guinea, Gyne only, Figs 91–95).. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . *M. enigmatical* **sp.n.**
- Smaller species (HW 1.02–1.09mm, TL ca 7.1–7.4mm). Subpetiolar extension an approximately equilateral triangle, inclined posteriorly (Fiji: Viti Levu, gyne only, Figs 96–100) . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . *M. manni* **sp.n.**

## 15. *Metapone krombeini* M.R. Smith, 1947
(Figs 71–80)

*Metapone krombeini* M.R. Smith, 1947:76, gyne; Type locality: New Guinea, *Milne Bay* [10˚S, 150˚E].

**Material examined.** INDONESIA: West Papua (as "New Guinea: Neth"): *River Tor* (*mouth*), 4km E of Hol Maffen [1˚58'S x 138˚55'E] (T.C. Maa, VII-4-1959) alate gyne (LACMNH). PAPUA NEW GUINEA: Northern

Province: *Milne Bay*, KB Mission (K.V. Krombein, 26–28 Mar 1944) holotype alate gyne (USNMNH, Type No 58003): Madang Province: *Ohu village*, 5°26'S 145°68'E (M. Janda, hand collection ex rotten log, 100–200m, 22 viii 200'''2) ANIC: West New Britain Province: *Umboi Island* [5°32'S, 147°52'E]: *1km N of Awelkom*, 600m (G.A. Samuelson, 21–28.II.1967) alate gyne (LACMNH). The River Tor gyne is badly damaged by pinning, with the detached right forewing, postpetiole and gaster glued to the data label. It closely matches the *krombeini* holotype, and has a label by K. Yasumatsu identifying it as that species. An MCZC alate gyne from INDONESIA: West Papua (as "New Guinea: Neth") Vogelkop: Manokwari ("Menoekwari" [5°20', 134°05'], 75m (D. Elmo Hardy, vii-18-1957) is provisionally identified as *M. krombeini*. It generally agrees with the type but the proboscis is slightly different.

**Worker diagnosis.** General and diagnostic features as in original description (Smith, 1947) and Figs 76–80. Similar to gynes from New Guinea and Micronesia assigned below to the smaller *M. truki*, with differences itemised in the key to species above.

**Gyne diagnosis.** General features as in original description (Smith, 1947) and Figs 71–75. Similar to gynes from New Guinea and Micronesia assigned below to the smaller *M. truki*. The two species differ as specified in couplet 5 of the key to Melanesian species above. Colour dark brown, the gaster reddish-brown, TL: 3.36, HL: 1.72, HW (across eyes): 1.22, CI: 71, CpL: 0.65, CpI: 38, WL: 2.84, PetL: 0.78, PetW: 0.62, PetH: 0.98, PpetL: 0.64, PpetW: 0.79, PpetH: 0.74, GW: 1.34.

Five New Guinean workers and a male (LACMNH) are provisionally identified as *M. krombeini*.

## 16. *Metapone truki* M.R. Smith, 1953
(Figs 81–90)

*Metapone truki* M.R. Smith, 1953:135, worker; Type locality: Caroline islands, *Truk* (properly *Chuuck*) *Island* [7°00'N, 152°00'E].

**Distribution, material examined.** A relatively widespread species known from mainland New Guinea, New Britain and several Micronesian islands. Possibly dispersed by human activity. MICRONESIA CAROLINE ISLANDS: *Truk Island*: North Basin, Mt Chukumong, Moen, ex rotten breadfruit (R.W.L Potts, II-10-49) holotype worker (USNMNH, Type No 61855), paratype worker (CASC). *Truk*: no further data (Matsushima, xii-28-36) 2 mounted workers, and vial with brood (MCZC). *Dublon* (= *Tonoas*) *Island* [7°22'N, 151°52'](Z. Ono, XII 22 '35), 2 very damaged alate gynes (MCZC), 2 workers (LACMNH): Palau islands: *Koror Island* [7°21N', 134°38'E]: limestone ridge south of inlet, under dead bark (H.S. Dybas, 21 Jan. 1948) dealate gyne (MCZC). PAPUA NEW GUINEA: Madang province: *Upper Gogol Valley*, ca 24km W of Madang [5°4'S, 145°46'E], colony series ex rotting log, rainforest, ca 50m. (RWT, 20–23, 6, 1972) (ANIC). EAST NEW BRITAIN*: Yalom* [4°25'S, 151°45'E], 1000m (Noona Dan Expedition, 11 May 1962) 2 workers.

Our concept of *M. truki* is based on assertion of conspecificity between the holotype worker and workers from the various samples listed above. The New Guinean Gogol Valley colony series provides confident identification of a worker-associated gyne. Its smaller workers closely match the Micronesian holotype, and its larger workers demonstrate that there can be considerable intranidal size variation in this species. The specimens from Dublon Island are individually mounted on separate pins and identically labelled. They were almost certainly collected together, providing a matching Melanesian worker-gyne association. The Gogol colony was collected in lowland rainforest near the edge of a large recently (and environmentally questionably) clear-felled tract at a site previously deep in virgin forest, and thus almost certainly a "native" habitat unlikely to have been penetrated by an introduced species. We conclude that *M. truki* is probably of New Guinean rather than Micronesian origin, and that the Micronesian populations were likely derived from one or more introduced New Guinean propagules. The appropriate areas were subject to much aircraft and shipping movement by both Japanese and American forces during the Second World War (1942–1945).

**Worker diagnosis.** General features as illustrated and in the key to Micronesian, Melanesian and Pacific species above.


**FIGURES 71–75.** *Metapone krombeini*, holotype gyne; **FIGURES 76–80.** Worker, see text for dimensions.


**FIGURES 81–85.** *Metapone truki*, holotype gyne; **FIGURES 86–90,** worker, see text for dimensions.

Dimensions (listed in order: *M. truki* holotype; other Micronesian workers: smallest (M. *truki* Paratype, largest (LACMNH Dublon Island specimen); Gogol Valley colony series: smallest; largest): TL(ca): 6.0; 5.1, 6.2; 5.1, 6.8. HL: 1.18; 1.13, 1.32; 1.10, 1.61. HW: 0.88; 0.85, 0.95; 0.78, 1.11. CI: 75; 76, 72; 71, 69. CpL: 0.43; 0.41, 0.50; 0.42, 0.57. CpI: 36; 36, - ; - , 35. MSL: 1.44; 1.40, 1.65; 1.34, 1.96. PML: 0.75; 0.73, 0.88; 0.70, 1.03. PMW: 0.61; 0.57, 0.63; 0.55, 0.76. PMI: 52; 52, 53; 52, 53. PDW: 0.57; 0.52, 0.58; 0.47, 0.67. PetL: 0.44; 0.39, 0.47; 0.37, 0.62.

PetW: 0.35; 0.34, 0.40; 0.33, 0.51. PetH: 0.62; 0.57, 0.69; 0.54, 0.79. PpetL: 0.34; 0.32, 0.41; 0.32, 0.53. PpetW: 0.45; 0.43, 0.55; 0.41, 0.67. PpetH: 0.49; 0.47, 0.57; 0.44, 0.67. GW: 0.91; 0.88, 0.96; 0.85, 1.23.

**Gyne diagnosis.** General features as illustrated.

*Dimensions*: Gogol Valley colony Gyne: HL: 1.68, HW (across eyes): 1.06, CI: 63, CpL: 0.61, CpI: 36, WL: 3.52, PetL: 0.66, PetW: 0.52, PetH: 0.86, PpetL: 0.53, PpetW: 0.68, PpetH: 0.66, GW: 1.21. The Koror gyne *is* small and relatively heavily sculptured.

**Voucher specimen record** The Koror Island gyne is labelled "*Voucher specimen Gottwald study 1968 My-109*". Its mouthparts were discussed and illustrated by W.H. Gottwald (1969: p107, plate 80).

**17. *Metapone enigmatica* sp.n.**
(Figs 91–95)

**Type locality.** PAPUA NEW GUINEA: Eastern Highlands: *Aiyura* [6°20'S, 145°53'S] 1800m. (L.J. Gressitt, 10, 1, 1964).

**Type deposition.** ANIC (Type no 32-069966).

**Distribution, material examined.**

**Gyne diagnosis.** General and diagnostic features, sculpturation, pilosity and colour as illustrated and in the key to Pacific species above.

*Dimensions*: TL ca.: 8.8; HL: 1.73; HW (across eyes): 1.48; CI: 85; CpL: 0.68; CpI: 39; MSL: 3.00; PetL: 0.77; PetW: 0.98; PetH: 1.14; PpetL: 0.61; PpetW: 0.98; PpetH: 0.90; GW: 1.54.


**FIGURES 91–95.** *Metapone enigmatica*, holotype gyne, see text for dimensions.

**18. *Metapone manni* sp.n.**
(Figs 96–100)

**Type locality.** FIJI, VITI LEVU: *Nadarivatu* [16°34′S, 177°58′E].

**Type deposition.** ANIC (Type no 32-069965).

**Material examined.** Known only from the holotype gyne collected at 850 m elevation (8–13.iii.1963, C.M. Yoshimoto).


**FIGURES 96–100.** *Metapone manni*. holotype gyne, see text for dimensions.

**Gyne diagnosis.** General and diagnostic features, sculpturation, pilosity and colour as illustrated and in the key to Pacific species above. Anteromedian section of clypeus extended forwards slightly beyond its lateral margins, with a narrow, transverse, tab-like anterior section, stepped on each side from a wider base; anterior border straight. Clypeal surface immediately behind anterior border slightly raised on each side producing reflections suggesting vestiges of denticles. Subpetiolar edge straight in profile; subpetiolar angle slightly obtuse, its apex narrowly rounded; subpetiolar extension small, approximately equilaterally triangular, its apex slightly inclined posteriad, its base about half as long as the subpetiolar edge.

*Dimensions*: holotype, paratype: TL ca.: 7.1, 7.4; HL: 1.33, 1.41; HW: 1.02, 1.09; CpL: 0.47, 0.52; CpI: 35, 37; MSL: 2.22, 2.34; PnW: 0.79, 0.84; PDW: 0.70, 0.73; PetL: 0.54, 0.57; PetW: 0.64, 0.68; PetH: 0.81, 0.83; PpetL: 0.52, 0.54; PpetW: 0.72, 0.77; PpetH: 0.71, 0.79; GW: 1.07, 1.10.

**Remarks.** The wings were removed from 2 alate specimens to facilitate photography, and are now mounted on the specimen pins.

**Etymology.** Named for William M, Mann, the pioneering doyen of Fijian myrmecology.

## 19. *Metapone philwardi* sp.n.

(Figs 101–105)

**Type locality.** PAPUA NEW GUINEA: *Iora Creek, 17km S of Kokoda* [8°52′S, 147°44′E].

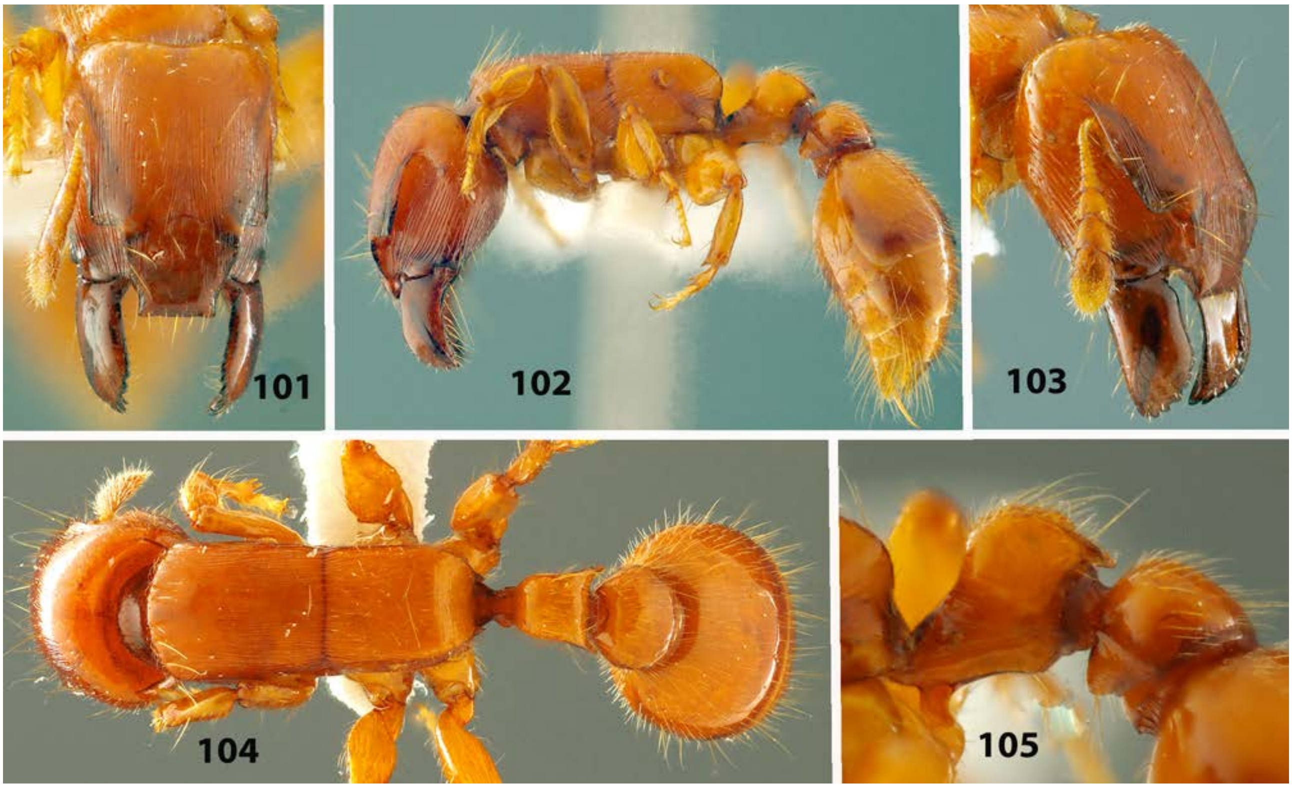
**Type deposition.** ANIC (Type No. 32-069964).

**Material examined.** Known only from the holotype worker, collected "ex rotten log", montane rainforest, 1400m" (5.viii.1976, P. S. Ward acc.no. 1826).

**Worker diagnosis.** General and diagnostic features, sculpturation and colour as illustrated and in the key to Pacific species above. Clypeus extended, shortly rostrate, anterior border straight, anterolateral corners right-angled. Clypeus, frons and cheeks finely longitudinally striate, most strongly on cheeks; dwindling somewhat posteriorly on frons; dorsum and sides of mesosoma similarly striate. Eyes minute, maximum diameter ca 0.05mm, with about 8 very indistinct, somewhat irregular unpigmented facets Petiole in dorsal view overall a little less wide than long, posterodorsolateral spines relatively acute and well-developed. Ventral subpetiolar edge concave in profile; subpetiolar angle broadly rounded; subpetiolar extension a small, barely translucent hook-like process placed anteriorly. Frons, petiolar dorsum and entire postpetiole and gaster with relatively long pilosity as illustrated; a distinctive transverse linear crest of long hairs anteriorly on pronotal dorsum; hairs elsewhere on mesosoma shorter and more dispersed.

*Dimensions*: TL: ca 7.5; HL: 1.64; HW: 1.28; CI: 78; CpL: 0.61; CpI: 37; MSL: 1.86; PML: 1.21; PMW: 0.86; PMI: 65; PDW: 0.73; PetL: 0.53; PetW: 0.57; PetH: 0.95; PpetL: 0.44; PpetW: 0.86; PpetH: 0.61; GW: 1.38.

**Etymology.** Named for our friend, the celebrated myrmecologist Philip S. Ward of the University of California, Davis.




**FIGURES 101–105.** *Metapone philwardi*, holotype worker, see text for dimensions.

**20. *Metapone salomonis* sp.n.**
(Figs 106–110)

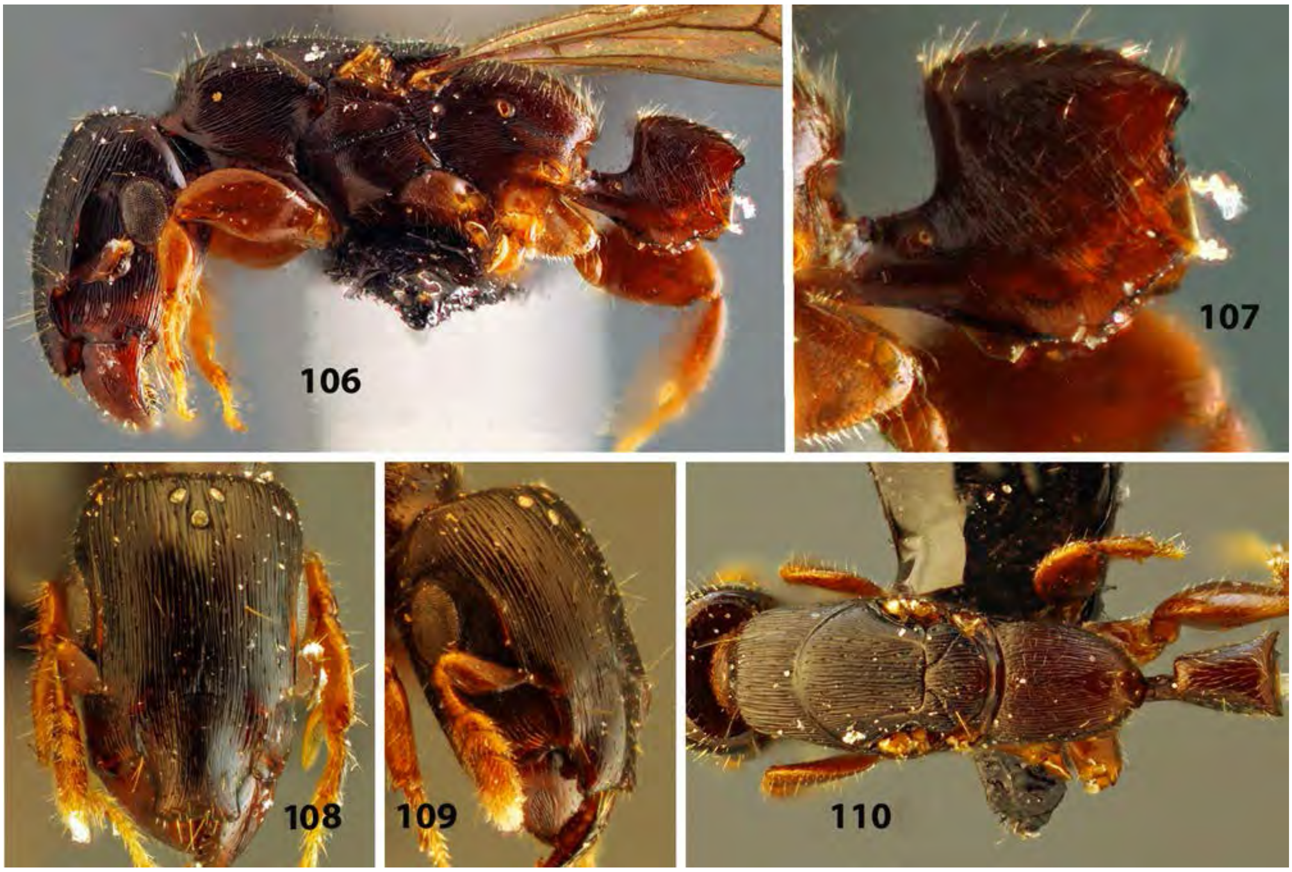
**Type locality.** SOLOMON ISLANDS: SAN CRISTOBAL: Wainoni Bay [10°68′S, 162°00′E].

**Type deposition.** ANIC (Type No. 32-069959).

**Distribution, material examined.** Solomon islands: san Cristobal (= Makira): *Wainoni Bay*, in flight, noon (P.J.M. Greenslade, 21;7;1965).

**Gyne diagnosis.** General and diagnostic features, sculpturation, pilosity and colour as illustrated and in the key to Melanesian and Pacific species above. Clypeus anteriorly rostrate, lateral margins of its posterior section converging anteriorly and indented on each side at the base of the narrower rostrum, anterior border concave, edentate, anterolateral corners in frontal view slightly raised, acute, almost right-angled, apices narrowly rounded. Subpetiolar angle in profile strongly obtuse, rounding to the subpetiolar edge, subpetiolar extension relatively very small, subsemicircular with tapered anterior border.

*Dimensions*: TL: (estimated) ca. 5.5–6mm; HL: 1.27, HW: 0.87, CpL: 0.46, CpI: 36, MSL: 1.97, PetL: 0.52, PetW: 0.43, PetH: 0.65. TL measurement is estimated (compare proportions of other species) because the specimen has lost its gaster.




**FIGURES106–110.** *Metapone salomonis*. holotype gyne, see text for dimensions.

## 21. *Metapone titan* sp.n.

(Figs 111–115)


**FIGURES 111–115.** *Metapone titan*. holotype gyne, see text for dimensions.

**Type locality.** Papua New Guinea: New Ireland Province: *Lemkamin*. The type locality is not recognisable. It will be within 25km of an axis between 2°25' 150° 23"S and 4° 51' 152° 52"E.

**Type deposition.** ANIC (Type No. 32-069963).

**Distribution, material examined.**

**Gyne diagnosis.** General and diagnostic features, sculpture, pilosity and colour as illustrated and in the key to Melanesian and Pacific species above. Clypeus relatively broadly rostrate over almost its full width; anterior border straight; anterolateral corners slightly acute, anterolateral borders minutely concave apically, as illustrated. Petiole in dorsal view overall somewhat wider than long; dorsal posterolateral spines well developed, acute, apices minutely rounded. Subpetiolar edge concave, posterior subpetiolar angle approximately right angled, subpetiolar a relatively long, narrow posteriorly-directed hook-like process. *Dimensions*: TL ca.: 14.3, 16.0; HL: 2.86, 3.08; HW: 2.30, 2.51; CI: 80, 81; CpL: 1.22, 1.29; CpI: 42, 42; MSL: 4.31, 4.85; PetL: 0.99, 1.12; PetW: 1.32, 1.51; PetH: 1.55, 1.70; PpetL: 0.92, 0.98; PpetW: 1.26, 1.41; PpetH: 1.18, 1.36; GW: 2.41, 2.68.

**Remarks.** The large size (which we expect will also characterise the workers) immediately identifies *M. titan* among all *Metapone* species discussed here. The clypeal and petiolar structures and sculpturation are also unusual in the genus.

## The Australian species

Seven species are recognized with three described as new. The worker alone is known for one, gynes alone for three, and both castes for two. Four species are known from N.E. Queensland, and three from S.E. Queensland, one of which is reported also from northeast and south coastal NSW. One is described from Flinders Island, Tasmania. Most mainland species have documented rainforest associations. *M. tricolor*, known from southern inland NSW and south-eastern South Australia and provisionally from far northeast Queensland, apparently inhabits *Eucalyptus*-dominated woodland.

Probable sympatric associations are indicated at the following rainforested localities: N.E. Queensland: Mossman Bluff Track (*M. tecklini*, *M. hoelldobleri*), Mt Sampson and Windsor Tableland (*M. tecklini*, *M. mjobergi*), Kuranda (*M. hoelldobleri, M. mjobergi*). S.E. Queensland—Lamington National Park (*M. leae*, *M. tillyardi*).

## Key to the Australian species of *Metapone*

1. Head flattened, its dorsal and ventral surfaces essentially parallel in lateral view. Mesosoma similarly flattened. Clypeus extended forwards over mandibles, its rostrum deeply concave on either side, anterior border straight, with relatively strong anterolateral denticles directed laterally. Subpetiolar extension lacking (southeast Queensland, gyne only, Figs 126–130). . . . . . . . . . . *M. leae* Wheeler
- Head and mesosoma normally proportioned, ventral cephalic profile broadly rounded. Clypeus otherwise. Subpetiolar extension present, distinct. . . . . . . . 2

2(1) Smaller species, HW (gynes and workers) 0.83–0.92 mm, usually low in that range. . . . . . . . 3
- Larger species HW (gynes and workers) 0.96–1.42 mm, usually high in that range. . . . . . . . 5

3(2). Subpostpetiolar process in lateral view seen as a very narrow digitate process (Flinders Island, Tasmania, worker only, Figs 156–159). . . . . . . . *M. mathinnae* **sp.n.**
- Subpostpetiolar process broadly to narrowly rounded, not appearing narrowly digitate in profile (mainland Eastern Australia). . . . . . . . 4

4(3) Head relatively elongate and narrow in frontal view (CI 66–68). Petiolar node in dorsal view clearly much longer than wide. A species possibly restricted to dry sclerophyll habitats (apparently widespread in Eastern Australia, far north Queensland to Victoria and SE South Australia (gyne only, Figs 141–145). . . . . . . . *M. tricolor* McAreavey
- Head in frontal view relatively broad (CI 75–77). Petiolar node in dorsal view very slightly longer than wide. Known only from tropical north Queensland rainforest habitat (gyne only, Figs 160–164) . . . . . . . . *M. tecklini* **sp.n.**

5(2) Clypeus extended forwards as a broadly lobate rostrum approximately as long as the remaining body of the sclerite. Larger species. Head proportionately narrow (HW: worker 1.28–1.42 mm, CI 73; gyne HW 1.36–1.45 mm, CI 68–70) (worker and gyne, Figs 146–155). . . . . . . . *M. hoelldobleri* **sp.n.**
- Clypeus not notably anteriorly rostrate. Smaller species with less-narrowed heads (relevant worker dimensions 96–118 mm, CI 77–80; gynes 108–131 mm, 74–77) . . . . . . . . 6

6(5) Anterior border of clypeus somewhat obscurely bicuspid. A partly variable species: some (perhaps most) workers with very reduced or vestigial eyes, others with distinct multi-faceted eyes (Fig 132). Petiolar node in workers and gynes in lateral view

relatively high and narrow; subpetiolar extension in lateral view semicircular, its base occupying the whole subpetiolar edge (Fig 130) (southeast Queensland, south from Big Tableland ca 22˚30S'; northeast New South Wales, apparently ranging south from Dorrigo (30˚S) distantly to ca 36˚S in the Batemans Bay area). . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . *M. tillyardi* Wheeler
Anterior clypeal border without dentate projections; its outline straight to very feebly concave or convex; anteroventral extremities each with a small squarish excision. All workers apparently with reduced, vestigial eyes (Figs 116, 117). Petiolar node in workers and gynes relatively small; subpetiolar extension in lateral view a posteriorly inclined triangle or low semicircle, its base anteriorly occupying about 2/3 of the subpetiolar edge (Fig 120). (North Queensland). . . . . . . . *M. mjobergi* Forel

## 22. *Metapone mjobergi* Forel, 1915
(Figs 116–125)

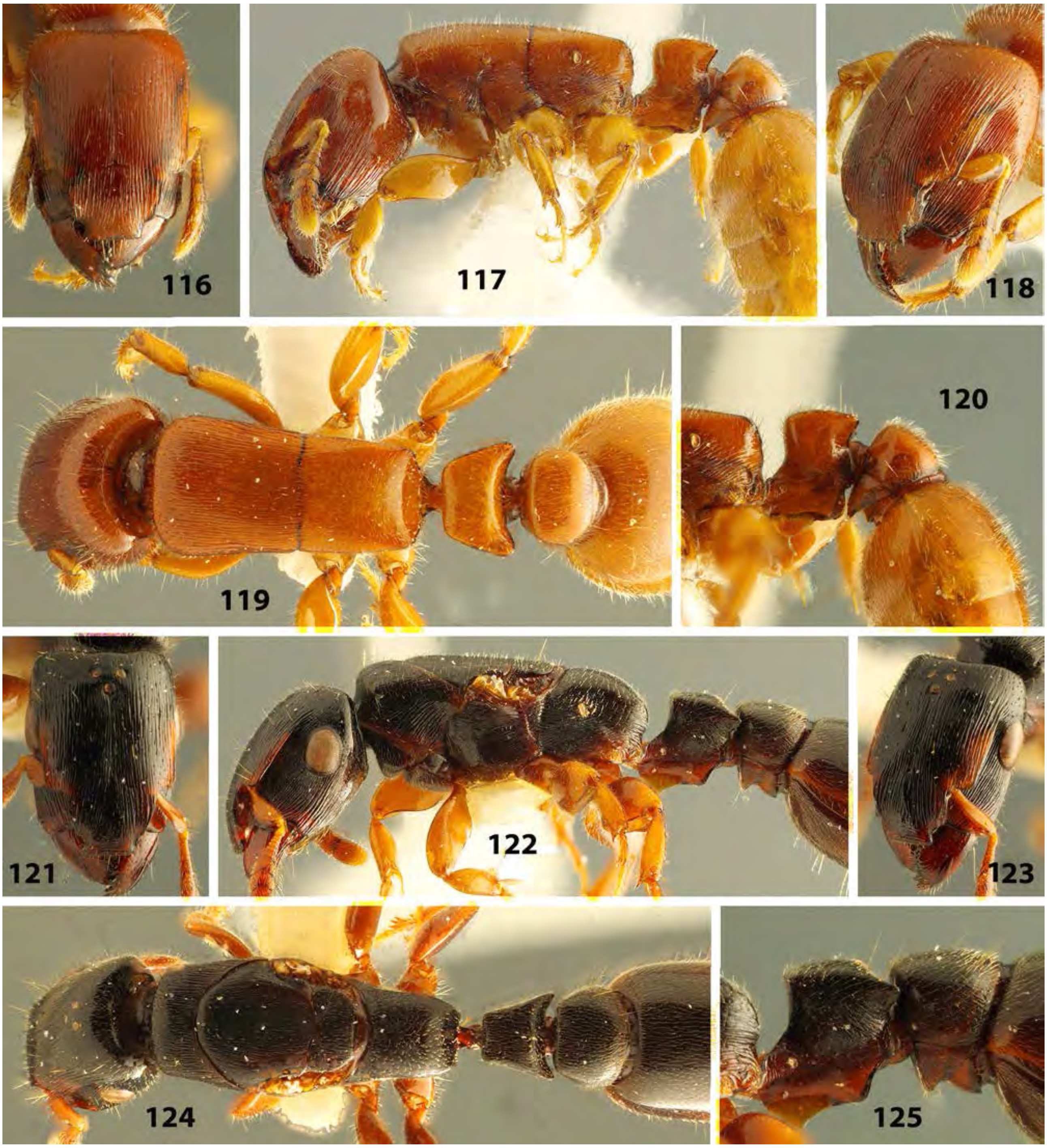
*M. mjöbergi* Forel, 1915: 36—Worker, Gyne; Type locality: Malanda [17°21'S, 145°35'E], N. Queensland.

**Material examined, distribution:** AUSTRALIA: N.E. QUEENSLAND: *Big Tableland*, 15°43'S, 145°17'E, 800m (ANZSES Expedition, 20 Dec 1990–8 Jan 1991), 2 alate gynes. *Big Tableland, N.W. corner*, 740m (ANZSES Expedition, 20 Dec 1990–8 Jan 1991), alate gyne. *Mt Sampson*, 15°48'S, 145°12'E, 600–790m (ANZSES Expedition, 27 Dec 1990–18 Jan 1991), 3 alate gynes. *Windsor Tableland* [16˚13S, 145˚02'E], ANZSES Site 6 (ES, 27 Dec 88–8 Jan 1989), 5 alate gynes. *Mt Lewis Rd*, [16˚58'S, 145˚27'E], 11km from highway (GBM, GIT, ANZSES Site1, 1, 000m, 18 Dec 1989–13 Jan 1990), alate gyne. *Near Kuranda*, [16˚44'S, 145˚44'E], ca 430m (RWT & JDF, 27/6/71, nesting in rotting log, rainforest) 2 workers. *3.2km E of Lake Barrine* [17˚15'S, 145˚38'E], 700m (RWT & JDF, 1/7/71, nesting in rotting log, with termites) 12 workers. *Lake Eacham* (17˚7'S, 145˚7'E], 750m (GBM, GIT & HJ, 9 Dec 1989–14Jan 1990) 3 alate gynes. *Gadgarra State Forest, 10km E. of Lake Eacham* (17˚7'S, 145˚37'[, 700m (GBM, GIT & HJ, 9–31 Dec 1989) 7 alate gynes. *Malanda* [17˚21'S, 145˚35'E](Type locality) (E. Mjöberg) syntype worker (MHNG). *PEI Road, Topaz*, [17˚24'S, 145˚41'E], Rainforest, 580m (GBM, DC & HJ, 6 Dec 93–25 Feb 1994) 4 alate gynes. *Charmillin Creek crossing*, *Tully Falls Rd*., 950m (GBM, GIT & HJ, 6 Dec 1989–5 Jan 1990) 4 alate gynes. *Kenny Road*, 17°28'S, 145°32'E, 850m (GBM & JH, 25 Nov 1994–10 Jan 1995, flight intercept trap) 2 alate gynes. *Polly Creek*, 17°28'S, 146°01'E, 80m (GBM & JH, 25 Nov 1994–10 Jan 1995, flight intercept trap) 2 alate gynes. *Massey Creek*, 17°37'S, 145°34'E, 1000m (P. Z, 3 Jan–4 Feb 1995, flight intercept trap) alate gyne. *Tully River crossing, 10km S of Koombooloomba Dam* (17˚50'S, 145˚36'E], 750m (GBM, GIT & HJ, 8 Dec 1989–4 Jan 1990) alate gyne. *Wallaman Falls Rd* [18°36′S, 145°48′E]?, 800m (GBM, GIT & Hamlet, 2 Jan 1987, rainforest) alate gyne. *Mt Bartle Frere, W base*, 17°37'S, 145°46'E, 50m (GBM & JH, 25 Nov–10 Jan 1995, flight intercept trap) alate gyne (collected with *M. mjobergi* gyne).Apparently endemic to the mountains and tablelands of the N.E. Queensland wet tropics at known elevations between 450 and 1000m. Unless stated labels indicate that all modern samples of gynes are from flight intercept or pitfall traps. The latter implying that mated gynes search partly on foot for termite host nests.

**Worker diagnosis.** General features as in original description (Forel, 1914), as illustrated here and cited in the key to Australian species above. Clypeus projecting anteriorly shortly beyond its lateral sections, not rostrate; anterior border shorter than the width of the body of the sclerite, stepped inwards at each corner; anterior border feebly concave to feebly convex. Eyes vestigial, very small and somewhat obscure, with 3 to 5 minute, irregular, indistinct facets. No evidence of polymorphism in eye size, as seen in *M. tillyardi*. Petiolar node approximately twice as wide as long in dorsal view. Subpetiolar extension shallowly sub-semicircular to triangular, its apex inclined forwards, base about ¾ as long as subpetiolar edge. Posterior subpetiolar face triangular, margined laterally but not apically. Subpostpetiolar process an acute point in lateral view. Sculpturation as illustrated.

*Dimensions*: (smallest and largest specimens respectively from Kuranda and E of Lake Barrine, N =14): TL ca: 5.4, 6.9; HL: 1.23, 1.51; HW: 0.96, 1.18; CI: 78, 78; CpL: 0.45, 0.52; CpI: 37, 34; MSL: 1.31, 1.84; PML: 0.78, 0.99; PMW: 0.72, 0.97; PMI: 60, 54; PDW: 0.58, 0.78; PetL: 0.37, 0.46; PetW: 0.50, 0.78; PetH: 0.64, 0.82; PpetL: 0.36, 0.47; PpetW: 0.50, 0.63; PpetH: 0.54, 0.73; GW: 1.0, 1.33. The MHMG syntype worker is relatively large, with HL 1.60; HW 1.23; CI 77; PW 1.05; MSL 2.27.

**Gyne diagnosis.** General features as in original description (Forel, 1915), as illustrated and in the key to Australian species above. Petiole in dorsal view about as wide as long with strong posterolateral denticles. Clypeus and subpetiolar process as in worker; subpostpetiolar process in lateral view shorter, less acute, narrowly rounded apically.




**FIGURES 116–120.** *M. mjobergi*, worker, Lake Eacham National Park, HW 0.96, PMW 0.72, MSL 1.31; **FIGURES 121–125.** Gyne, Lake Barrine National Park, HW 1.14, ScW 1.06, MSL 2.48.

*Dimensions*: (smallest (Lake Eacham) and largest (Wallaman Falls Rd) available specimens (N= 35): TL: ca 8.0, 9.0; HL: 1.55, 1.72; HW: 1.14, 1.31; CI: 74, 76; CpL: 0.54, 0.65; CpI: 35, 37; MSL: 2.48, 2.77; ScW: 1.06, 1.12; PetL: 0.55, 0.63; PetW: 0.61, 0.68; PetH: 0.80, 0.93; PpetL: 0.56, 0.61; PpetW: 0.77, 0.89; PpetH: 0.71, 0.87; GW: 1.17, 1.43.

**Illustrations.** The illustrated worker is from Lake Eacham N.P. and the gyne from nearby Lake Barrine N.P.

**Congeneric sympatric associations.** Sympatric with *M. tecklini* on Mt Sampson and Windsor Tableland and with *M. hoelldobleri* near Kuranda.

**Remarks.** *M. mjobergi* and *M. tillyardi* are similar, possibly related species.

**Nomenclature.** Wheeler (1919b) erroneously emended the species epithet *mjöbergi* to "*mjoebergi*", which would be correct under the International Code of Animal Nomenclature if Mjöberg's surname was German. That name is in fact Swedish, so the correct emendation is "*mjobergi*".

### 23. *Metapone leae* Wheeler, 1919
(Figs 126–130)

*M. leae* Wheeler, 1919b: 183, Figs 3, 4, Gyne; Type locality: Tamborine Mountain [27S, 153E], Queensland.


**FIGURES 126–130.** *M. leae*, syntype gyne, HW 1.15, ScW 0.99, MSL 2.15.

**Distribution, material examined.** AUSTRALIA: S.E. Queensland: *Tamborine Mountain* [27S, 153E] (cited as "Mt Tambourine") no further data (A.M. Lea) 11 syntype gynes. *Lamington National Park*, 28.207°S, 153.137°E, 471m (C. Lambkin, N. Starick, 15–15 Jan 2007, rainforest, malaise trap, IBISCA Qld Plot #IQ-500-D), two alate gynes mounted separately (QMBA). Known only from these two rain-forested habitats in extreme S.E. Queensland. Probably present also in N.E. NSW, depending on the distribution of termite host species.

Specimens from the type series (syntypes, labelled as "cotypes" by Wheeler) have been examined from the following collections: ANIC (7 specimens on 4 pins), MCZC (2; 1), USNMNH (1). Wheeler reported 22 specimens in the original series. All but one of the ANIC examples are damaged or fragmentary. One of the MCZC specimens is here designated lectotype, and the remaining specimens paralectotypes (all appropriately labelled). An intact type-compared Lamington National Park specimen is illustrated. It was originally alate. Its wings were removed to facilitate photography, and are card-mounted on the specimen pin.

**Gyne diagnosis.** General and diagnostic features as illustrated and keyed here, and in Wheeler's detailed (1919b) description and figures. Readily identified in the key to Australian species above. *M. leae* is one of the most peculiarly recognizable of all known *Metapone* species by virtue of its uniquely flattened head and mesosomal profiles (see Figs), laterally directed clypeal denticles, unusually constituted petiolar node (with the dorsum raised well above the level of the posterolateral denticles, the latter posterolaterally directed, and the posterior border in dorsal view between the denticles narrowly, medially convex and bilaterally concave, and the very reduced subpetiolar configuration. These characters will, we expect, be present also in the worker caste. The frontal carinae are densely translucent, so that in full frontal view the antennal bases can be faintly seen beneath (Fig 128).

Dimensions (Smallest Lamington N.P. specimen, lectotype): TL: 7.05, 6.93; HL: 1.48, 1.56; HW: 1.15, 1.18; CI: 78, 76; CpL: 0.58, 0.58; CpI: 39, 37; MSL: 2.15, 2.29; ScW: 0.99, 0.98; PetL: 0.49, 0.52; PetW: 0.50, -; PetH: -, 0.58; PpetL: 0.51, -; PpetW: 0.61, -; PpetH: -, 0.68; GW: 1.16, 1.14. The three head-intact ANIC paralectotypes have HW values 1.16–1.19 and CI values of 72–75, and the second Lamington N.P. specimen has HW 1.14, CI 76.

**Congeneric sympatric associations.** The Lamington National Park Record implies that *M. leae* is sympatric there with the *M. tillyardi.*

## 24. *Metapone tillyardi* Wheeler, 1919
(Figs 131–140)

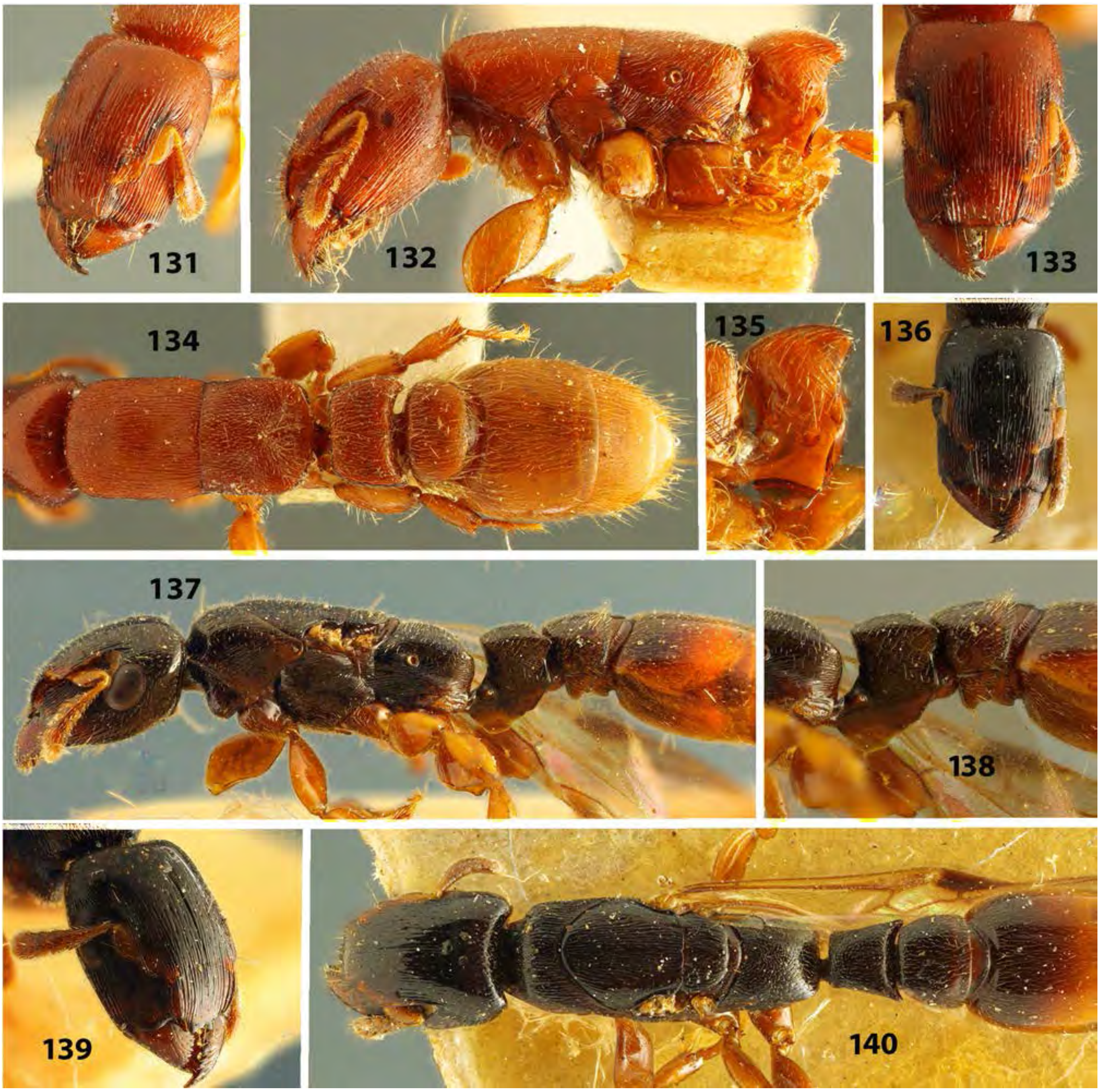
*M. tillyardi* Wheeler, 1919b: 187, Fig 6 a, b—Worker; Type locality: Dorrigo, New South Wales.

**Distribution, material examined.** AUSTRALIA: QUEENSLAND: *Lords Table, W slopes*, 22°39'5"S, 148°00'7"E, nest in rotting log, vine scrub, 60m (C. Burwell, 7 March, 2006, QMBA) dealate gyne, 8 workers on 3 pins; *Stony Creek, via Samford,* 27°20'S, 153°48'E, 850m (HJ &GBM, 22 Oct–2 Feb 1995, open forest, flight intercept trap), Gyne. *Banyo* [27˚22'S, 53˚04'E], branch of 'pine' tree (October 2005 J. Gray acc 12394) 7 alate queens (QMBA). *Lamington National Park*: 11 alate gynes with various data, as follows: 28.142˚S, 153.133˚E, Plot #IQ-300-D, 248m, 13–23 Jan 207 (GBM, 22162, n=1); 28.151˚S, 153.138˚E, Plot #IQ-300-C, 260m, 13–23 Jan 207 (GBM, 22161, n=2); 28.155˚S, 153.139˚E, Plot #IQ-300-B, 282m, 13–23 Jan 2007 (GBM & RM, 22183, n=1); same data (IBSCA 22139, GL & NS, n=4); same data (Plot #IQ-300-C, 260m, n=1); 28.193˚S, 153.128˚E, IBISCA 700c, 2 Nov–9 Dec, 2008 (GBM, n=1); 28.227˚S, 153.131˚E, Plot #IQ-900-D, 920m, 14–24 Jan 2007 (CL & NS, 221s, n=1) (QMBA). NEW SOUTH WALES: *Acacia Plateau* (28;152) (J. Armstrong, 3.1.48, ANIC) alate gyne. *Brooklana* (30;152) (W.W. Froggatt, ANIC) dealate gyne. *Dorrigo* (30;152) 5 syntype workers from the following collections: ANIC (3 specimens on 2 pins), MCZC (2-1), QMBA (1). *Sunshine Bay* 35°45' S 150°13' E ex Willow (*Salix* sp.) branch in caravan park J.A.L Watson & RWT 5 v 1990 ANIC. All Queensland labels from localities except Lords Table indicate collection in rainforest by Malaise or flight intercept trap. Note that the word "pine" on the Banyo labels is given in parentheses. It presumably does not refer to an exotic tree of genus *Pinus*.

Apparently widespread in S.E. Queensland and northeastern NSW, at least between S latitudes 22 and 35. The types were almost certainly collected in rainforest at Dorrigo National Park (30°22'S, 152°45'E). Worker/gyne identity of unassociated specimens is confirmed by the Lords Table series.

**Worker diagnosis.** General and diagnostic features as illustrated and keyed here, and in Wheeler's detailed (1919b) description and figures. Note however that the original description (Wheeler, 1919b) did not mention that some of the worker types have reduced eyes, and less massive propodeal and waist node configuration than that of the lectotype (see above). Clypeus projecting anteriorly less than in *M. mjobergi*; anterior border somewhat obscurely bicuspid, with a pair of blunt projections at approximately its outer quarters, the space between them shallowly excavated, concave and raised almost to their apices. Eyes and waist nodes as discussed above. Subpetiolar process differing from *M. mjobergi* as in couplet 6 of the key to Australian species above. Posterior subpetiolar face as in *M. mjobergi*. The Sunshine Bay specimens are relatively small and gracile and have reduced petioles. They were taken from a colony which might not have been large enough ergonomically to produce large, less-gracile workers.

*Dimensions*: (MCZC Syntype, the 2 intact ANIC syntypes, other specimens not syntypes, Sunshine Bay series: TL ca: 6.3, 6.4, 6.7, 6.9, 5.6, 6.6; HL: 1.30, 1.32, 1.42, 1.47, 1.24, 1.45; HW: 1.01, 1.04, 1.11, 1.17, 0.99, 1.14; CI: 78, 79, 78, 79, 80, 79; CpL: 0.42, 0.40, - , 0.48, 0.40, 0.48; CpI: 32, 30, - , 33, - , - ; MSL: 1.83, 1.86, 2.05, 2.00, 1.56, 1.85; PML: 1.02, 1.08, 1.15, 1.27, 1.00, 1.00; PMW: 0.91, 0.93, 0.98, 0.96, 0.75, 0.85; PMI: 56, 58, 56, 63, 64, 54; PDW: 0.84, 0.88, 0.94, - , 0.65, 0.72; PetL: 0.56, - , 0.61, 0.53, 042, 0.49; PetW: 0.83, 0.91, 0.89, 0.78, 0.57, 0.68; PetH: -, - , - , - , 0.70, 0.84 PpetL: 0.51, - , 0.55, 0.52, 0.37, 0.42; PpetW: 0.78, 0.81; 0.86, 0.77, 0.58, 0.67; PpetH: -, -; - , - ; 0.59, 0.70; GW: 1.20, 1.21, 1.33, 1.45, 1.01, 1.1. Two damaged, otherwise unmeasured ANIC syntypes lacking waist nodes and gasters have HW 1.01 and 1.11 mm. Some syntype measurements were not possible due to glue or anatomical obstruction. Note also the differences in petiole and postpetiole dimensions in the two ANIC syntypes. The larger specimen has a relatively small petiole and postpetiole and virtually imperceptible, vestigial eyes, while the smaller specimen has large eyes, much as illustrated in Figs 131 and 132, and more massive propodeal and waist node structure. Possible significance of these details is unknown.




**FIGURES 131–136.** *M. tillyardi*, worker, Brooklana, NSW, HW 1.01, PMW 0.91, MSL 1.83; **FIGURES 137–140.** gyne, HW 1.15, MSL 2.38.

**Gyne diagnosis.** General features as illustrated. Clypeus and subpetiolar process as in worker. Mesosoma in dorsal view more bulky than in gynes of *M. mjobergi*.

*Dimensions*: The available gynes vary little in size (HW 1.11–1.19 mm, N = 17). One from Banyo with mean HW has: TL: ca 8.4, HL: 1.47, HW: 1.13, CI: 77, CpL: 0.42, CpI: 29, MSL: 2.38, PetL: 0.58, PetW: 0.64, PetH: 0.72, PpetL: 0.48, PpetW: 0.66, PpetH: 0.67, GW: 1.21.

**Discussion:** *M. tillyardi* is apparently a relatively widespread species ranging at least from southeast Queensland to the vicinity of Sunshine Bay on the south shore of Batemans Bay, NSW. Its worker caste is significantly morphologically variable, possibly evidencing incipient caste polymorphism, on the following grounds: (1) The available Dorrigo worker types include specimens with relatively large eyes and robust propodeal, petiolar and postpetiolar structure (as illustrated in Figs 131–136), along with others which are more gracile, with less robust propodea and petiolar nodes, and with eyes very reduced to absent. Wheeler's original description and illustrations (Wheeler, 1919b) featured only the former, overlooking this variability in the type-series. (2) Ten workers from Sunshine Bay satisfy the *M. tillyardi* diagnosis but the specimens are mostly relatively small. They have even less-robust propodeal and waist structure than the gracile, optically-reduced Dorrigo syntypes. They also have small, essentially vestigial eyes similar to those of the more gracile Dorrigo types. This interpretation depends in part on a reasonable assumption that the Dorrigo and Batemans Bay series are genuinely conspecific. The alternative possibility that two species are represented in Wheeler's type series, with one of them present also at Sunshine Bay, seems improbable.

**Illustrations.** The illustrated gyne (Figs 136–140) is the confidently identified Brooklana, NSW, specimen listed above.

**Remarks.** *M. tillyardi* and *M. mjobergi* are similar, possibly related species.

**Congeneric sympatric associations.** The Lamington National Park Record implies that *M. tillyardi* is sympatric there with *M. leae.*

## 25. *Metapone tricolor* McAreavey, 1949

(Figs 141–145)

*M. tricolor* McAreavey, 1949: 4, Figs 17–19—Gyne; Type locality: Nyngan, New South Wales.

**Distribution, material examined.** AUSTRALIA: NEW SOUTH WALES: *Nyngan* (31°34'S, 147°12'] (J. Armstrong, 9, 9, 47) holotype alate gyne (ANIC). SOUTH AUSTRALIA: *Strathalbyn*, 35°16'S, 138°54'E, in water trough (R.D. Robinson, 25, 01, 87) alate gyne (SAMA). *Kangaroo Island, eastern end* (J. O. Schmidt, 1 Jan 1999) alate gyne (ANIC). Also provisionally identified below from far northeast QUEENSLAND.

Evidently widespread in south-eastern (or eastern) Australia, though known only from the specimens discussed here.

Provenance of the Kangaroo Island alate is uncertain. It was collected alive in late afternoon inside a tour bus which had arrived from its Adelaide base that morning by road and ferry and had then travelled widely on the Island (J.O. Schmidt, *pers com*.). The specimen could have entered the bus between Adelaide and Cape Jervis, but Kangaroo Island seems more likely.

**Gyne diagnosis.** General features as described by McAreavey (1949) and in the key and figures presented here. Clypeus narrowed anteriorly, with slight anterolateral extensions, barely denticles. Subpetiolar process, relatively simple; subpetiolar lamella translucent, almost semicircular and nearly as long as the ventral edge; posterior subpetiolar surface approximately equilaterally-triangular, its outer edges minutely carinate. Distinguished from most other known Australian *Metapone* species by medium size, (HW 0.84–0.89), narrow, elongate head (CI 66–68), relatively light sculpturation, and the clypeal and subpetiolar structure. Gynes of the larger Australian *Metapone* species have the collective HW range of 0.99–1.45. The *M. mathinnae* worker holotype has HW 0.84, CI 78, and the type series *M. tecklini* gynes HW 0.83–0.92, CI 75–77.

*Dimensions*: (holotype, Strathalbyn specimen, Kangaroo Island specimen): TL: ca 7.8, 6.7, 7.4; HL: 1.31, 1.27, 1.29; HW: 0.89, 0.84, 0.88; CI: 68, 66, 68; CpL: 0.41, 0.42, 0.43; CpI: 31, 33, 33; MSL: 2.33, 2.16, 2.29; ScW: 0.79, 0.75, 0.74; PetL: 0.63, 0.55, 0.58; PetW: 0.45, 0.47, 0.49; PetH: 0.82, 0.73, 0.78; PpetL: 0.56, 0.45, 048; PpetW: 0.63, 0.56, 0.61; PpetH: 0.71, 0.63, 0.66; GW: 0.97, 0.92, 96. Measurements of the Strathalbyn specimen apart from TL are separately all within 87–97% of those of the holotype (mean 92%), for the Kangaroo Island specimen 88–99% (mean 96%). The least consistent dimensions are those of the petiole and postpetiole, indicating differences in relative proportions.

**Provisionally determined material:** Despite the far-distant location in north east Queensland we relate the following provisionally identified specimen to *M. tricolor*: N.E. QUEENSLAND: *2km N of Rokeby* (13°39'S 142°.40'E] flight intercept trap (15 Feb–18 March, 1994, P.Z & M.S.) alate gyne (ANIC). It matches the diagnosis above and its indices are similar to the other specimens reviewed, but it is somewhat smaller. Dimensions (with appended percentage comparisons with the *M. tricolor* holotype): TL: ca 5.9; HL: 1.04 (79%); HW: 0.70 (78%); CI: 67; CpL: 0.37 (90%); CpI: 35; MSL: 1.75 (75%); ScW: 0.60 (76%); PetL: 0.45 (71%); PetW: 0.38 (84%); PetH: 0.59 (72%); PpetL: 0.43 (77%); PpetW: 0.49 (78%); PpetH: 0.57 (80%); GW: 0.70 (76) (Average difference 78%). Note especially the CI value.


**FIGURES 141–145.** *M. tricolor*, holotype gyne, HW 0.89, ScW 0.79, MSL 2.33.

All specimens discussed here, including the Rokeby individual, have similar sculpturation with only slight variation in its intensity of expression: frons largely smooth and shining with irregularly-spaced very fine striae anteriorly from about the anterior level of the eyes, and a stronger incised median line reaching to the anterior ocellus. Antennal fossae and cephalic cheeks with more intense, close-spaced and regular striation. Mesosomal dorsum and sides very finely and somewhat thinly striate, much like the anterior frons, apart from the sparsely point-punctate propodeal dorsum. Sides of petiole similarly but less-strongly striate.

**Possible termite associations:** Acceptance of conspecificity among the above specimens presumes *M. tricolor* to be very widespread in dry *Eucalyptus* woodland. If it is an obligate associate of a single termite species that species must be present across that *tricolor* range. Possibilities are the subterranean species *Coptotermes acinaciformis* (Froggatt) or *C. frenchi* Hill (both Rhinotermitidae) or the probably less-likely *Ephalotermes argutus* (Hill) (Termitidae) (Watson & Abbey, 1993, maps 41, 45, 170).

## 26. *Metapone hoelldobleri* sp.n.

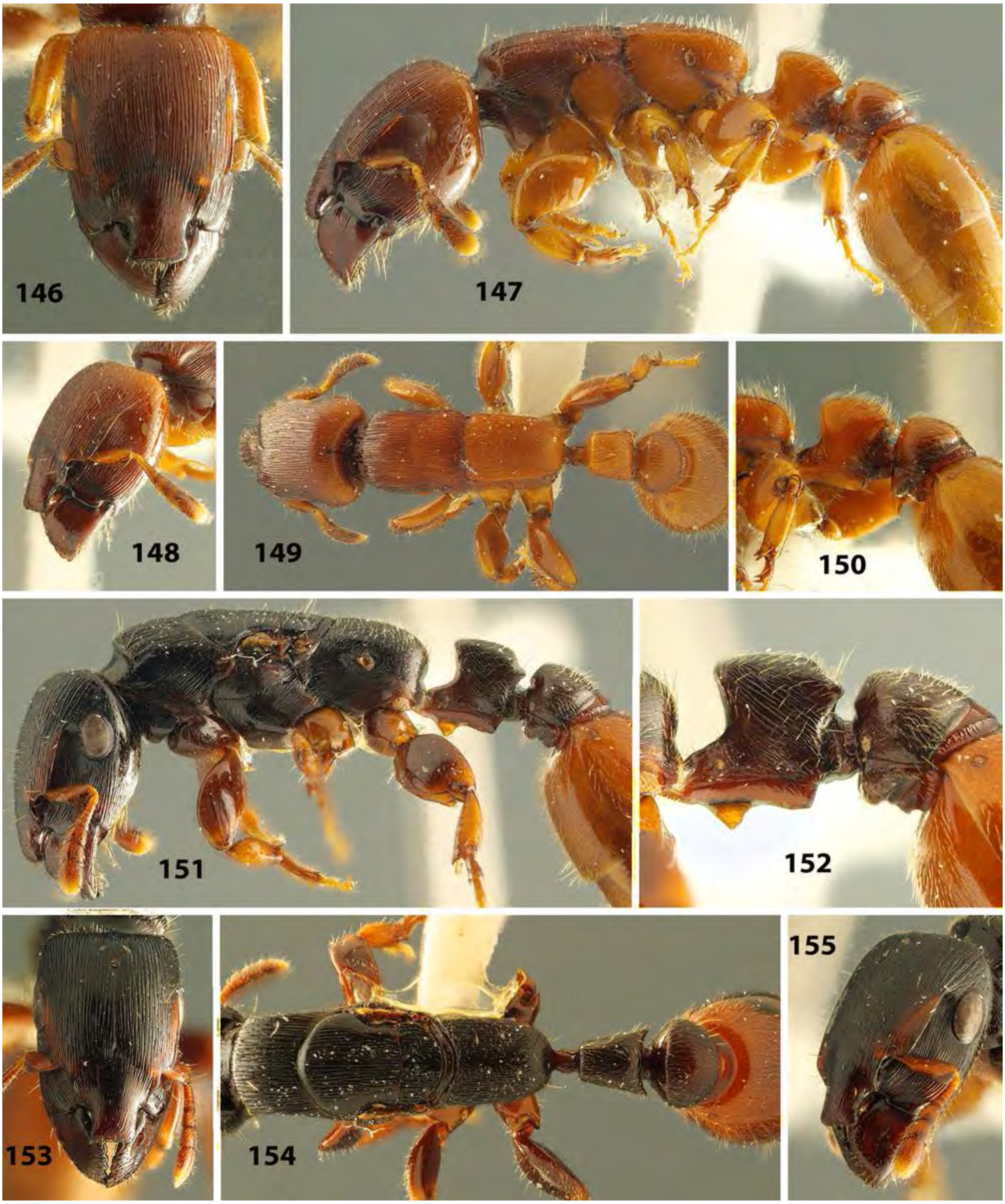
(Figs 146–155)

**Type locality.** AUSTRALIA: N. E. QUEENSLAND: *W. McNamee Creek*, 17°40'S, 145°43'E, near Innisfail.

**Type deposition.** holotype and paratypes from all localities in ANIC (Type No. 32-069961). Worker and gyne paratypes in BMNH, MCZC, MHNG, QMBA.

**Distribution, material examined.** AUSTRALIA: N.E. QUEENSLAND: *1km WNW of Cape Tribulation*, 16°04'S, 145°28'E, 10m, (PZ 1–31 May, 1996) paratype alate gyne. *Mossman Bluff Track*, 5–10km W of Mossman (16°28'S, 145°23'E, 360m) (16–30 Dec 1988, GBM & GIT, ANZSES site 2,) paratype alate gyne; ANZSES site 4, 600m, paratype alate gyne; 1–16 Jan, 1989, ANZSES site 4, 600m, paratype alate gyne. *Kuranda* [16°49'S, 145°48'E], paratype dealate gyne (FPD, 28 xii 1920). *Polly Creek*, 17°28'S, 146°01'E, 80m (GBM & JH, 25 Nov 1994–10 Jan 1995, flight intercept trap) 2 alate gynes. *Mt Bartle Frere, W base*, 17°37'S, 145°46'E, 50m (GBM & JH, 25 Nov–10 Jan 1995, flight intercept trap) alate gyne (collected with *M. hoelldobleri* gyne). *McNamee Creek*, 17°40'S, 145°43'E (type locality), holotype worker, 4 paratype workers, paratype dealate gyne (RWT & JDF, 6.7.1971, rainforest, in rotting log). All specimens apart from the type-nest series and the Kuranda gyne are labelled “flight intercept” or “pitfall trap”. Worker/gyne association confirmed by McNamee Creek series. Apparently ranging at locally middle to lower elevations (all records below 600m) between at least the latitudes of Cape Tribulation and McNamee Creek in the “base of peninsula” rainforests of N.E. Queensland.

**Congeneric sympatric associations.** Sympatric with *M. mjobergi* at Kuranda, and *M. tecklini* at Mossman Bluff. One of the Mossman Bluff Track worker specimens was originally mounted with the holotype alate gyne of *M. tecklini* (on the same pin, a separate card point).




**FIGURES 146–150.** M. *hoelldobleri*, holotype worker see text for dimensions; FIGURES 151–155. paratype gyne, HW 1.45, ScW 1.15, MSL 3.37.

**Worker diagnosis.** General and diagnostic features as in Figs 146–150 and the key to Australian species, above. A distinctive species readily distinguished using the Figures provided here. In some specimens the rostrate portion of the clypeus has striation which is fundamentally longitudinal, but curves divergently to one side anteriorly. This feature is present in several series, so it could be a general characteristic of *M. hoelldobleri*.

*Dimensions*: holotype, smallest paratype, largest paratype (N=2): TL: ca 8.5, 7.7, 8.45; HL: 1.95, 1.76, 1.95; HW: 1.42, 1.28, 1.42; CI: 73, 73, 73; CpL: 0.77, 0.72, 0.78; CpI: 39, 41, 40; MSL: 2.51, 2.21, 2.51; PML: 1.27, 1.17, 1.31; PMW: 1.01, 0.88, 0.98; PMI: 51, 53, 52; PDW: 1.02, 0.76, 0.92; PetL: 0.61, 0.56, 0.64; PetW: 0.62, 0.58, 0.63; PetH: 1.05, 0.95, 1.02; PpetL: 0.57, 0.54, 0.62; PpetW: 0.78, 0.70, 0.80; PpetH: 0.78, 0.72, 081; GW: 1.50, 1.4, 1.49.

**Gyne diagnosis.** General features as in Figs 151–155. The Figures presented here allow ready diagnosis of *M. hoelldobleri* gynes from those of other known Australian *Metapone* species.

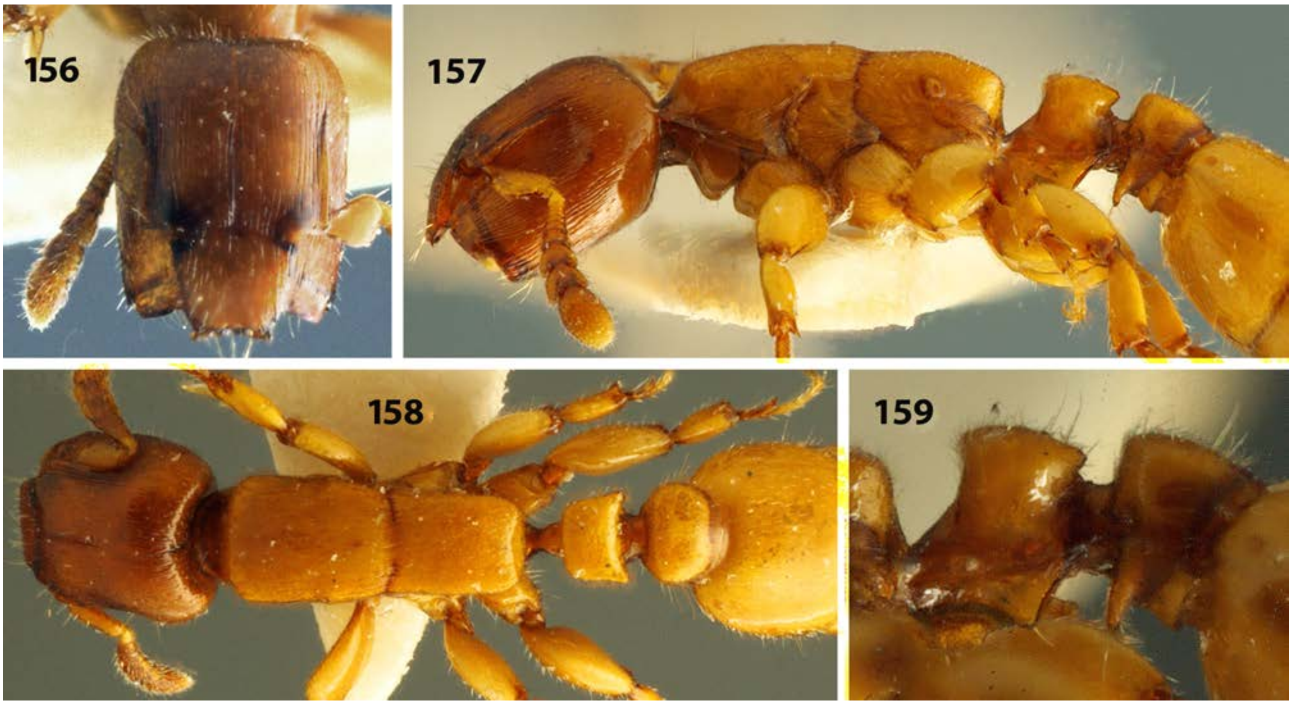
*Dimensions*: (Nidoparatype, smallest, and largest specimens ( both labelled Mossman Bluff track): TL: ca 10.5, 10.1, 10.45; HL: 2.07, 2.01, 2.08; HW: 1.45, 1.36, 1.44; CI: 70, 68, 69; CpL: 0.83, 0.78, 0.85; CpI: 40, 39, 41; MSL: 3.37, 3.17, 3.32; ScW: 1.15, 1.12, 1.23; PetL: 0.75, 0.76, 0.81; PetW: 0.72, 0.67, 0.69; PetH: 1.10, 1.01, 1.10; PpetL: 0.68, 0.61, 0.65; PpetW: 0.92, 0.89, 0.91; PpetH: 0.88, 0.80, 0.84; GW: 1.53, 1.40, 1.45.

**Etymology.** Named for our friend and respected colleague, the distinguished myrmecologist Bert Hölldobler.

### 27. *Metapone mathinnae* sp.n.

(Figs 156–159)

**Type locality.** AUSTRALIA; TASMANIA: Flinders Island: Vinegar Hill [40°12'S, 148°15'E].




**FIGURES 156–159.** *M. mathinnae*, holotype worker, see text for dimensions.

**Distribution, material examined.** Known only from the holotype worker, collected 29 ii 1952 by the late John H. Calaby of CSIRO Division of Wildlife Research, who regularly collected termite samples for the ANIC. The dissected mouthparts including the mandibles are stored in glycerine in a micro vial pinned below the point-mounted specimen.

**Type deposition.** ANIC (Type No. 32-069960).

**Worker diagnosis.** General and diagnostic features as illustrated. Readily identified in the key to Australian species above. Smaller than other known Australian *Metapone* workers (*M. mjobergi*, *M. hoelldobleri* and *M. tillyardi*), and probably those of the gyne-based species (assuming likely relative gyne/worker sizes). Lateral clypeal borders straight, anteriorly convergent. Anterior clypeal border slightly concave, anteroventral corners angular to subdentate in frontal view. Eyes minute, maximum diameter ca 0.04 mm, with minimal surface structure visible in reflected light and several very indistinct minute facets. Subpetiolar process much as in the three species just cited, especially the first two (see Figs). Subpostpetiolar process distinctive among Australian species and unusual in *Metapone* at large—a thin semicircular transverse plate, more slender and parallel-sided in profile than those of any other known Australian species.

*Dimensions*: TL: ca 5.4 (mandibular component estimated); HL: 1.08; HW: 0.84; CI: 78; CpL: 0.39; CpI: 36; MSL: 1.36; PML: 0.82; PMW: 0.59; PMI: 60; PDW: 0.49; PetL: 0.34; PetW: 0.44; PetH: 0.61; PpetL: 0.32; PpetW: 0.47; PpetH: 0.53; GW: 0.90. Palpal formula: Maxillary 1: Labial 2 (dissected).

**Possible termite associations:** Available termite distribution records (Watson & Abbey, 1993) imply that *M. mathinnae* is likely associated with either (or both?) of the termite species known from Flinders Island, namely *Porotermes adamsoni* (Froggatt) (Termopsidae) and *Kalotermes convexus* (Walker) (Kalotermitidae), both of which occur also in south-eastern Australia and mainland Tasmania (*ibid*, maps 2, 34). The only two other recorded Tasmanian termites (and possible hosts) are *Stolotermes brunneicornis* (Hagen) (Termopsidae) and *Bifiditermes improbus* (Hagen) (Kalotermitidae). The former is known only from mainland Tasmania and the latter is widespread elsewhere on the Australian mainland (*ibid*. maps.4, 7).

**Etymology.** Named for the martyred native Tasmanian *Mathinna* (1835–1852), the adopted, Europeanised daughter of 1837–1843 "Van Diemen's Land" Lieutenant Governor John Franklin (of previous and later Arctic exploration fame) and his wife Lady Jane (Griffin) Franklin. Mathinna was abandoned when the Franklins returned to England from Tasmania in 1843, and died tragically, socially rejected, soon afterwards (see Flanagan, 2008).

### 28. *Metapone tecklini* sp.n.

(Figs 160–164)

**Type locality.** Mt Sampson (15°48'S, 145°02'E,) northeast Queensland.

**Type deposition.** ANIC (Type No. 32-069962).


**FIGURES 160–164.** *M. tecklini*, holotype gyne, see text for dimensions.

**Distribution, material examined.** AUSTRALIA: N. E. QUEENSLAND: *Mt Sampson* (15°48'S 145°12'E, 600–790m) (27 Dec 1990–18 Jan 1991, 5–10km W of Mossman (480m) flight intercept trap, holotype alate gyne. *Mossman Bluff Track*, 5–10km W of Mossman [16°28'S, 145°23'E], 480m (1–16 Jan 1989, GBM & GIT, ANZSES site 3) paratype alate gyne. *Windsor Tableland* (no coordinates) (27 Dec 1988–10 Jan 1989, E. Schmidt, ANZSES site 2. flight intercept trap) paratype alate gyne. Habitat is not indicated on labels, but all records are from known rain forested sites.

**Gyne diagnosis.** General features as illustrated and in the key to Australian *Metapone* species above. Somewhat similar to *M. tricolor*, with the following salient differences: (1) Head relatively short (CI 75–77 *vs* 66–68); (2) Mesosoma more robust (MSL 1.74–2.00, ScW 0.75–0.80 *vs* 2.16–2.33 and 0.74–0.79); (3) Petiole in dorsal view approximately as long as wide *vs* petiole clearly over 1.5x as long as wide; (4) subpetiolar extension a low triangle, smaller than the larger structure in *M. tricolor*; (5) less intense sculpturation, as illustrated.

*Dimensions*: (holotype, paratype (Windsor Tableland) TL: ca 6.1, 6.7; HL: 1.08, 1.22; HW: 0.84, 0.92, CI: 77, 75; CpL: 0.41, 0.45; CpI: 38, 37; MSL: 1.74, 2.00; ScW: 0.75, 0.80; PetL: 0.38, 0.42; PetW: 0.36, 0.43; PetH: 0.59, 0.65; PpetL: 0.36, 0.47; PpetW: 0.50, 0.58; PpetH: 0.53, 0.59; GW: 0.89, 0.99.

**Congeneric sympatric associations.** Sympatric with *Metapone mjobergi* on Mt Sampson and Windsor Tableland, and with *M. hoelldobleri* at Mossman Bluff.

**Etymology.** Named with pleasure for Jerry E, Tecklin of the University of California, Davis and Nevada City California.

## Acknowledgments

The curators of relevant collections (listed above) are gratefully acknowledged, as are Katsuyuki Eguchi, Eli Sarnat, and Phil Ward for the loan or donation of specimens, and Colin Beaton, Barry Bolton, Chris Burwell, John Longino, Alexander Radchenko, Justin Schmidt, Michael Schwarz, Steve Shattuck, Dr S. Sheela (Zoological Survey of India), Wendy Taylor, Jochen Zeil and an anonymous referee for their support and assistance. Consulting termite specialist and friend (the late) J.A.L. (Tony) Watson is fondly remembered.

## References

Alpert, G.D. (2007) A review of the ant genus *Metapone* Forel from Madagascar, *In :*Snelling, R.R., Fisher, B.L. & Ward, P.S. (Eds.), *Advances in ant systematics (Hymenoptera: Formicidae): homage to E.O. Wilson—50 years of contributions*. Memoirs of the American Entomological Institute, 80. pp. 8–18.

Bolton, B. (1994) *Identification guide to the ant genera of the world*. Harvard University Press, Mass., Cambridge, 222 pp.

Bolton, B. (1995) *A new general catalogue of the ants of the world*. Harvard University Press, Mass., Cambridge, 504 pp.

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

Crawley, W.C. (1924) Ants from Sumatra, with biological notes by Edward Jacobson. *Annals and Magazine of Natural History*, 9 (13), 380–409.
http://dx.doi.org/10.1080/00222932408633052

Eguchi, K. (1998) A new ant of the genus *Metapone.* (Hymenoptera: Formicidae) from Sabah, Borneo. *Entomological science,* 1, 605–609.

Emery, C. (1912) Etudes sur la Myrmicinae. *Annales de la Société Entomologique de Belgique,* 56, 94–105.

Flanagan, R (2008) *Wanting*, Random House Australia, Melbourne, 272 pp.

Forel, A. (1911) Sur le genre *Metapone.* n. g. nouveau groupe des Formicides et sur quelques autres formes nouvelles. *Revue Suisse de Zoologie,* 1, 445–459.
http://dx.doi.org/10.5962/bhl.part.29919

Forel, A. (1912) Descriptions provisoires de genres, sous-genres, et espèces de Formicides des Indes orientales. *Revue Suisse de Zoologie,* 20, 761–774.
http://dx.doi.org/10.5962/bhl.part.19251

Forel, A. (1915) Results of Dr. E. Mjöbergs Swedish Scientific Expeditions to Australia 1910–1913. 2. Ameisen. *Arkiv für Zoologi,* 9 (16), 1–119 pls 1–3.

Gottwald, W.H. (1969) Comparative morphological studies of the ants, with particular reference to the mouthparts (Hymenoptera: Formicidae). *Cornell University Agricultural Experiment Station Memoir,* 408, 1–150.

Gregg, R.E. (1958) Two new species of *Metapone.* from Madagascar (Hymenoptera: Formicidae). *Proceedings of the Entomological Society of Washington,* 60, 111–121.

Hölldobler, B., Leibig, J. & Alpert, G.D. (2002) Gamergates in the myrmicine genus *Metapone* (Hymenoptera: Formicidae). *Naturwissenshaften,* 89, 305–307.
http://dx.doi.org/10.1007/s00114-002-0329-8
Hölldobler, B., Oldham, N., Alpert, G.D. & Liebig, J. (2002) Predatory Behavior and Chemical Communication in two *Metapone* species (Hymenoptera: Formicidae). *Chemoecology,* 12, 147–151.
http://dx.doi.org/10.1007/s00012-002-8340-7
Hölldobler, B. & Wilson, E.O. (1990) *The Ants*. Harvard Belknap Press, Mass, Cambridge, 732 pp.
Karavaiev, V. (1933) Ameisen aus dem Indo-Australischen Gebiet, VII. (Fortsetzung). *Konowia*, 12, 103–120.
Kusnezov, N. (1960) La posición sistemática del género *Metapone.* Forel (Hymenoptera, Formicidae). *Acta Zoologica Liloana,* 18, 119–126.
McAreavey, J.J. (1949) Australian Formicidae. New genera and species. *Proceedings of the Linnean Society of New South Wales,* 74, 1–25.
Rigato, F. & Bolton, B. (2001) The ant genus *Liomyrmex*: a review (Hymenoptera Formicidae). *Bollettino della Societa Entomologica Italiana,* 133, 247–256.
Smith, M.R. (1947) A new species of *Metapone* Forel from New Guinea (Hymenoptera, Formicidae) *Proceedings of the Entomological Society of Washington,* 49, 75–77.
Smith, M.R. (1953) A new *Metapone* from the Micronesian Islands (Hymenoptera, Formicidae). *Journal of the New York Entomological Society,* 61, 135–137.
Taylor, R.W. (1987) A checklist of the ants of Australia, New Caledonia and New Zealand (Hymenoptera: Formicidae). *C.S.I.R.O Division of Entomology Report,* No. 41, 1–92.
Taylor, R.W. (1991) Nomenclature and distribution of some Australian ants of the Myrmicinae (Hymenoptera: Formicidae). *Memoirs of the Queensland Museum,* 30, 599–614.
Terayama, M. (2009) A synopsis of the family Formicidae of Taiwan (Insecta, Hymenoptera). *Liberal Arts Bulletin of Kanto Gakuen University,* 17, 81–266.
Tiwari, R.N. & Jonathan, J.K. (1986) A new species of *Metapone* Forel from Nicobar Islands (Hymenoptera: Formicidae: Myrmicinae). *Record of the Zoological Survey of India,* 83, 149–153.
Ward, P.S., Brady, S.G., Fisher, B.L. & Schultz, T.R. ( 2015) The evolution of myrmicine ants: phylogeny and biogeography of a hyperdiverse ant clade (Hymenoptera: Formicidae). *Systematic Entomology*, 40, 61–81.
http://dx.doi.org/10.1111/syen.12090
Watson, J.A.L. & Abbey, H.M. (1993) *Atlas of Australian Termites*. CSIRO Publishing, Melbourne, Australia, 155 pp.
Wheeler, G.C. & Wheeler, J. (1953) The ant larvae of the myrmicine tribes Melissotarsini, Metaponini, Myrmicariini and Cardiocondylini. *Journal of the Washington Academy of Sciences,* 43, 185–189.
Wheeler, W.M. (1914) Note on the habits of *Liomyrmex*. *Psyche* (Cambridge, Mass.), 21, 75–76.
http://dx.doi.org/10.1155/1914/85894
Wheeler, W.M. (1916) Four new and interesting ants from the mountains of Borneo and Luzon. *Proceedings of the New England Zoological Club,* 6, 9–18.
Wheeler, W.M. (1919a) The ants of Borneo. *Bulletin of the Museum of Comparative Zoology*, 63, 43–147.
Wheeler, W.M. (1919b) The ants of the genus *Metapone* Forel. *Annals of the Entomological Society of America,* 12, 173–191.
http://dx.doi.org/10.1093/aesa/12.3.173
Wheeler, W.M. (1935) New ants from the Philippines. *Psyche* (*Cambridge, Mass*), 42, 38–52.
http://dx.doi.org/10.1155/1935/52134