

## NOMENCLATURE AND DISTRIBUTION OF SOME AUSTRALIAN AND NEW GUINEAN ANTS OF THE SUBFAMILY FORMICINAE (HYMENOPTERA: FORMICIDAE)

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### Abstract

Various Australian and New Guinean species of the formicine ant genera *Acropyga* Roger, *Camponotus* Mayr, *Echinopla* Fr. Smith, *Notoncus* Emery, *Notostigma* Emery, *Polyrhachis* Fr. Smith, *Prolasius* Forel, *Pseudonotoncus* Clark, *Stigmatoceros* Forel and *Teratomyrmex* McAreavey are discussed. *Notoncus* and *Prolasius* are recorded for the first time from New Guinea. *Notoncus capitatus* Forel, *Stigmatoceros foreli* Viehmeier and *S. fossulata* Viehmeier are reinstated from junior synonymy. *Prolasius nitidissimus formicoides* (Forel) and *P. hemiflavus wilsoni* McAreavey are raised to species. New synonymies (senior names listed first) are: *Acropyga acutiventris* Roger = *A. moluccana australis* Forel; *Echinopla turneri* Forel = *E. turneri piciticeps* Forel; *Notostigma carazzii* (Emery) = *N. podenzanai* Emery; *Prolasius convexus* McAreavey = *P. nigriventris* McAreavey; *P. flavicornis* Clark = *P. flavidiscus* McAreavey = *P. flavicornis minor* McAreavey; and *P. nitidissimus* (André) = *P. niger* Clark = *P. depressiceps similis* McAreavey. *Notostigma sanguinea* Clark is transferred to *Camponotus* as *C. johnclarki* Taylor nom.n., and *C. sanguineus* McAreavey is renamed *C. macareaveyi* Taylor nom.n., both changes due to secondary homonymy. The aggregate name *Pseudonotoncus (hirsutus)* Clark is proposed to cover the 2 nominal species of that genus. The putative dolichoderine *Turneria frenchi* Forel is declared *incertae sedis* in family Formicidae. Biological and distributional notes are given, including information on the association of the pseudococcid *Xenococcus annandalei* Silvestri with *Acropyga acutiventris*.

### Introduction

Various Australian and New Guinean species of the formicine ant genera *Acropyga* Roger, *Camponotus* Mayr, *Echinopla* Fr. Smith, *Notoncus* Emery, *Notostigma* Emery, *Polyrhachis* Fr. Smith, *Prolasius* Forel, *Pseudonotoncus* Clark, *Stigmatoceros* Forel and *Teratomyrmex* McAreavey are discussed below. A number of nomenclatural changes are proposed.

*Notoncus* and *Prolasius* are recorded for the first time from New Guinea, where they are represented respectively by the Australia-based taxa *N. gilberti* Forel and a species provisionally identified as *P. formicoides* (Forel).

The genera discussed may be identified using my recent key to the formicine genera of Australia, New Caledonia and New Zealand, published with others in Hölldobler and Wilson (1990: 55-60). All are illustrated in that work (pp. 132-141). The figures include the following species reviewed here: *Acropyga acutiventris* Roger, *Echinopla australis* Forel, *Notostigma carazzii* (Emery), *Pseudonotoncus (hirsutus)* Clark, and *Teratomyrmex greavesi* McAreavey.

Types or type-compared voucher specimens of relevant species are deposited in the Australian National Insect Collection (ANIC). Specimens designated here as lectotypes or paralectotypes have been appropriately labelled.

Distributions are summarised using "short" 1 degree coordinates (e.g. 12/132), as in Taylor (1987). Citation of collection dates has been standardised; distances and elevations are stated as on the collection labels, with calculated metric conversions added for those originally in miles or feet. Publication details for species are given either in the references cited, or in Taylor and D. R. Brown (1985) or Taylor (1987). Unless otherwise noted all specimens discussed are in the ANIC, and all are workers.

Collectors indicated by their initials are BBL = B. B. Lowery, GBM = G. B. Monteith, RWT = R. W. Taylor, and TAW = T. A. Weir. N.P. = National Park, and relevant Australian States are abbreviated N.S.W., Qld, Vic. and W.A. Abbreviations for institutions which provided types on loan, with the names of cooperating curators, whose help is greatly appreciated, are: HNHM, Hungarian Natural History Museum, Budapest (Dr J. Papp); MCSN, Museo Civico di Storia Naturale 'Giacomo Doria', Genoa, Italy (Dr R. Poggi, Dr V. Raineri); MHNG, Muséum d'Histoire Naturelle, Geneva, Switzerland (Dr C. Besuchet); MVMA, Museum of Victoria, Melbourne (K. Walker); OXUM, University Museum, Oxford, U.K. (Drs C. O'Toole, I. Lansbury); QMBA, Queensland Museum, Brisbane (E. C. Dahms and Dr G. B. Monteith); ZMHB, Museum für Naturkunde, Humboldt-Universität, Berlin, Germany (Drs E. Königsmann, F. Koch).

**Acropyga Roger****Acropyga acutiventris Roger**

*Acropyga acutiventris* Roger, 1862: 243.

*Acropyga moluccana australis* Forel, 1902: 477. Syn.n.

The Indo-Australian *Acropyga acutiventris* species group (*Acropyga* subgenus *Acropyga* of authors) includes *A. acutiventris* Roger (type locality: Ceylon), *A. moluccana* Mayr (Ceram, Indonesia) and *A. crassicornis* Emery (New Guinea) (Emery 1925). Several subspecies and varieties were listed by Emery (1925) under *acutiventris* and *moluccana*, and others have been described since (see Chapman and Capco 1951). The Australian *A. moluccana australis* Forel, 1902 (type locality: Mackay (21/149), Qld) was considered a subspecies of *A. acutiventris* by Forel (1911) and Emery (1925).

ANIC holdings from India, West Malaysia, Singapore, Sarawak, Sabah, Sumatra, Rakata I. (= Krakatau), New Guinea and northern Australia imply that the *acutiventris* "group" comprises a single, widespread, somewhat variable species, and that most relevant names proposed after 1862 (with the possible exception of *crassicornis*) are probably junior synonyms of *acutiventris*. Names other than *australis* are not formally synonymised here; that would be beyond the scope of this study, and type specimens apart from those of *australis* (syntypes, ANIC) have not been examined.

The wide-ranging conspecificity inferred among these nominal taxa gains support from recent observations that the inquiline, subterranean, root-feeding homopteran *Xenococcus annandalei* Silvestri (Hemiptera: Pseudococcidae) is found in the nests of "*A. acutiventris*" throughout much of its geographical range. This presumably mutualistic association has been recorded from India, West Malaysia, Vietnam, Hong Kong, the East and West Sepik districts of Papua New Guinea, and northern Australia (Williams 1978; 1985; Williams and Watson 1988).

ANIC specimens of *A. acutiventris* and *X. annandalei* collected together, and supplied to Williams, have considerably extended the known geographical distribution of this association, which includes Australian localities indicated \* in the list of *acutiventris* records given below. These reports have mostly been based on specimens of *X. annandalei* collected inadvertently into liquid preservative with targeted ants, and later extracted from the ANIC formicid spirit collection. *X. annandalei* probably occurs throughout the range of *A. acutiventris* and has been recorded only from *A. acutiventris* nests or being transported by flying *A. acutiventris* queens.

Living, gravid females of *X. annandalei* are known (from ANIC specimens) to be carried in the jaws of *A. acutiventris* queens during nuptial flight, in order apparently to establish the symbiotic association in founding colonies. Neither species is known to maintain such relationships with other equivalent insects, though nuptial-flight dispersal of pseudococcids is probably frequent in *Acropyga* (Hölldobler and Wilson 1990), and could be universal among its species.

*A. acutiventris* is widely distributed in northern Australia, as follows (ANIC records; associations with *X. annandalei* indicated \*): NORTHERN TERRITORY: Baroalba Spring\* (12/132). QUEENSLAND: Darnley I. (09/143); Wyer I., Maer I. (09/144); Iron Range\*, Lamond Hill, Tozers Gap (12/143); Cape Tribulation, Mossman Gorge, Yarrabah Mission (16/145); Chillagoe (17/144); Josephine Falls\*, The Boulders Park, Upper Mulgrave River, Waugh Pocket\* (17/145); Mission Beach (17/146); Missionary Bay (Hinchinbrook I.)\* (18/146); Finch Hatton Gorge\* (21/148); Mackay (21/149). (Collectors: J. E. Feehan, H. Heatwole, BBL, GBM, RWT, W. Taylor, TAW).

In the Cairns District *A. acutiventris* is readily collected at low altitudes (below about 300 m or 1000 ft). It has never been taken, to my knowledge, at higher elevations on the Atherton Tableland, and could be excluded there by low winter temperatures. In this regard its local distribution is like that of the weaver or "green tree" ant, *Oecophylla smaragdina* (F.), and the 2 species appear likely to have similar overall ranges in Australia (for distribution of *O. smaragdina* see Lokkers 1986).

*A. acutiventris* is distinguished from all other known Australian formicine ants by the following "key" characters: antennae 11-segmented; eyes clearly defined, multifaceted, with diameter approximating that of an antennal scape; second funicular segment as long as first.

#### Other Australian *Acropyga* species

The 2 other described Australian *Acropyga* species are represented by syntypes in the ANIC. They are *A. indistincta* Crawley (type locality: Mundaring (31/116), W.A.), and *A. myops* Forel (type locality: Bombala (36/149), N.S.W.)—see Taylor (1987).

At least 8 other species are present in the ANIC (several represented only by nuptial queens and males collected in flight). Records are from the following grid cells: NORTHERN TERRITORY: 11/133, 12/132. QUEENSLAND: 10/142, 12/143, 16/145, 17/145, 18/145, 22/150, 26/152, 27/153. NEW SOUTH WALES/AUSTRALIAN CAPITAL TERRITORY: 28/153, 33/151, 33/152, 35/148, 35/149, 35/150, 36/149. VICTORIA: 37/141, 37/144. SOUTH AUSTRALIA: 32/134, 33/138, 34/139. WESTERN AUSTRALIA: 31/116. Some of the northern specimens could be conspecific with others from Papua New Guinea.

*Acropyga* might be substantially species-rich in southern Australia. I have, for example, collected 4 apparently undescribed species near Long Beach, Batemans Bay (35/150), N.S.W. Three of them are represented only by queens (many specimens, each taken with a transported pseudococcid) and males, collected on different occasions swarming diurnally, and apparently orientating above a silver-grey motor car, always parked at the same spot, adjacent to a house near partly cleared tall *Eucalyptus* forest. Batemans Bay is not far from Bombala, the type locality of *A. myops*, so at least 5 species could be present in south-eastern N.S.W.

#### *Camponotus* Mayr

##### *Camponotus johnclarki* Taylor nom.n.

*Notostigma sanguinea* Clark, 1930: 116. A secondary homonym by present assignment to *Camponotus*; nec *Camponotus* (*Camponotus*) *japonicus* Mayr var. *sanguinea* Viehmeyer (a junior synonym of *Camponotus herculeanus* (L.); synonymy by Yasumatsu and W. L. Brown 1951: 37).

The endemic Australian genus *Notostigma* includes 2 rain-forest-inhabiting species known only from limited ranges in eastern Qld and north-eastern N.S.W. (see below). *Notostigma sanguinea* was described from south-western W.A. (Original localities Perth (31/115), Ludlow (33/115)). It has thus always been biogeographically anomalous.

*Notostigma* superficially resembles *Camponotus*, but is immediately distinguished by its possession of metapleural glands, structures apparently absent in all Australian and most other species of *Camponotus* (see Hölldobler and Engel-Siegel 1984). The only exception to this condition known to me is that of the widespread South-East Asian *C. gigas* (Latreille), a relatively large species of *Camponotus* which has well-developed metapleural glands. This might imply that *gigas* should be classified elsewhere, perhaps in a reinstated genus *Dinomyrmex* Ashmead, of which it is the type species by monotypy (*Dinomyrmex* is currently cited either as a subgenus or junior synonym of *Camponotus*). Assignment of *gigas* to *Notostigma* is precluded, since it is otherwise close to *Camponotus* in detailed overall physiognomy. In this and other regards Clark's "*Notostigma sanguineus*", which lacks metapleural glands, is a *Camponotus*, wrongly assigned to *Notostigma*.

The *nomen novum* designated above is required because of the secondary homonymy indicated.

I have seen 2 worker syntypes (a major and a minor) of *C. johnclarki* (Ludlow (33/115), W.A., MVMA). The ANIC has 6 topotypic workers with Ludlow data labels identical to those of the syntypes, but lacking indication of type status. They have been labelled as type-compared paradigms. Other records are from at or near the

following localities: WESTERN AUSTRALIA: Darlington, Mundaring (31/116); 25 mi (40.2 km) EbyS Ravensthorpe, 27 mi (43.4 km) E Ravensthorpe (33/120); 44 mi (70.7 km) W. Esperance, Esperance, Gibson (33/121); Goora Rock (provenance not known). SOUTH AUSTRALIA: 15 km W of Murray Bridge (35/139) (Collectors: J. Clark, I. F. B. Common, T. Greaves, BBL, M. S. Upton, RWT).

It is interesting that, when preparing the lists of *Notostigma* records given below, I found several eastern *Camponotus* species included in error with spirit-stored samples sorted as *Notostigma* in the ANIC by various myrmecologists, including B. B. Lowery, P. S. Ward and myself.

### **Camponotus macareaveyi** Taylor nom.n.

*Camponotus sanguineus* McAreevey, 1949: 18. A primary junior homonym of *Camponotus* (*Camponotus*) *japonicus* Mayr var. *sanguinea* Viehmeyer (a junior synonym of *Camponotus herculeanus* (L.); synonymy by Yasumatsu and W. L. Brown 1951: 37).

This long-standing homonymy was not recognised until the above secondary homonymy in *Camponotus* of *C. sanguinea* Clark, ex *Notostigma*, was investigated. The holotype major worker of *C. macareaveyi* and a paratype minor worker are in the ANIC.

### **Echinopla** Fr. Smith

Two species of *Echinopla* are known from Australia, and the ANIC has syntypes (donated by MHNG) of the 3 available names they share. All were established by Forel (1901) with type locality Mackay (21/149), Qld.

### **Echinopla australis** Forel

*Echinopla australis* Forel, 1901: 75.

*E. australis* is readily distinguished from *E. turneri* Forel (see below) by the presence of a strong, distinctly incised metanotal groove crossing the mesosomal dorsum of the worker. This species is known from Papua New Guinea and eastern Cape York Peninsula, south to beyond latitude 21°S, at Eton, near Mackay.

I have not investigated the status of *E. australis octodentata* Stitz, 1911: 381; type locality "New Guinea", which could be a junior synonym of *australis*. There seem to be no likely Melanesian senior synonyms of either *australis* or *turneri*.

Like many arboreal ants *E. australis* is seldom collected unless especially sought. It nests in hollow twigs, apparently frequents well-insolated rain forest fringes and canopy, and is most frequently taken running on vines and vegetation at the edges of rain forest or mangrove thickets, or where tree-fall clearings in closed forest are penetrated by sunlight.

Modern PAPUA NEW GUINEA material (ANIC) is from the Bulolo River Valley, 6 km NE of Wau (rain forest, 1100 m, RWT, vi.1962) and Bupu River near Lae (from branches and vines on fallen tree, lowland rain forest, BBL, 17.i.1968).

QUEENSLAND records are from: 9 km ENE of Mt Tozer (12/143) (pyrethrum knockdown, rain forest edge, TAW and A. Calder, 5-10.vi.1986); Noah Beach, Cape Tribulation N.P. (16/145) (ex dead mangrove branch on ground, R. R. Snelling, 18.xii.1988); Cairns (16/154) (on vines, disturbed rain forest, RWT, 4.vi.1962); Bellenden Ker landing, Russell River (17/145) (nest in dead mangrove branch, BBL, 4.viii.1975); Deeral Landing (17/145) (strays on tall mangroves, BBL, 4.viii.1975); Hull Head, 13 km E of Tully (17/146) (2 colonies in dead twigs, mangrove swamp, BBL, 21.ix.1980, 17.v.1981); Crystal Creek N.P. (18/146), near Paluma, N of Townsville (stray worker, gallery forest, BBL, 11.i.1977); 30 km N of Giru, at Cape Cleveland, near Australian Institute of Marine Science (19/147) (colony ex vine, small gully near beach, BBL, 8.ix.1980); Mt Elliott N.P., Pangola Park near Giru (19/147) (colony ex dead twig on tree in creek bed, BBL, 31.iii.1980); Airlie Beach near Proserpine (20/148) (colony in hollow twig, rain forest, BBL, 2.v.1981); 10 km SW of Eton (21/148) (colony ex dead twig, gallery rain forest, BBL, 5.iii.1981).

An *E. turneri* worker was collected sympatrically with *E. australis* at Crystal Creek by BBL, and other sympatric associations are implied when the above list and that for *E. turneri* (following) are compared.

### ***Echinopla turneri* Forel**

*Echinopla turneri* Forel, 1901: 76.

*Echinopla turneri picticeps* Forel, 1901. Syn.n.

There is no evident justification for separate recognition of *E. turneri* and *E. picticeps* when their types and other specimens are compared. Distinction of *E. turneri* from *E. australis* is discussed above. The 2 appear to have similar nesting habits, habitat preferences and distribution. The ANIC has Papua New Guinean specimens which resemble Australian *E. turneri* material. They have more dense pubescence and, in some series, different sculpturation. They could constitute one or more sibling species, or might represent *turneri* as a widespread and substantially variable species.

Australian records are from QUEENSLAND: Crystal Creek N.P. (18/146), stray worker, collected with *E. australis* (see listing above); various records from Mt Elliott N.P., near Giru (19/147), all of the colonies collected from dead twigs on vegetation in gallery rain forest by BBL (specific localities and dates are: Pangola Park, 30.v.1980; Ridge above Margaret Creek, 9.vi.1981 (2 colonies); Margaret Creek, 3.xii.1980) (3 colonies); Cedar Creek Falls, 15 km SE of Proserpine (20/148) (colony in dead twig, gallery rain forest, BBL, 14.ii.1980); 10 km N of Koumala (21/149) (foragers on vines, gallery rain forest, 4 pm, BBL, 12.ii.1980); Byfield (23/150), near Yeppoon (strays, rain forest edge, RWT and TAW, 26.x.1976).

It is of interest that all of the colony series of both *Echinopla* species listed above contain advanced larvae and cocoon-enclosed pupae, despite the seasonally wide range of collection times (which comprise dates in early January, February, March, May, June and September). Alate queens and males are present only in the 2 *E. turneri* colonies collected at Margaret Creek (19/147) on 3.xii.1980. These both contain large larvae and pupae, and are also the only colonies with eggs or hatching larvae. Callow workers are present in several samples, implying that adult worker production might be essentially continuous in these ants.

One of three December 1980 Margaret Creek *turneri* colony series, which I judge to be slightly the largest I have seen for either species, contained at collection a dealate queen, 98 workers, 30 alate queens and 22 males. The presence of alates implies that this must be a mature colony, and, assuming that *E. turneri* nests are not polydomous, probably close to maximum size, apart from foragers absent at the time of collection. Mating flights presumably occur in mid- to late summer.

### ***Notoncus* Emery**

W. L. Brown (1955) recognised 5 "good" species in *Notoncus* where 17 names of the species group had been previously used. His classification is satisfactory except for the synonymy of *N. capitatus* Forel under *N. enormis* Szabó. These are clearly separate species, and *Notoncus capitatus* is reinstated here to specific rank. It retains the junior synonyms indicated by Brown (1955: 489) (i.e. *N. mjobergi* Forel and *N. capitatus minor* Viehmeyer). Some of the nominal species recognised by Brown might be composite, but his arrangement is a great advance on the past. I have examined a syntype of *N. capitatus* (Tamborine Mt (27/153), Qld; ANIC, donated by MHNG), and 3 putative worker syntypes of *N. enormis* (Mt Victoria (33/150), N.S.W.) (these are not labelled as types, but have appropriate data labels, and were sent from the HNHM following request for type specimens on loan). The ANIC has 3 closely matching, syntype-compared workers of *N. enormis* from Springwood (33/150), N.S.W. (E. Kearney, 2.iv.1965), which were taken under a sandstone rock at the base of a tree on a well-wooded ridge, in an area where *Aphaenogaster longiceps* (Fr. Smith) was common. A colony series of about 50 workers and numerous large larvae was taken in a soil pocket at the base of a *Eucalyptus* tree in wet sclerophyll forest at Bulahdelah Mt, 8 km W of Bulahdelah (32/152), N.S.W., by BBL, 8.ix.1977. A

dealate queen from Mittagong (34/150), N.S.W. (BBL, 1.v.1967) was taken under a rock at the base of a tree in dry sclerophyll woodland over sandstone.

*N. enormis* and *N. capitatus* can be distinguished by the following diagnoses, which may be added as couplet 3A to Brown's (1955: 484) key to species of *Notoncus* workers.

- Smaller species, maximum Head Width less than 1.3 mm. Appressed pubescence present on all body tagmata, almost as thick on propodeum as on gaster, with density otherwise diminishing cephalad. Head and mesosoma relatively finely sculptured, individual cephalic striae narrower than the diameter of an eye facet . . . . . ***N. capitatus* Forel**
- Larger species, maximum Head Width exceeding 1.9 mm. Appressed pubescence almost entirely restricted to gaster. Head and mesosoma much more coarsely sculptured, individual cephalic striae clearly wider than an eye facet . . . . . ***N. enormis* Szabó**

*Notoncus* is here recorded for the first time from New Guinea. The ANIC has specimens identifiable by Brown's criteria as *N. gilberti* Forel, from the following localities: PAPUA NEW GUINEA: NORTHERN DISTRICT: Gona Rd (10.vi.1973, P. M. Room); Managalase Area, 2500-3000 ft (760-912 m) (viii.1965, R. Pullen). CENTRAL DISTRICT: Hombrom Bluff (18.iv.1973, P. M. Room).

Gona Village is N of Popondetta (8°45' S 148°15' E); Managalase is an area centred on Sila Mission (ca 9°05' S 148°26' E), upper Pongani River valley, N of Mt Lamington; Hombrom Bluff (9°23' S 147°19' E), is just north-east of Port Moresby. According to the collectors specimens were taken in savanna habitats rather than rain forest. *N. gilberti* is thus known in New Guinea from 3 widely separated areas, each with local savanna vegetation including *Eucalyptus*, and seems unlikely to have been introduced from Australia by human agency. It is more likely that the species was once widespread in *Eucalyptus* savanna woodland on northern *Terra Australis* (the former united Australia/New Guinea land mass), and became isolated vicariantly on New Guinea when the 2 modern lands were last separated by ocean. The most northern known Australian record is from Turulka (17/145), near Ravenshoe, Qld (19.vi.1937, T. Greaves).

### **Notostigma Emery**

The Western Australian *N. sanguinea* Clark is transferred above to *Camponotus* and renamed *C. johnclarki* due to secondary homonymy. The two species remaining in *Notostigma* are:

### **Notostigma carazzii (Emery)**

*Camponotus carazzii* Emery, 1895: 354.  
*Camponotus podenzanai* Emery, 1895: 355. Syn.n.

This taxon, described from the worker, was originally assigned to *Camponotus*, with type locality Mt Bellenden Ker (17/145), Qld. In the same paper Emery named as *Camponotus podenzanai* queen and male specimens from Kamerunga (16/145), near Cairns, about 50 km further north. I have previously examined a queen type in the Emery collection (MCSN) and consider it to be a sexual of *N. carazzii*, establishing the above synonymy. Colony-associated sexuals and workers of this species have apparently never been collected.

*N. carazzii* has the following known distribution (ANIC, QMBA): QUEENSLAND: Black Mt, 17 km ESE of Julatten, Cairns, "Windsor Castle" on Mount Windsor Tableland (16/145); 9 km W of Herberton, Boar Pocket, Boulders N.P. near Babinda, Douglas Creek in Lamb Range, Hypipamee Crater N.P., Josephine Falls N.P., Koombalooomba, Lake Barrine N.P., Millstream N.P., Tomoulin (17/145); Mt Spec, 4 mi (6.4 km), 8 km and 10 km W of Paluma (18/145); Gayundah Creek, Hinchinbrook I. (18/146); Broken River, Eungella N.P. at 2000 ft (608 m) (21/148) (Collectors: E. H. Bourne, J. G. Brooks, D. Cook, J. E. Feehan, T. Greaves, S.

Higashi, R. J. Kohout, BBL, T. Matsumoto, GBM, S. R. Monteith, D. C. F. Rentz, G. I. Thompson, RWT, TAW, D. Yeates).

This species is seldom encountered diurnally, but in suitable areas its workers may be taken commonly at night on the ground. They range many metres from their nests as solitary foragers, and appear to navigate visually, yet may be taken abroad in darkness extreme to humans. Nests are constructed in the soil without a distinct mound, and have large, open entrances, usually overhung by exposed tree roots or pieces of rotting wood lying on the ground. They are frequently constructed at the bases of large trees. The upper nest chambers can often be exposed if the covering material can be lifted aside, but most chambers are deeper underground, to at least 0.5 m. Colony surrounds are quiescent during the day, and it is not usually possible to raise defenders, except by considerable excavation. At night, however, many ants may be present at nest entrances, depositing excavated soil, foraging, etc, and defenders are easily provoked to reaction. They spray formic acid (samples chemically identified by Dr T. E. Bellas), which can become locally redolent with disturbance. Most specified records are from rain forest, but several samples taken W of Paluma are from "wet sclerophyll". *N. carazzii* has not been encountered at some sites where I have frequently worked at night (e.g. Lake Eacham N.P.), and I suspect for this reason that its distribution might be patchy.

This is perhaps the largest formicine, and one of the largest ants apart from *Myrmecia*, found in base-of-Cape-York-Peninsula rain forests. Its ground colour is very dull deep brown, almost black, with the head usually a shade darker, and largely shining in the very large-headed soldiers. Maximum head width in these can exceed 6 mm, and the occipital border may be allometrically deeply to very deeply concave in the largest individuals.

### ***Notostigma foreli* Emery**

*Notostigma foreli* Emery, 1920: 253.

*N. foreli*, like *N. carazzii*, is limited in distribution. It is found in south-eastern Queensland and north-eastern New South Wales, and seems to be restricted to rain forest. Its workers are likewise solitary, nocturnal foragers. The soil excavated from a nest may form a pronounced symmetrical cone, about 0.3 m high, surrounding the open summit entrance. The raised, reddish local sub-soil often makes these very easily seen. During the day above-ground effort to disturb the ants is typically ineffectual, but at night large numbers of workers may be present on the mound surfaces.

The known distribution (ANIC) is: QUEENSLAND: Mt Glorious (27/152); Joalah N.P., Tamborine Mt (27/153); Stanthorpe (28/151); near Binna Burra (i.e. Binnaburra Lodge), (Lamington) National Park, Upper Tallebudgera Valley below Springbrook (28/153). NEW SOUTH WALES: Lismore (28/153); Myall Lakes N.P. (32/152) (Collectors: D. Cook, C. F. Deuquet, H. Hacker, D. Havenstine, A. Hiller, GBM, Z. Leipa, E. Sutton, RWT, W. Taylor, G. I. Thompson).

*N. foreli* is relatively large as a non-myrmeciine ant, but it is smaller than *N. carazzii*. Head width in the largest workers is about 4 mm, and the occipital border is at most only feebly concave in frontal view, even in the largest workers. The ground colour is dull golden brown, with the head slightly, but usually distinctly darker.

### ***Polyrhachis* Fr. Smith**

Emery (1925) listed 2 Melanesian species under *Polyrhachis* subgenus *Campomyrma* Wheeler, and 5 under subgenus *Aulacomyrma* Emery. Formal use of the *Polyrhachis* subgenera of the Emery/Wheeler classification is not recommended, though Emery's subgeneric listings do conveniently bring together species relevant to this study. They have been reviewed to identify possible synonyms of Australian names, of which one, discussed elsewhere, was found. Melanesian names published after 1925 have not been considered. They could not be senior synonyms of the 4 Australian "*Campomyrma*" species described since then. I have elsewhere reviewed

nomenclature of all named Australian "*Campomyrma*" species (Taylor 1989). Further information, with some additional synonymy in "*Campomyrma*", is given in Kohout and Taylor (1990).

Type material of all Melanesian taxa relevant here and described by Emery (MCSN) has been examined. *P. dohrni* Forel is not represented in the Forel collection (MHNG). Types of *P. serrata* Fr. Smith, and the distinctive *P. excellens* Viehmeyer could not be located. The latter might have been destroyed in Dresden during World War II.

The ANIC contains about 10 Melanesian species which Emery would have placed in *Aulacomyrma*. Only *P. exarata* Emery and *P. excellens* can confidently be recognised among them. The others are probably undescribed. Type comparison shows *exarata* to be close to *P. sculpta* Emery. "*Aulacomyrma*" (which is perhaps best referred to as the *P. sculpta* species group) might be richly diverse on New Guinea. Almost every available series apparently represents a different species. These ants appear to constitute a lineage or lineages in *Polyrhachis* related to "*Campomyrma*", and characterised by progressive development of heavy, longitudinally costulate sculpturation, and other features, maximally expressed in the aberrant *P. porcata* Emery. The *P. sculpta* group is not known from Australia.

### **Prolasius Forel**

*Prolasius* has previously been recorded only from Australia and New Zealand. It is here reported for the first time from New Guinea (see below under *P. formicoides*).

Twenty-three Australian species-group taxa were cited in this genus by Taylor and D. R. Brown (1985) and Taylor (1987) in checklists which followed the taxonomic arrangement of McAreavey (1947). No Australian names were listed in these references as junior synonyms, one replaced a former junior homonym, and 4 were listed as subspecies. Nineteen of these taxa were described by the Australians Clark (1934; 5 species) and McAreavey (1947; 14 species). These authors unfortunately did not study type material of the 4 senior species-group names previously established by the European workers André, Forel and Emery. Their work was partly flawed as a result. McAreavey seems in addition to have paid scant attention to Clark's types, and to similarities between his own putative species, which seem frequently to outweigh the differences alleged to separate them.

McAreavey's former collection, including some secondary types of his *Prolasius* species, is now incorporated in the ANIC (see notes below under *Stigmatocros*). His *Prolasius* holotypes, and most paratypes, are in the MVMA. Many of the specimens are broken and otherwise in poor condition, partly due to incrustation by a white powder, which is believed to be DDT or another insecticide applied by McAreavey to "protect" them (testé B. B. Lowery). Some have been cleaned and remounted for this study, and some original points and pins have been replaced. The ANIC also contains topotypical series of several *Prolasius* species described by McAreavey or Clark. These have provided paradigms for comparison with relevant MVMA holotypes. They bear no type-indicative labels, but some could be from original series or type-colonies, judging from the labelling and original mounting details. Several undescribed *Prolasius* species are also represented in the ANIC, most of them donated by Fr. B. B. Lowery.

I have examined types of all Australian names available in *Prolasius*, except *P. depressiceps* (Emery) (Katoomba (33/150), N.S.W.), which for that reason has not been considered in the following synonymic analysis. Cross-comparison of this material, and consideration of substantial ANIC holdings in *Prolasius*, convincingly supports the nomenclatural changes to follow. These either synonymise or raise to species all former subspecific names in the genus, and reduce the tally of valid named Australian species to 18. The relevant type localities and types examined (all workers) are indicated. Unless otherwise stated each series discussed is mounted on a single pin. It seems probable that further synonymies would result from a detailed study of the genus.



***Prolasius convexus* McAreavey***Prolasius convexus* McAreavey, 1947: 15.*Prolasius nigriventris* McAreavey, 1947: 17. Syn.n.

This distinctive species was described from "The Dorrigo" (presumably Dorrigo N.P., or Mount Dorrigo, near Dorrigo, 30/152), N.S.W. I have examined the following type material: holotype (labelled "type"), paratype (so labelled, lacking head—a blank point denotes a lost specimen on the same pin), MVMA; 2 paratypes (so labelled), ANIC. These specimens are clearly conspecific with the compared types of *P. nigriventris* McAreavey, 1947 (Deal Island (39/147), Vic.: holotype (labelled "type", pinned with a separately pointed paratype male) and 3 paratypes (so labelled, 2 workers, 1 male), MVMA; 6 paratypes (so labelled, 8 workers, 1 male, mounted on 3 pins), ANIC).

***Prolasius flavicornis* Clark***Prolasius flavicornis* Clark, 1934: 69.*Prolasius flavidiscus* McAreavey, 1947: 21. Syn.n.*Prolasius flavicornis minor* McAreavey, 1947: 21. Syn.n.

*P. flavicornis* was described with type locality Beech Forest (38/143), Vic. Five paratypes (so labelled) on 2 pins are in the ANIC. They and the following types of the 2 new junior synonyms indicated above have been compared and found to be conspecific: (1) *P. flavidiscus* McAreavey 1947 (Mt Ben Cairn (37/145), Vic.: holotype (labelled "type", pinned with separately carded, dealate paratype queen), 2 paratypes (so labelled), MVMA; 11 topotypical type-compared vouchers mounted on 2 pins (ANIC); (2) *P. flavicornis minor* McAreavey 1947 (Sherbrooke Forest (37/145), Vic.: holotype (labelled "type"), 3 paratypes (so labelled), MVMA; 3 paratypes (so labelled), ANIC).

***Prolasius formicoides* (Forel) Stat.n.***Melophorus formicoides* Forel, 1902: 483.*Prolasius nitidissimus formicoides*: Wheeler, 1935: 71.

*P. formicoides* (Mackay (21/149), Qld; syntype, ANIC, donated by MHNG) is clearly distinct from *P. nitidissimus* (André, 1896) (Victorian Alps (37/146), Vic.; 2 syntypes (labelled "TYPE", mounted on 1 pin), ANIC, donated by Muséum d'Histoire Naturelle, Paris).

*P. mjobergi* (Forel) (Malanda (17/145), Qld) is a possible sibling species, or junior synonym of *formicoides*. Types of the 2 taxa differ mainly in body proportions, and in clypeal, frontal and pronotal chaetotaxy. Analysis of other material from North Queensland implies either that these features are substantially variable in a single species, or that several sibling species are present in that area.

Specimens of the first *Prolasius* species reported from Papua New Guinea are provisionally identified here as *P. formicoides*. They carry the following data: PAPUA NEW GUINEA: Black Cat Trail, 6 miles (9.6 km) E of Wau (07/146) (4500 ft (1370 m), nest (with queen), in rotten fragment of wood on ground, valley montane rain forest, BBL, 6.i.1971); 12 km S of Telefomin (5°15'S 141°15'E) (2100 m, nest (including large larvae, pupae, and callow workers), in *Hydnophytum* on ground, moss forest, P. S. Ward #4688, 5-6.vii.1980); same general data, workers taken foraging on low vegetation (P. S. Ward #4680). It is probably significant that these records, the only ones known for this southern, probably Gondwanic, genus on New Guinea, are from high elevations, in relatively temperate situations.

***Prolasius nitidissimus* (André)***Formica nitidissima* André, 1896: 255.*Prolasius niger* Clark, 1934: 68. Syn.n.*Prolasius depressiceps similis* McAreavey, 1947: 23. Syn.n.

*P. nitidissimus* (Victorian Alps (37/146), Vic.; 2 syntypes (labelled "TYPE", mounted on 1 pin), ANIC, donated by Muséum d'Histoire Naturelle, Paris) is the senior Australian name in *Prolasius*. The following types have been compared with those of *nitidissimus* in determining the above synonymy: (1) *P. niger* Clark, 1934

(Beech Forest (38/143), Vic.: holotype (labelled "type"), MVMA; 3 topotypical type-compared vouchers, ANIC). (2) *P. depressiceps similis* McAreavey, 1947 (Mt Kosciusko (36/148), N.S.W.: holotype (labelled "type"), 5 paratypes (so labelled) on 2 pins, MVMA; 3 topotypical type-compared vouchers, ANIC).

### ***Prolasius wilsoni* McAreavey. Stat.n.**

*Prolasius hemiflavus wilsoni* McAreavey, 1947: 18.

*P. wilsoni* (Bogong Plains (36/147), Vic.: holotype (labelled "type"), 2 paratypes (so labelled), MVMA; 3 paratypes (so labelled), ANIC) is distinct from *P. hemiflavus* Clark, 1934 (Beech Forest (38/143), Vic.; 3 paratypes (so labelled), ANIC).

### ***Pseudonotoncus* Clark**

This endemic Australian genus is represented by a number of specimens in the ANIC and elsewhere. Considerable variation is evidenced in colour and sculpturation, the latter especially on the propodeum and petiole, but available specimens reveal no convincing reason to recognise more than a single taxon. These are 2 nominal species (Taylor 1987), the senior of which is *Pseudonotoncus hirsutus* Clark 1934.

I have for some time used the aggregate name *Pseudonotoncus (hirsutus)* when identifying *Pseudonotoncus* specimens, thus setting aside the second, and junior, species name, *P. turneri* Donisthorpe, without declaring it to be a synonym of *P. hirsutus*, but indicating that (*hirsutus*) could cover more than a single species. This is reasonable usage pending the accumulation of more informative collections. The procedure utilises the provisions of Art. 6 of *The International Code of Zoological Nomenclature* (3rd edn, 1985).

Clark would evidently have split the species or complex recognised here. He used the name *turneri* on the determination label of a Stanthorpe, Qld, specimen in the ANIC, and evidently accepted the existence of a possible third species, since a worker from Woori Yallock, Vic., has his determination label bearing an unpublished species name.

Most records of *P. (hirsutus)* are from eastern coastal areas, from just north of the Qld/N.S.W. border (the *P. turneri* type locality is Tamborine Mt, Qld), south to southern Victoria, with the most westerly known site on the Otway Peninsula, at Gelibrand, the type locality of *P. hirsutus*. I have collected a single worker, which perhaps represents a relict population, much further north, at high elevations on Mt Elliott (19°29'S 146°59'E), south-west of Townsville, Qld (rain forest, nocturnal stray on tree trunk, 1050 m, 6-7.vi.1977, RWT). At the time of collection (near mid-winter) the rain-forested, upper slopes of Mt Elliott were observed to be exceptionally depauperate in ants, and the same was (and is generally) true of the mammals and birds (testé J. W. Winter). This locality is somewhat geographically isolated from the generally warmer, high-altitude rain forests of the Atherton Tableland further north. Mt Elliott seems to be climatically unsuitable for occupation by ant taxa found on the northern tableland rain forests. The mountain would justify careful collecting for ants in summer, when higher activity levels might significantly increase the species yield.

Known grid cells of record for *Pseudonotoncus* are: QUEENSLAND: 19/146; 27/153, 28/151; Victoria 37/145, 38/143.

### ***Stigmacros* Forel**

W. L. Brown (1955) eschewed formal taxonomic recognition of the 6 *Stigmacros* subgenera established in McAreavey's (1957) monograph of this endemic Australian genus. This opinion I support—it is very unlikely that truly monophyletic taxa are represented by the named *Stigmacros* "subgenera" (apart from the monotypic *Chariostigmacros* McAreavey and *Pseudostigmacros* McAreavey).

I have examined type material of all 46 *Stigmacros* species and 2 junior synonyms discussed in McAreavey's (1957) monograph and listed by Taylor and D. R. Brown

(1985) and Taylor (1987). Thirty-three of these were described by McAreavey (1957, 1949).

Fr. McAreavey's collection (including many relevant types; mainly in *Stigmacros* and *Prolasius*) lay virtually unattended and inaccessible in a Melbourne Jesuit house for some years before his death in March 1975. Thanks to prompt action at that time by Fr. B. B. Lowery it is now incorporated with the ANIC ant collection.

The holotypes of the McAreavey *Stigmacros* species, except *S. elegans* (ANIC), are in the MVMA collection, where they were originally deposited. Most of the paratypes are in the ANIC.

The type(s) of *S. aemula* Forel were almost certainly destroyed in Hamburg by World War II aerial bombing (Prof. O. Krauss, pers. comm.). It would not be appropriate here to designate a neotype, but the ANIC has specimens suitable for that purpose, determined by McAreavey.

The other 14 taxa described by authors preceding McAreavey are all represented in the ANIC by types (those of Forel and Viehmeyer donated respectively by the MHNG and ZMHB) or RWT type-compared paradigms.

Most available names, notably all of those with extant types described prior to McAreavey's 1957 paper, seem to represent good species. In addition, a number of apparently undescribed species are housed in the ANIC, enough probably at least to double the species' tally. *Stigmacros* is thus deserving of further taxonomic attention. The genus is, moreover, almost ubiquitous in southern mainland Australia, except in closed wet forests. Arrays of 4 or 5 sympatric species may be encountered at semi-arid or sub-humid collection sites. Foragers seem to be active mostly in the late afternoon and evening.

I have specifically compared worker types of Viehmeyer's *S. foreli* (4 syntypes ZMHB; 1 syntype ANIC, donated by ZMHB) and *S. fossulata* (1 syntype ZMHB; 1 syntype ANIC, donated by ZMHB) (both species described in 1925 from Trial Bay (30/153), N.S.W., and originally assigned to *Acantholepis* subgenus *Stigmacros*) with 3 syntypes (ANIC, donated by MHNG) of *S. froggatti* (Forel, 1902) (originally *Acantholepis* (*Acrostigma*) *froggatti*, Bong Bong (34/150), N.S.W.). These 3 names were considered synonyms in subgenus *Stigmacros* by McAreavey (1957), who did not study the Viehmeyer types. The separate type series are clearly not conspecific (indeed, *S. foreli* would relate to subgenus *Campostigmacros* in the McAreavey classification), and appear not to represent junior synonyms of prior names (I have compared them also with type material of the 6 pre-1925 names available in *Stigmacros*, and the 3 others described from Trial Bay by Viehmeyer in 1925). *S. foreli* and *S. fossulata* must therefore be reinstated as good species. As a result no species name currently assigned to *Stigmacros* is at present considered to be a junior synonym.

The transfer to *Stigmacros* by Shattuck (1990) of the putative dolichoderine described as *Turneria frenchi* by Forel (1911) requires amendment. Shattuck pointed out that: (1) the holotype of *T. frenchi* cannot be located; (2) its description is not applicable to any known *Turneria* species; (3) a specimen of an apparently undescribed *Stigmacros* species in the OXUM collection was once labelled by W. C. Crawley as *Turneria frenchi* (this was presumably one of the specimens from Mt Victoria, N.S.W., assigned "with some hesitation" to *T. frenchi* by Crawley in 1922); and (4) the *frenchi* description could apply to a species of "*Stigmacros* subgenus *Camptstigmacros*". The conclusion followed that "The specimen Forel described is . . . apparently a *Stigmacros* rather than a *Turneria*, but it is not conspecific with the OXUM specimen", and the combination *Stigmacros frenchi* was proposed (Shattuck 1990: 105).

It is indisputable that Forel's description could apply to a *Stigmacros* (though Crawley's determination is barely influential in this assessment). However, transfer of such a questionable species to another genus, in another subfamily, where it will be more problematical than before, cannot be justified. Until its type is located and reassessed *Turneria frenchi* should properly be considered *incertae sedis* in family Formicidae, or *frenchi* a species *inquirenda* in *Turneria* (where it was assigned by

Forel—the *only* person in this account to have seen the relevant holotype). The first option is recommended, because there are valid doubts about both genus and subfamily.

Consider that, prior to 1911, Forel had personally defined both relevant genera—*Turneria* in 1895, with type species *T. bidentata* (Forel 1895); and *Stigmacros* in 1902 (*Stigmacros* was originally called *Acantholepis* subgenus *Acrostigma* (Forel 1902), a name changed by Forel to *Acantholepis* subgenus *Stigmacros* in 1905, due to the junior homonymy of his *Acrostigma* (Forel 1905). *Stigmacros* was raised to generic rank by Emery in 1925). Also, he had correctly assigned a second species to *Turneria* (*T. dahlii* in 1901), and 5 species to *Stigmacros* (*australis*, *bosii*, *clivispina*, and *froggatti* in 1902; *aemula* in 1907). *Stigmacros* specimens have a well-developed, distinctively formicine venom nozzle, so it seems unlikely that Forel would have mistaken one for a dolichoderine (though Crawley presumably supposed his relevant *Stigmacros* specimens to be dolichoderines). Note further that Wheeler's (1930) mistake in describing as a formicine his "new genus" *Aphantolepis* (complete with illustrated, though non-existent, formicine venom nozzle) demonstrates the possibility of such an error—*Aphantolepis* is in fact a junior synonym of the dolichoderine genus *Technomyrmex* (W. L. Brown 1953). The *T. frenchi* type locality was not detailed by Forel, but the collector, Charles French Sr., though resident in Victoria, did collect in North Queensland, within the known range of *Turneria*, and exchanged material with entomologists resident there (French 1908).

All other comment is speculation in the absence of the *T. frenchi* holotype, and the least disruptive remedial nomenclatural action is the one recommended here.

### Teratomyrmex McAreavey

The sole known species of this endemic Australian genus is *T. greavesi* McAreavey, 1957, (Blackall Range (26/152), Qld). Additional records (ANIC, QMBA) suggest that *Teratomyrmex* is relatively limited in distribution to south-eastern Queensland and north-eastern New South Wales, as follows: QUEENSLAND: Mt Tenison Woods, 4 km W of Mt Glorious (27/152), (pyrethrum fogging, rain forest, GBM and C. Sarnes, 24.ii.1981); Joalah N.P., Tamborine Mt (27/153) (2000 ft (608 m), ex dead branch of fallen tree, rain forest, RWT, 10.v.1962); near Binna Burra (i.e. Binnaburra Lodge) (28/153) (3000 ft (912 m), ex rotten log, rain forest, RWT, 21.v.1962); Numinbah Natural Arch (28/153) (nest in log, rain forest, BBL, 20.vi.1988). NEW SOUTH WALES: Mt Warning (28/153) (2000 ft (608 m), nest in white-rotten log, BBL, 1.ix.1965); Tomewin (28/153) (1400 ft (426 m), nest in underside of very moist white-rotten log, rain forest, BBL, 2.ix.1966).

The Mt Warning and Tomewin series include dealate queens, and the Numinbah colony has numerous similarly-sized large larvae, perhaps indicating that *Teratomyrmex*, like many other ants, overwinters advanced larval brood in its nests.

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### References

- ANDRÉ, E. (1896)—Fourmis nouvelles d'Asie et d'Australie. *Revue Ent.* 15: 251-265.  
 BROWN, W. L. JR. (1953)—Characters and synonymies among the genera of ants. Part II. *Breviora* 18: 1-8.  
 BROWN, W. L. JR. (1955)—A revision of the Australian ant genus *Notoncus* Emery, with notes on the other genera of Melophorini. *Bull. Mus. comp. Zool. Harv.* 113: 469-494.  
 CHAPMAN, J. W. and CAPCO, S. R. (1951)—Check list of the ants (Hymenoptera: Formicidae) of Asia. *Monogr. Inst. Sci. Technol., Manila* 1.  
 CLARK, J. (1934)—Ants from the Otway Ranges. *Mem. natn. Mus. Vict.* 8: 48-73.  
 CRAWLEY, W. C. (1922)—New ants from Australia. *Ann. Mag. nat. Hist.* (9) 10: 16-36.  
 EMERY, C. (1895)—Descriptions de quelques fourmis nouvelles d'Australie. *Annls Soc. ent. Belg.* 39: 345-358.  
 EMERY, C. (1920)—Studi sui *Camponotus*. *Boll. Soc. ent. Ital.* 52: 1-49.

- EMERY, C. (1925)—Hymenoptera Fam. Formicidae Subfam. Formicinae *Genera Insect.* 183: 1-302.
- FOREL, A. (1895)—Nouvelles fourmis d'Australie, recoltées a The Ridge, Mackay, Queensland par M. Gilbert Turner. *Annls Soc. ent. Belg.* 39: 417-428.
- FOREL, A. (1901)—Formiciden des Naturhistorischen Museums zu Hamburg. Neue *Caluptyomyrmex*-, *Dacryon*-, *Podomyrma*-, and *Echinopla*-Arten. *Mitt. naturh. Mus. Hamb.* 18: 45-82.
- FOREL, A. (1902)—Fourmis nouvelles d'Australie. *Revue suisse Zool.* 10: 405-548.
- FOREL, A. (1905)—Miscellanea myrmécologiques 2 (1905). *Annls Soc. ent. Belg.* 49: 155-185.
- FOREL, A. (1907)—Formicidae. In Michaelsen, W. and Hartmeyer, R., (eds.) *Die fauna Sudwest-Australiens*. Vol. 1. G. Fischer: Jena.
- FOREL, A. (1911)—Die Ameisen des K. Zoologischen Museums in München. *Sber. bayer Akad. Wiss.* 41: 249-303.
- FRENCH, C. (1908)—A naturalist's health trip to northern Queensland. *Vict. Nat.* 24: 167-176.
- HÖLDOBLER, B. and ENGEL-SIEGEL, H. (1984)—On the metapleural gland of ants. *Psyche, Camb.* 91: 201-244.
- HÖLDOBLER, B. and WILSON, E. O. (1990)—*The Ants*. Belknap Press of Harvard University Press: Cambridge.
- KOHOUT, R. J. and TAYLOR, R. W. (1990)—Nomenclatural and distributional notes on Australian ants of the genus *Polyrhachis* Smith, with a synonymic list of the species (Hymenoptera: Formicidae: Formicinae). *Mem. Qd. Mus.* 28: 509-522.
- LOKKERS, C. (1986)—The distribution of the weaver ant, *Oecophylla smaragdina*, in northern Australia. *Aust. J. Zool.* 34: 683-687.
- MCAREAVEY, J. J. (1947)—New species of the genera *Prolasius* Forel and *Melophorus* Lubbock (Hymenoptera: Formicidae). *Mem. natn. Mus. Vict.* 15: 7-27.
- MCAREAVEY, J. J. (1949)—Australian Formicidae. New genera and species. *Proc. Linn. Soc. N.S.W.* 74: 1-25.
- MCAREAVEY, J. J. (1957)—Revision of the genus *Stigmacros* Forel. *Mem. natn. Mus. Vict.* 21: 7-64.
- ROGER, J. (1862)—Einige neue exotische Ameisen-Gattungen und Arten. *Berl. ent. Z.* 6: 233-254.
- SHATTUCK, S. O. (1990)—Revision of the ant genus *Turneria* (Hymenoptera: Formicidae). *Syst. Ent.* 15: 101-117.
- STITZ, H. (1911)—Australische Ameisen (Neu-Guinea und Salomons-Inseln, Festland, Neu-Seeland). *Sber. Ges. naturf. Freunde Berl.* 1911: 351-381.
- TAYLOR, R. W. (1987)—A checklist of the ants of Australia, New Caledonia and New Zealand. *CSIRO Aust. Div. Ent. Rep.* 41: 1-92.
- TAYLOR, R. W. (1989)—The nomenclature and distribution of some Australian ants of the genus *Polyrhachis* Fr. Smith. (Hymenoptera: Formicidae: Formicinae). *J. Aust. ent. Soc.* 28: 23-27.
- TAYLOR, R. W. and BROWN, D. R. (1985)—Hymenoptera: Formicoidea. In Walton, D. W. (Ed.) *Zoological Catalogue of Australia, Vol. 2*. pp. 1-143, 306-349 Australian Government Publishing Service: Canberra.
- VIHMEYER, H. (1925)—Formiciden der australischen Faunenregion. *Ent. Mitt.* 14: 25-39.
- WHEELER, W. M. (1930)—Two new genera of ants from Australia and the Philippines. *Psyche, Camb.* 37: 41-47.
- WHEELER, W. M. (1935)—Myrmecological notes. *Psyche, Camb.* 42: 68-72.
- WILLIAMS, D. J. (1978)—The anomalous ant-attended mealybugs (Homoptera: Pseudococcidae) of South-east Asia. *Bull. Br. Mus. nat. Hist. (Ent.)* 37: 1-72.
- WILLIAMS, D. J. (1985)—*Australian mealybugs*. British Museum (Natural History): London.
- WILLIAMS, D. J. and WATSON, G. W. (1988)—*The scale insects of the tropical south Pacific region. Part 2. The mealybugs (Pseudococcidae)*. C.A.B. International: Wallingford.
- YASUMATSU, K. and BROWN, W. L. (1951)—Revisional notes on *Camponotus herculeanus* Linné and close relatives in palearctic regions (Hymenoptera: Formicidae). *J. Fac. Agric. Kyushu Univ.* 10: 31-44.

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