

NEW SYNONYMS AND NOMENCLATURAL CHANGES IN THE ANT GENUS *POLYRHACHIS* FR. SMITH (HYMENOPTERA: FORMICIDAE: FORMICINAE)

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Twenty-eight former subspecies are raised to species: *P. andromache semitestacea* Emery; *P. arcuata denselineata* Viehmeyer; *P. arcuspinosa waigeuensis* Donisthorpe; *P. atropos circumdata* Viehmeyer; *P. atropos tersa* Viehmeyer; *P. conops simpla* Santschi; *P. conops spinifera* Stitz; *P. continua procera* Emery; *P. costulata radicola* Dahl; *P. dahli cincta* Viehmeyer; *P. hippomanes hortensis* Forel; *P. hippomanes lucidula* Emery; *P. labella obliqua* Stitz; *P. mayri obesior* Viehmeyer; *P. mucronata bismarckensis* Forel; *P. rastellata goramensis* Emery; *P. relucens decipiens* Roger; *P. relucens litigiosa* Emery; *P. saevissima romanovi* Santschi; *P. santschii campbelli* Mann; *P. schang alata* Forel; *P. schang excitata* Viehmeyer; *P. schang leviuscula* Viehmeyer; *P. sexspinosa esuriens* Emery; *P. sumatrensis striatorugosa* Mayr; *P. textor aequalis* Forel; *P. thrinax javanica* Mayr and *P. villipes noesaensis* Forel. 47 synonyms of species-group names are proposed (senior names cited first): *P. andromache* Roger = *P. proxima semirufipes* Donisthorpe; *P. arcuata* (Le Guillou) = *P. arcuata continentis* Forel; *P. aurita* Emery = *P. schlaginhaufeni* Viehmeyer = *P. schlaginhaufeni longispina* Viehmeyer; *P. batesi* Forel = *P. distincta* Karavaiev; *P. bicolor* Fr. Smith = *P. bicolor concolor* Forel; *P. caeciliae* Forel = *P. punctata* Karavaiev; *P. carbonaria* Fr. Smith = *P. orsyllus dentulata* Stitz = *P. orsyllus subcarinata* Emery; *P. caulomma* Viehmeyer = *P. caulomma parallela* Viehmeyer; *P. conops* Forel = *P. conops stitzi* Santschi; *P. continua* Emery = *P. continua revocata* Viehmeyer; *P. creusa* Emery = *P. creusa distinguenda* Karavaiev; *P. cyrus* Forel = *P. urania* Forel; *P. decipiens* Roger = *P. restituta* Viehmeyer = *P. restituta conclusa* Viehmeyer; *P. dives* Fr. Smith = *P. dives siwiensis* Santschi; *P. doddi* Donisthorpe = *P. townsvillei* Donisthorpe; *P. esuriens* Emery = *P. arcuspinosa* Donisthorpe = *P. juxtaspinosa* Donisthorpe; *P. goramensis* Emery = *P. coronata* Santschi; *P. hermione* Emery = *P. daemeli sulcativentris* Forel; *P. leviuscula* Viehmeyer = *P. schang laurae* Menozzi; *P. limbata* Emery = *P. verticalis* Santschi; *P. litigiosa* Emery = *P. sericata pruinosula* Santschi; *P. marginata* Fr. Smith = *P. rotundiceps* Karavaiev; *P. melpomene* Emery = *P. dolichocephala* Viehmeyer; *P. moesta* Emery = *P. paromalus tobias* Forel; *P. nigropilosa* Mayr = *P. nigropilosa conophthalma* Emery; *P. numeria* Fr. Smith = *P. schizospina* Karavaiev; *P. obtusa* Emery = *P. arcuata aruana* Karavaiev; *P. queenslandica* Emery = *P. dahli unisculpta* Viehmeyer; *P. radicola* Dahl = *P. karawaiewi* Santschi; *P. rixosa* Fr. Smith = *P. lycidas* Fr. Smith; *P. rufofemorata* Fr. Smith = *P. biroi* Forel = *P. biroi bidentata* Stitz = *P. biroi paprika* Forel; *P. sculpturata* Fr. Smith = *P. sumatrensis hamulata* Emery; *P. sericeopubescentis* Donisthorpe = *P. inusitata* Kohout; *P. solmsi* Emery = *P. alexandri* Karavaiev; *P. spinifera* Stitz = *P. continua hirsutula* Emery; *P. striata* Mayr = *P. striata assamensis* Forel; *P. striatorugosa* Mayr = *P. striatorugosa exophthalma* Forel; *P. vestita* Fr. Smith = *P. vestita unicolor* Emery; *P. vigilans* Fr. Smith = *P. pyrgops* Viehmeyer and *P. villipes* Fr. Smith = *P. sumatrensis* Fr. Smith = *P. striata tritschleri* Forel. *P. hosei* Donisthorpe, formerly synonymised with *P. inermis* Fr. Smith, and *P. mentor* Forel, formerly synonymised with *P. limbata* Emery, are reinstated as valid species. *P. olybria* Forel, originally described from a queen and placed in the subgenus *Myrmhopla* Forel, is recognised as a member of the nominal subgenus *Polyrhachis* and the identity of the worker caste established. Material of three unavailable names is referred to valid species (valid names cited first): *P. andromache* Roger for '*P. sericata pruinosula harmsi*' Karavaiev; *P. foreli* Kohout for '*P. relucens decipiens papuana*' Emery and *P. obliqua* Stitz for '*P. relucens litigiosa aloseana*' Forel. Types of *P. bihamata minor* Karavaiev, *P. hookeri* Lowne, *P. jurii* Karavaiev, *P. pallescens* Mayr and *P. ypsilon synacantha* Santschi, which were previously reported inaccessible or missing, presumed lost, have been located and their specific identity, including previously proposed synonymy, confirmed. *P. eudora* Fr. Smith and *P. latreillei* (Guérin-Ménéville) are declared species inquirendae. Lectotypes are designated for *P. creusa distinguenda* Karavaiev and *P. hermione* Emery. □ Hymenoptera, Formicidae, *Polyrhachis*, taxonomy, nomenclature, synonymy.

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During visits to European and British museums in 1990, partly funded by an Australian Entomological Society Research/Travel Grant (Kohout, 1991), I was able to study a number of *Polyrhachis* types, including some that were previously considered lost. These studies, with those of a later European survey in 1992, revealed a number of species-level synonyms. Some, relevant to the Australian fauna, have been discussed elsewhere (Kohout, 1994: 135). In 1994 I visited the Zoological Institute of the Ukrainian Academy of Sciences in Kiev in order to examine the little-known types of *Polyrhachis* species described by Karavaiev. Their subsequent comparison with types of species formerly described by Emery, Forel, Fr. Smith, Stitz and Viehmeyer helped to clarify their specific identity and to unravel their extensive synonymies.

The following nomenclatural changes were compiled too late for inclusion in the catalogues of Bolton (1995) or Dorow (1995). I extend sincere thanks to both these colleagues for making their then unpublished computer-based manuscripts available for this study.

The treatment of species is arranged alphabetically within relevant subgenera and/or species-groups, which generally follow the classification of Dorow (1995). Despite some criticism (Hung, 1967) the subgenera of *Polyrhachis* provide useful foci for sorting of species in this otherwise large and difficult genus (Kohout & Taylor, 1990: 510; Dorow, 1995: 7). Publication dates and the spelling of species epithets and author's names follow Bolton (1995).

The measurements (in mm) and indices follow those of Kohout (1990: 499): TL = Total length (the necessarily composite measurement of the entire ant); HL = Head length (the maximum measurable length of the head in perfect full face view, measured from the anterior-most point of the clypeal border or teeth, to the posterior-most point of the occipital margin); HW = Head width (width of the head in perfect full face view, measured immediately in front of the eyes); CI = Cephalic index ($HW \times 100/HL$); SL = Scape length (length of the antennal scape, excluding its condyle); SI = Scape index ($SL \times 100/HW$); PW = Pronotal width (width of the pronotal dorsum measured at the bases of the pronotal spines, or across the humeri in species without spines); MTL = Metathoracic tibial length (maximum measurable length of the tibia of the hind leg).

Where a holotype is described herein as 'unique', this infers that there was only a single specimen available for that species description.

Abbreviations for institutions (with the names of cooperating curators) are: ANIC = Australian National Insect Collection, Canberra, Australia (Drs R.W. Taylor, S.O. Shattuck); BMNH = Natural History Museum, London, U.K. (Barry Bolton); BPBM = Bernice P. Bishop Museum, Honolulu, Hawaii, USA (Dr G.M. Nishida); BSMP = Bureau of Science, Manila, Philippines; CAS = California Academy of Sciences, San Francisco, CA, USA; HNHM = Hungarian Natural History Museum, Budapest, Hungary (Dr J. Papp); DEIE = Deutsche Entomologische Institut, Eberswalde, Germany (Dr A. Taeger); IRSN = Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium (Drs P. Grootaert, P. Dessart); IZAS = Institute of Zoology, Ukrainian Academy of Sciences, Kiev, Ukraine (Dr A.G. Radchenko); MCSN = Museo Civico di Storia Naturale 'Giacomo Doria', Genova, Italy (Drs R. Poggi, V. Raineri); MHNG = Muséum d'Histoire Naturelle, Geneva, Switzerland (Drs C. Besuchet, I. Löbl); MNHN = Muséum National d'Histoire Naturelle, Paris, France (Dr J. Casevitz Weulersse); MNHU = Museum für Naturkunde, Humboldt-Universität, Berlin, Germany (Dr F. Koch); NHMB = Naturhistorisches Museum, Basel, Switzerland (Dr M. Brancucci); NHMW = Naturhistorisches Museum, Wien, Austria (Drs M. Fischer, S. Schödl); NRMS = Naturhistoriska Riksmuseet, Stockholm, Sweden (Drs K.-J. Hedqvist, F. Ronquist); OXUM = University Museum, Oxford, UK (Dr C. O'Toole); QMBA = Queensland Museum, Brisbane, Australia (Drs G.B. Monteith, C.J. Burwell); RMNH = Nationaal Natuurhistorisch Museum, Leiden, The Netherlands (Dr Ing. C. van Achterberg); SMF = Forschungsinstitut Senckenberg, Frankfurt am Main, Germany (Dr J.-P. Kopelke, W.H.O. Dorow); UDSB = Università Degli Studi Di Bologna, Italy (Prof. Dr Maria M. Principi); USNM = US National Museum, Washington, DC, USA (Dr D.R. Smith); ZSSM = Zoologische Staatssammlung, München, Germany (Dr E. Diller).

SYSTEMATICS

Genus *Polyrhachis* Fr. Smith, 1857

Subgenus *Campomyrma* Wheeler, 1911

Polyrhachis creusa Emery, 1897

Polyrhachis creusa Emery, 1897: 577. Holotype worker. Type locality: New Guinea, Ighibirei (L. Loria), MCSN (examined).

Polyrhachis (Campomyrma) creusa distinguenda Karavaiev, 1927: 7, fig. 1. Syntype workers. Type locality: Indonesia, Ambon I. (W. Karavaiev #3007), IZAS, QMBA (examined). Syn. nov.

(For full synonymy citations see Kohout & Taylor, 1990: 514).

REMARKS. Karavaiev described *P. creusa distinguenda* from five workers 'sämtlich einzeln aber nahe von einander gesammelt'. The original series comprised specimens in two distinct size classes, but Karavaiev considered them conspecific, since he described them as 'major' and 'minor' workers of a single species. However, examination of four syntypes shows that the type series includes two distinct species. The 'major' workers of the *P. creusa distinguenda* syntype series (#3007) resemble the syntypes of *P. creusa chlorizans* Forel from Ralum, Bismarck Archipelago so closely that they appear to be part of the same series. Kohout & Taylor (1990: 514) synonymised *P. creusa chlorizans* with *P. creusa* Emery, and this synonymy is now confirmed. The 'minor' workers of the *P. creusa distinguenda* series (#2452) are, on the other hand, identical to voucher specimens (ANIC, QMBA) compared formerly by Taylor (1989: 25) with the holotype of *P. insularis* Emery. I consider them conspecific.

LECTOTYPE DESIGNATION. I have designated a 'major' worker specimen from the Karavaiev collection (IZAS) as the lectotype of *P. creusa distinguenda* and the other 'major' specimen (QMBA) as paralectotype. Both are in good condition. They bear identical sets of three labels, as follows: - Amboina, Karavaiev, 3007; - 3007. Coll. Karavaiev; - Syntypus ♀ *Polyrhachis creusa distinguenda* Karaw. (red tag).

Subgenus *Myrmatopa* Forel, 1915

Polyrhachis alata Forel, 1904 stat. nov.

Polyrhachis gracilis r. *alata* Forel, 1904: 177. Syntype workers. Type locality: Indonesia, Sulawesi, Patuhuang (H. Fruhstorfer), MHNG (examined).

Polyrhachis gracilis Emery; Forel, 1909: 232. Junior synonym of *P. schang* Forel.

Polyrhachis schang var. *alata* Forel; Emery, 1925: 181.

REMARKS. Direct comparison of a *P. alata* syntype with the syntypes of *P. schang* Forel and *P. gracilis* Emery shows them to be closely related. The two latter taxa are undoubtedly conspecific, but the general appearance of the *P. alata* type sets it well apart. The *P. gracilis* syntypes are more-or-less uniformly brown, with only the mouth parts, pronotal collar, appendages, and apical portion of the gaster a shade lighter. The *P. alata* syntype is distinctly bicoloured — mostly light yellowish-brown, with the occiput, lateral and ventral portions of the head, antennae (except the apical funicular segments), lateral portions of mesosoma, front coxae, legs (except trochanters)

and most of the petiole and gaster diffusely blotched medium to dark reddish-brown. The masticatory margins of the mandibles, denticles of the truncated median portion of the anterior clypeal margin, frontal carinae, mesonotal and lateral propodeal margins and the petiolar spines are narrowly bordered with very dark brown. This conspicuous colour pattern is particularly distinct in recently collected specimens (Sulawesi Utara, Dumoga-Bone Nat. Park, nr Danau Mooat, 1100m, 1 viii 1985, N. Stork). Besides its colour, the *P. alata* type differs from the other relevant types in its larger size (HL 1.53-1.79 in *P. alata* versus HL 1.40-1.50 in *P. gracilis*), with higher and more acute lateral margins to its mesonotum, and longer, more slender petiolar spines.

Polyrhachis excitata Viehmeyer, 1913

stat. rev.

Polyrhachis excitata Viehmeyer, 1913: 147, fig. Holotype worker. Type locality: Indonesia, Sulawesi (in copal), MNHU (examined).

Polyrhachis schang var. *excitata* Viehmeyer; Viehmeyer, 1914: 48, fig. 8.

REMARKS. *P. excitata* stands closest to *P. ulysse* Forel and shares with that species distinct, posteriorly raised lateral margins to the mesonotum, and relatively long petiolar spines. However, the *P. excitata* type differs from *P. ulysse* specimens in a number of characters, including the strongly raised frontal carinae, the more convex and shorter propodeal dorsum, the less divergent petiolar spines, and rather dense sculpturation of the head, mesosoma and gaster. Sculpturing in *P. ulysse* is distinctly finer, notably on the head and over the anterior portion of the pronotal dorsum. The characters separating *P. excitata* from *P. schang* are even more pronounced. They include the lack of highly raised frontal carinae in *P. schang*, its generally finer sculpturation, lighter colour and distinctly smaller size. I consider that Viehmeyer's action in reducing *P. excitata* to a subspecies of *P. schang* was unjustified, and confidently return *P. excitata* to its original species rank.

Polyrhachis leviuscula Viehmeyer, 1916

stat. nov.

Polyrhachis (Myrmatopa) schang var. *leviuscula* Viehmeyer, 1916: 164. Syntype workers. Type locality: Singapore (H. Overbeck), MNHU (examined).

Polyrhachis (Myrmatopa) schang var. *laurae* Menozzi, 1926: 100. Syntype workers. Type locality: Singapore (C.F. Baker), UDSB, USNM, QMBA (examined). Syn. nov.

REMARKS. Comparison of the *P. schang levi-uscule* and *P. schang laurae* syntypes shows them to be taxonomically inseparable and undoubtedly conspecific. Additionally, comparison of *P. schang* Forel and the *P. leviuscule* types confirms their separate specific status.

***Polyrhachis solmsi* Emery, 1887**

Polyrhachis solmsi Emery, 1887: 224 (footnote), pl. 3, fig 12. Syntype workers, queens, males. Type locality: Indonesia, Java, Buitenzorg (Conte Solms Laubach), MCSN (examined).

Polyrhachis alexandri Karavaiev, 1906: 375, fig. 1. Syntype queens. Type locality: Indonesia, Java, Buitenzorg (W. Karavaiev), IZAS (examined). Syn. nov.

REMARKS. I have been unable to locate either of Karavaiev's two syntype queens of *P. alexandri* at Kiev (IZAS) or in any other examined European collection. However, I did find two probably relevant queens in the Karavaiev collection. They bear identical labels reading 'Java, Buitenzorg, Karavaiev 1184'. They were placed together with *P. muelleri* Forel, though they could not represent queens of that species, since they do not belong to the subgenus *P. (Myrmhopla)*. They do, however compare well with available queens of subgenus *P. (Myrmatopa)*. These specimens are very similar, differing significantly only in colour. One of them is generally light reddish-brown, with the gastral and most other body segments narrowly bordered with dark brown. The other is generally darker. These specimens compare well with Karavaiev's figure of *P. alexandri* and I am confident that his fig. 1 actually depicts one of them. I consider, also, that Karavaiev's figs 2 and 3 portray the head of the same specimen, despite Karavaiev's claim that they depict lateral and frontal views of *P. muelleri*.

Following comparison of these queens with the original description and Karavaiev's additional notes (kindly translated by Wolfgang Dorow), I accept them as the missing syntype queens of *P. alexandri*. Moreover, their comparison with available *P. (Myrmatopa)* material in the Emery (MCSN), Forel (MHNG) and QMBA collections indicates their close similarity to *P. solmsi*. I consider *P. alexandri* to be synonymous with that species, as formally proposed above.

Subgenus *Polyrhachis* Fr. Smith, 1857

***Polyrhachis bihamata* (Drury, 1773)**

Formica bihamata Drury, 1773: 73, pl. 38, figs 7, 8. Worker. Type locality: Island of Johanna near Madagascar (locality evidently in error - see Bolton, 1973: 352). Location of type unknown.

Polyrhachis (Polyrhachis) bihamata var. *perplexa* Santschi, 1925: 92. Syntype workers. Type locality: Laos, Muong Pek (Vitalis de Salvaza), NHMB (examined). Synonymy by Hung, 1970: 16.

Polyrhachis (Polyrhachis) bihamata var. *minor* Karavaiev, 1927: 12. Holotype worker. Type locality: Indonesia, Java, Tjampea nr Buitenzorg (= Bogor) (Karavaiev #2390), IZAS (examined). Junior homonym of *P. minor* Forel, 1886: 241. Synonymy by Hung, 1970: 16.

Polyrhachis (Polyrhachis) bihamata var. *tonsilis* Santschi, 1928: 133. Syntype workers. Type locality: Indonesia, Sumatra, Sibolangit, 1918 (J.B. Corporaal), NHMB (examined). Synonymy by Hung, 1970: 16.

REMARKS. Hung (1970: 19) was unable to access the type of *P. bihamata minor* and based his proposed synonymy of that form with *P. bihamata* solely on its short original description. I have compared the unique holotype of *P. bihamata minor* with the syntypes of *P. bihamata tonsilis* Santschi, *P. bihamata perplexa* Santschi and abundant material of *P. bihamata* itself, and accept the earlier decision of Hung, but with some reservations. I consider *P. bihamata perplexa* undoubtedly conspecific with *P. bihamata*, but both the other forms differ from *P. bihamata* in several regards. As a result, I am inclined to follow Santschi, who considered *P. bihamata tonsilis* to be a transitional form between *P. bihamata* and *P. bellicosa* Fr. Smith. Judging from the available specimens, I believe that the synonymy of *P. bihamata minor* with *P. bihamata tonsilis*, and elevation of the latter to specific status could be justified. However, following arduous search in numerous collections, the only other known specimen representative of the '*P. bihamata tonsilis*' morph is a topotypical individual (Sumatra, Sibolangit, 1919, J.A. Loerzing). I am hesitant therefore to accept any of the above nomenclatural changes pending a detailed study of additional material when it becomes available.

***Polyrhachis olybria* Forel, 1912**

Polyrhachis olybrius Forel, 1912: 73. Syntype queens. Type locality: Indonesia, Sumatra, Indrapura (Tritschler), MHNG, QMBA (examined).

Polyrhachis olybrius Forel; Emery, 1925: 197. Combination in *P. (Myrmhopla)*.

Polyrhachis bellicosa Fr. Smith; Hung, 1970: 5 (in part).

REMARKS. In contrast to the vast majority of *Polyrhachis* species, where queens are very much like workers, queens of the nominal subgenus *Polyrhachis* are very different. On the fully developed, winged mesosoma the mesonotal spines are evidently not adaptive, and are not present.

The petiolar spines are greatly reduced. In workers the height of the petiole is equal-to or even greater than the length of the head, with the tips of the spines distinctly hook-shaped. The petiolar spines in queens are short and simply pointed. As a result of their dissimilarity to conspecific workers, the queens of *P. olybria* were originally described not only as a separate species, but were also placed in a different subgenus.

Comparison of *P. olybria* syntypes with recently collected material containing worker-associated sexuals has shown that the *P. olybria* syntype queens are conspecific with workers traditionally identified as *P. bellicosa* Fr. Smith. Subsequent study of classical and modern material reveals that SE Asian populations of '*P. bellicosa*' contain two distinct species — *P. olybria* and *P. bellicosa*. The former is apparently endemic to SE Asia, and the latter undoubtedly a New Guinea-based element which has extended its range into Indonesia, the Philippines and Malaysia. *P. bellicosa* is consequently relatively rare towards the northern and western limits of its distribution, where *P. olybria* is rather common. These species are easily separated by a number of characters of which the most conspicuous is the colour of the first gastral segment. The gaster of *P. bellicosa* is always uniformly black or very dark reddish-brown, while that of *P. olybria* is bicoloured, with the first segment ranging from very light yellowish-brown to medium reddish-brown. The propodeal dorsum in *P. bellicosa* is weakly margined, with the margins terminating posteriorly as medially-directed, short transverse ridges. In contrast, the propodeal dorsum in *P. olybria* lacks any trace of margins, and the posterior angles are produced as short but distinct acute spines, which are contiguous at the base to form a 'V'. Ocelli are always present in *P. bellicosa*, though the laterals are sometimes obscure. In *P. olybria* ocelli are lacking, with their relative positions occasionally marked by shallow depressions in the cephalic sculpturation. The petiolar spines also appear generally to be shorter in *P. bellicosa* than in *P. olybria*, and, despite small overlap in their petiolar index values (PI 87-108 in *P. bellicosa* versus PI 107-127 in *P. olybria*), they clearly indicate specific distinctiveness. In over 50 measured *P. olybria* specimens, the lowest PI values (107-112) were obtained from Sumatra, where *P. bellicosa* is so far unknown, while *P. olybria* PI values from Borneo, where both species are sympatric, were consistently higher (PI 118-127).

To assist in establishing the specific identity of the worker caste of *P. olybria*, I have selected two worker specimens to complement the syntype queens. These were originally identified by Forel as *P. bellicosa*, but comparison with modern material confirms their identity as *P. olybria*. These workers and the syntype queens are undoubtedly part of a single original series collected by Tritschler at Indrapura, Sumatra.

***Polyrhachis ypsilon* Emery, 1887**

Polyrhachis ypsilon Emery, 1887: 239. Syntype workers (lectotype designated by Hung, 1970: 19). Type locality: Singapore (L.M. D'Albertis), MCSN (examined).

Polyrhachis (Polyrhachis) ypsilon ab. *synacantha* Santschi, 1933: 2. Holotype worker. Type locality: Borneo, Kp. Makoendjoeng (Baritoe Riv.) (Prince Léopold), IRSN (examined). Synonymy by Hung, 1970: 19.

(For full synonymy citations see Hung, 1970: 19).

REMARKS. When Hung proposed the above synonymy he was unable to locate the type of *P. ypsilon synacantha*, but was satisfied to consider this form an 'individual variant of the Borneo population' of *P. ypsilon*. This opinion was evidently based on Hung's understanding of Santschi's original description, which he translated to read 'petiolar spines are all parallel for some distance' and added that 'there are not any other significant deviations from the syntype worker of *P. ypsilon* and other specimens'.

I have examined the unique holotype of *P. ypsilon synacantha* in the collection of Prince Léopold (IRSN) and found it to be very unusual and undoubtedly an anomalous specimen. I believe that Hung's opinion in considering it a synonym of *P. ypsilon* was correct. However, his interpretation of the Santschi's description was inaccurate. The petiole of *P. ypsilon synacantha* is very peculiar, with the node rising as a huge, pillar-like structure, which terminates dorsolaterally as rather asymmetrical dentiform angles, with the apex furnished with two minute, uneven, posteriorly directed, acute spines.

Subgenus *Myrmothrinax* Forel, 1915

***Polyrhachis aequalis* Forel, 1910 stat. nov.**

Polyrhachis textor var. *aequalis* Forel, 1910: 129. Syntype workers, queen. Original localities: Philippines, Luzon, Province of Zambales, Olongapo (C.S. Banks); Negros, Maa (C.S. Banks), BSMP (types destroyed - see Baltazar, 1966: 284), MHNG, QMBA (examined).

REMARKS. Examination of the *P. textor aequalis* syntypes and their comparison with the

holotype of *P. textor* Fr. Smith clearly shows these taxa to be distinct and separate species. The most obvious characters separating these taxa are their relative size (HL 1.50-1.56 in *P. aequalis* versus HL 2.09 in *P. textor*) and the configuration of their petiolar spines. In *P. textor* the median spine is at least twice as long as the lateral spines, while in *P. aequalis*, as the name suggests, all three spines are of equal length.

***Polyrhachis cincta* Viehmeyer, 1913 stat. nov.**

Polyrhachis dahli var. *cincta* Viehmeyer, 1913: 149. Syntype workers. Type locality: Indonesia, Sulawesi (in copal), MNHU (examined).

REMARKS. Comparison of the types of *P. dahlii* Forel, *P. dahli cincta* Viehmeyer, *P. dahli unisculpta* Viehmeyer and *P. queenslandica* Emery shows all to be closely related. However, while the last two are undoubtedly conspecific (see below under *P. queenslandica*), *P. dahlii* and *P. dahli cincta* appear to be distinct, valid species. The most apparent difference separating them is the characteristic honey-yellow colour of *P. dahlii*, versus the generally very dark reddish-brown colour of *P. dahli cincta*, with only the gaster and appendages a shade lighter. Moreover, in *P. dahlii* the frontal carinae are only slightly elevated (a little more-so than in *P. queenslandica*), while in *P. dahli cincta* they are distinctly raised. In profile the mesonotal dorsum in *P. dahlii* is only marginally higher than the propodeum, while in *P. dahli cincta* the metanotal groove is accentuated by a distinct step-like transition between the mesonotum and propodeum. Also, the dorsum of the mesosoma in *P. dahlii* is densely punctate, without any apparent pattern of orientation, while the mesosomal sculpturation in *P. dahli cincta* is more-or-less distinctly longitudinally punctate-striate. I therefore confidently designate *P. cincta* as a species separate from *P. dahlii*.

***Polyrhachis javanica* Mayr, 1867 stat. nov.**

Polyrhachis thrinax var. *javanica* Mayr, 1867: 52. Holotype worker. Type locality: Indonesia, Java, [Mus. Holm = ?Holmgren] (location of type unknown).

REMARKS. The holotype of *P. thrinax javanica* cannot be found in the NHMW collection and must be presumed lost. Mayr, however, gave a description sufficient to allow reasonably confident identification of *P. javanica*. It clearly shows *P. javanica* to be a species separate from *P. thrinax* Roger.

***Polyrhachis queenslandica* Emery, 1895**

Polyrhachis queenslandica Emery, 1895: 356. Syntype workers. Type locality: Australia, Qld, Kamerunga (M. Podenzana), MCSN, MHNG (examined).

Polyrhachis dahli var. *unisculpta* Viehmeyer, 1914: 48. Syntype workers, queen. Type locality: New Guinea, Wareo, MNHU (examined). Syn. nov.

REMARKS. Comparison of the *P. queenslandica* and *P. dahli unisculpta* syntypes shows them to be taxonomically inseparable, evidently representing Australian and New Guinean populations of a single species.

Subgenus *Chariomyrma* Forel, 1915

***Polyrhachis arcuata* (Le Guillou, 1842)**

Formica arcuata Le Guillou, 1842: 315. Syntype queen, worker. Type locality: Borneo (for queen), N Australia (for worker), MNHN (types presumed lost).

Polyrhachis latifrons Roger, 1863: 155. Syntype workers. Type locality: Indonesia, Bintang I., MNHU (examined). Synonymy with *P. modiglianii* by Emery, 1895: 357; with *P. arcuata* by Emery, 1897: 583.

Polyrhachis arcuata (Le Guillou); Mayr, 1863: 443. Combination in *Polyrhachis*.

Polyrhachis modiglianii Emery, 1888: 529, pl. 9, fig. 1. Syntype workers. Type locality: Indonesia, Sumatra, Padang (E. Modigliani), MCSN (examined). Synonymy with *P. latifrons* Roger by Emery, 1895: 357.

Polyrhachis arcuata var. *continentis* Forel, 1905: 179. Syntype workers. Type locality: W Malaysia (Malacca, Pahang), MHNG (examined). Syn. nov.

REMARKS. The types of *P. arcuata* cannot be found in the MNHN or any other European collection and must be considered lost. However, the examination of the syntypes of *P. latifrons* Roger and *P. modiglianii* Emery, both of which were previously synonymised with *P. arcuata*, shows the *P. arcuata continentis* syntypes to be conspecific with them. The putative distinguishing characters given in the original *P. arcuata continentis* description are insignificant when the types are compared with specimens from a more extensive distributional range. I conclude that there is no justification for *P. arcuata continentis* to be recognised as a taxon separate from *P. arcuata*.

***Polyrhachis aurita* Emery, 1911**

Polyrhachis aurita Emery, 1911: 538. Syntype workers. Type locality: New Guinea, Cyclops Mts, MCSN (examined).

Polyrhachis schlaginhaufeni Viehmeyer, 1912: 12. Syntype workers. Type locality: New Guinea, Tor-

ricelli Mts (O. Schlaginhaufen), MNHU (examined). Syn. nov.

Polyrhachis schlaginhaufeni var. *longispina* Viehmeyer, 1912: 12. Syntype workers. Type locality: New Guinea (O. Schlaginhaufen), ?MNHU. Syn. nov.

REMARKS. I have directly compared syntypes of *P. aurita* and *P. schlaginhaufeni* and I am confident that they are conspecific. They were originally distinguished only by minor differences in the length and direction of spines. Such features are known to be of no value in differentiating species in this subgenus. I have been unable to locate either of the two *P. schlaginhaufeni longispina* syntypes. However, their original description clearly states that the only differences between them and *P. schlaginhaufeni* are the thickness and direction of the propodeal spines and their exceptional length (as the name *longispina* implied). I have examined a single specimen (in the QMBA collection) which fits the *P. schlaginhaufeni longispina* description, and am satisfied that this form is conspecific with *P. aurita*.

***Polyrhachis caulomma* Viehmeyer, 1914**

Polyrhachis caulomma Viehmeyer, 1914: 57, fig. 12. Holotype worker. Type locality: New Guinea, Wareo, MNHU (examined).

Polyrhachis caulomma var. *parallela* Viehmeyer, 1914: 612. Holotype worker. Type locality: New Guinea, Wareo, MNHU (examined). Syn. nov.

REMARKS. Direct comparison of the types of *P. caulomma* and *P. caulomma parallela* clearly demonstrates that the separate status of these forms was originally based on trivial characters, such as the length and direction of the propodeal spines. Considering the great variability in these structures in *Polyrhachis* workers, notably in subgenus *P. (Chariomyrma)*, I propose the above synonymy.

***Polyrhachis cyrus* Forel, 1901**

Polyrhachis cyrus Forel, 1901: 32. Syntype workers, queens, males. Type locality: Bismarck Archipelago, Ralum (PNG, East New Britain Prov.) (F. Dahl), MHNG, MNHU, QMBA (examined).

Polyrhachis urania Forel, 1902: 516. Syntype workers. Type locality: Australia, Qld, Mackay (G. Turner), MHNG (examined). Syn. nov.

REMARKS. I have directly compared the types of *P. cyrus* and *P. urania* and find them remarkably similar. The most obvious difference between them is the density of the cephalic pubescence, which is almost completely lacking in *P. cyrus*, but rather dense in *P. urania*, where

it completely obscures the underlying sculpturation. Also, the propodeal spines in *P. cyrus* are slender and almost straight, while in *P. urania* they are broad and sinuate, with their tips turned distinctly outwards. However, when specimens from the whole range of distribution are examined, these characters seem to integrate, notably in a short series of specimens from Papua New Guinea (PNG), Central Prov. (Port Moresby-Brown River Rd, 20 i 1968, B.B. Lowery) which are intermediate between the two named forms.

In the original description of *P. urania* Forel noted that: 'Cette forme n'est peut-être qu'une race australienne de la *P. Cyrus* de l'Archipel de Bismarck'. I consider this opinion to be correct, and that these forms are taxonomically inseparable, with '*P. urania*' representing an Australian population of its new senior synonym, *P. cyrus*.

***Polyrhachis denselineata* Viehmeyer, 1914 stat. nov.**

Polyrhachis arcuata var. *denselineata* Viehmeyer, 1914: 533. Syntype workers. Type locality: New Guinea, Rawlinsongebirge, MNHU (examined).

REMARKS. In lieu of the missing types of *P. arcuata* (see above under that species) I have compared a syntype of *P. arcuata denselineata* with the syntypes of *P. latifrons* Roger and *P. modigliani* Emery, both formerly synonymised with *P. arcuata* by Emery (1895: 357 and 1897: 583). I find *P. denselineata* to be a distinct species. The dorsa of the head, mesosoma and gaster are finely longitudinally striate, and the pronotal shoulders produced as distinct teeth. In comparison, the pronotal shoulders in *P. arcuata* are obtuse, while the longitudinal body striation is more coarse and irregular. This sculpturing is limited to the dorsa of the head and mesosoma, with the gaster finely shagreened. The petiolar dorsum of *P. arcuata denselineata* has a prominent, spine-like, intercalary tooth which is rather obscure or totally absent in *P. arcuata*. In addition, the rich, relatively long, hair-like pilosity of *P. latifrons* and *P. modigliani* is greatly reduced in *P. arcuata denselineata* and confined mostly to the head and gaster, with only a few hairs present on the mesosomal dorsum. The characters differentiating these taxa appear to be consistent in available material and I am confident in considering *P. denselineata* a species separate from *P. arcuata*.

***Polyrhachis hookeri* Lowne, 1865**

Polyrhachis hookeri Lowne, 1865: 334. Syntype workers. Type locality: Australia, New South Wales,

vicinity of Sydney (B.T. Lowne), ?BMNH (types presumed lost), NHMW (examined).

(For full synonymy citations see Kohout, 1994: 136).

REMARKS. Kohout & Taylor (1990: 515) believed the type/s of this species to be lost. However, during my most recent visit to the Mayr collection in Vienna, I found a single specimen of *P. hookeri* which undoubtedly represents a part of the Lowne's original series. This is surely the specimen referred to by Mayr (1876: 73) as '... ein ♀ in meiner Sammlung von Herrn Lowne' and have labelled it as a syntype of *P. hookeri*. Subsequent study has confirmed the identity of the previously selected voucher specimen ('paradigm') of *P. hookeri* discussed by Kohout & Taylor (1990: 515), and supports the synonymy of *P. cataulacoidea* Stitz proposed by Kohout (1994: 136).

***Polyrhachis limbata* Emery, 1897**

Polyrhachis limbata Emery, 1897: 585, pl. 1, fig. 24.

Holotype worker. Type locality: New Guinea, Sorong (L.M. D'Albertis), MCSN (examined).

Polyrhachis (Chariomyrma) abrupta Karavaiev, 1927: 19, fig. 10. Syntype workers. Indonesia, Aru Is, Wammar I. (W. Karavaiev #2586?, 3001), IZAS, QMBA (examined). Junior primary homonym of *Polyrhachis abrupta* Mayr, 1867.

Polyrhachis verticalis Santschi, 1928: 139. Replacement name. Syn. nov.

(*Polyrhachis mentor* Forel; Viehmeyer, 1914: 54.) Spurious synonymy.

REMARKS. I have directly compared the types of *P. limbata*, *P. verticalis* and *P. mentor* (MNHU) and am confident that *P. limbata* and *P. verticalis* represent a single species. The unique holotype of *P. limbata* appears somewhat worn, having lost most of the characteristic reddish pubescence, which is still evident in the syntypes of *P. verticalis* (and very conspicuous in modern specimens). Otherwise these types are closely comparable. However, I disagree with the synonymy of *P. mentor* with *P. limbata* as proposed by Viehmeyer (1914: 54). These species are superficially similar, mainly because of their shared reddish pubescence, but they are structurally well-differentiated. *P. mentor* is distinctly more slender, notably towards the propodeal dorsum, which is distinctly narrower than in specimens of *P. limbata*. The anterior margin of the petiolar dorsum is narrowly rounded, with almost straight, posteriorly diverging spines. The head and pronotal dorsum are finely, fairly regularly striate, while underlying reddish pubescence is almost lacking on the head and much diluted elsewhere, except on the gaster. In comparison, *P. limbata* is distinctly more robust, with sculpturation more-or-less striate-

rugose, and underlying reddish pubescence rather dense, notably on the mesosomal dorsum and gaster. The anterior margin of the petiolar dorsum is broadly rounded, and relatively long semicircular spines embrace the first gastral segment.

P. limbata is known to range from the Indonesian Aru Is to the New Guinean mainland, where it was most recently recorded from Torricelli Mts (West Sepik Prov., Lumi, 400-550m, 03° 28'S, 142°02'E, 4-13 viii 1984, R.J. Kohout acc. 84.262). *P. mentor* appears to be restricted to islands of the Bismarck Archipelago where the unique holotype was collected by F. Dahl on the 'wooded summit of Wunakokur' (= Vunakokor [Mt Varzin], c. 20km S of Rabaul, New Britain). The only other specimen I have seen was collected on New Ireland (Lelet Plateau, 800-1000m, c. 03°20'S, 151°56'E, 19-24 vii 1984, R.J. Kohout acc. 84.95).

It could be argued that, considering their superficial likeness and disjunct distributional ranges, *P. mentor* might represent an isolated population conspecific with *P. limbata*. However, in view of the scarcity of study material this assumption is purely hypothetical. I believe that the differences outlined above are sufficient to justify the separate specific status of these forms.

***Polyrhachis marginata* Fr. Smith, 1859**

Polyrhachis marginatus Fr. Smith, 1859: 139. Holotype worker. Type locality: Indonesia, Aru Is (A.R. Wallace), OXUM (examined).

Polyrhachis (Chariomyrma) rotundiceps Karavaiev, 1927: 18. Syntype workers. Type locality: Indonesia, Aru Is, Wammar I. (W. Karavaiev #2570, 3003), IZAS, QMBA (examined). Syn. nov.

REMARKS. Karavaiev was evidently unaware of Smith's *P. marginata*. Comparison of its type with those of *P. rotundiceps* shows them to be synonyms.

***Polyrhachis obtusa* Emery, 1897**

Polyrhachis aurea var. *obtusa* Emery, 1897: 589. Syntype workers. Original localities: New Guinea, Haveri, Kapa Kapa, Humboldt Bay (L. Loria), MCSN, MNHG, QMBA (examined).

Polyrhachis obtusa Emery; Kohout & Taylor, 1990: 516. Raised to species.

Polyrhachis arcuata var. *aruana* Karavaiev, 1927: 16. Syntype workers. Indonesia, Aru Is, Wammar I. (W. Karavaiev #2531, 2644, 3002) IZAS, QMBA (examined). Syn. nov.

REMARKS. Direct comparison of the syntypes of *P. obtusa* and *P. arcuata aruana*, together with more recent material from Indonesia and PNG,

demonstrates that these names have been applied to a single biological species.

***Polyrhachis pallescens* Mayr, 1876**

Polyrhachis guerini var. *pallescens* Mayr, 1876: 74.

Holotype worker. Type locality: Australia, Qld, Rockhampton (A. Dietrich), NHMW (examined).

Polyrhachis pallescens Mayr; Kohout & Taylor, 1990: 516. Raised to species.

(Full synonymy citations see Kohout & Taylor, 1990: 516).

REMARKS. Kohout & Taylor (1990: 516) raised *P. pallescens* to specific rank and considered *P. aurea depilis* Emery to be its junior synonym. At that time the holotype of *P. pallescens* could not be located and the possibility of its destruction was accepted. It was suggested that all the unique types of species described by Mayr from the material of various museums, including the Godeffroy, were returned to their original owners. Following the collapse of the firma Godeffroy, almost its entire collection was transferred to Hamburg Museum, and mostly destroyed during World War II. However, I have located in the Mayr collection a number of *Polyrhachis* specimens, most of them bearing original Godeffroy Museum labels, pinned as a separate group. Most of these are type specimens of *Polyrhachis* species described by Mayr (1876) from Godeffroy Museum material. They include the type of *P. pallescens*. It is well-documented that Mayr did not label specimens used for his descriptions to indicate their status, and this perhaps explains why these types have remained undetected for so long. Following examination of its unique holotype, the separate specific status of *P. pallescens* versus *P. guerini*, and the junior synonymy of *P. aurea depilis*, as proposed by Kohout & Taylor (1990: 516), are confirmed.

***Polyrhachis radiculicola* Dahl, 1901 stat. nov.**

Polyrhachis costulata var. *radiculicola* Dahl, 1901: 15. Workers, queens (alate), males. Type locality: Bismarck Archipelago, Ralum (F. Dahl) MHNG, MNHU, QMBA (specimens from the original series examined). [First available use of *Polyrhachis aurea* r. *costulata* var. *radiculicola* Forel, 1901: 32 (unavailable infrasubspecies)].

Polyrhachis (Chariomyrma) convexa Karavaiev, 1927: 17, fig. 7b. Syntype workers. Type locality: Indonesia, Ambon I., Hito (W. Karavaiev #2976) IZAS, QMBA (examined). Junior primary homonym of *Polyrhachis convexa* Roger, 1863.

Polyrhachis (Chariomyrma) karawaiewi Santschi, 1928: 139. Replacement name. Syn. nov.

REMARKS. Comparison of a *P. karawaiewi* syntype with specimens from the original series of *P.*

costulata radiculicola shows them to be conspecific.

P. nigrescens is a species very similar to *P. karawaiewi*. It was described by Karavaiev (1927: 16) in the same paper as his junior homonym '*P. convexa*', which was later replaced by Santschi's *P. karawaiewi*. The most obvious differences between these taxa are their relative size and the outline of the mesosomal dorsum in lateral view. *P. karawaiewi* is consistently smaller, with a highly convex mesosomal dorsum, while the larger *P. nigrescens* has the mesosomal dorsum only slightly arched. This character is especially conspicuous when specimens of both species are directly compared. However, I have seen material from Jilolo District (Halmahera, Indonesia) and Kavieng (New Ireland Prov., PNG) in which specimens matching both nominal species are mounted on the same pin. I have also collected a series at Baderi village (Northern Province, PNG) which ranges in character between these forms, with the smallest specimens very closely matching the type of *P. karawaiewi*, and the larger specimens closely similar to the *P. nigrescens* type. Similar variability is seen in specimens from several other PNG series. It is clearly possible that these nominal species represent a single, albeit variable, species. Unfortunately the head of the single *P. nigrescens* syntype available for this study is missing and I am reluctant to propose synonymy of these nominal taxa until other specimens in good condition become available.

Subgenus ***Hedomyrma*** Forel, 1915

***Polyrhachis campbelli* Mann, 1919 stat. nov.**

Polyrhachis (Hedomyrma) santschii subsp. *campbelli* Mann, 1919: 376. Syntype workers. Type locality: Solomon Is, Russell I., West Bay, 1916 (W.M. Mann), MCZC (Type 9192) (examined).

REMARKS. Comparison of the holotype of *P. santschii* Mann with syntypes of *P. santschii campbelli* clearly shows they represent separate species. The pronotal spines are rather short and broad at their bases in *P. campbelli*, while in *P. santschii* the spines are slender, much longer, and distinctly curved downwards. The propodeal spines in *P. santschii* are also very prominent, more-or-less horizontal, and with a distinctly broader, longitudinally striate base. Generally silver or pale-golden pubescence is well developed over most of the body in *P. campbelli*, while it is almost absent in *P. santschii*, except on the gastral dorsum, where it has a relatively more distinctly golden hue.

***Polyrhachis circumdata* Viehmeyer, 1913**
stat. rev.

Polyrhachis circumdata Viehmeyer, 1913: 152, fig. Syntype workers, queen. Type locality: Indonesia, Sulawesi (in copal), MNHU (workers examined).

Polyrhachis atropos var. *circumdata* Viehmeyer, 1914: 52. Reduced in rank to variety of *P. atropos* Fr. Smith.

REMARKS. Comparison of the *P. atropos* holotype with *P. circumdata* syntypes demonstrates that Viehmeyer's (1914) action in reducing the rank of the latter cannot be justified. These taxa are very distinct, notably in the form of the pronotal dorsum, which is relatively large in *P. atropos*, appearing somewhat disproportionate to the rest of the body, with its spines rather broad and the lateral borders only weakly emarginate at their bases. In *P. circumdata* the pronotal dorsum is distinctly more narrow, with its sides deeply emarginate at the bases of the relatively slender spines. I am confident that these forms represent separate species.

***Polyrhachis hermione* Emery, 1895**

Polyrhachis hermione Emery, 1895: 357. Syntype workers. Type locality: Australia, Qld, Mt Bellenden Ker (M. Podenzana), MCSN, MHNG (examined).

Polyrhachis daemeli var. *sulcativentris* Forel, 1915: 111. Syntype workers. Type locality: Australia, Qld, MHNG (examined). Syn. nov.

Polyrhachis daemeli var. *sulcativentris* Emery, in Forel; Bolton, 1995: 357.

Polyrhachis daemeli sulcativentris Mayr; Dorow, 1995: 27.

REMARKS. Despite extensive search in the Forel (MHNG) and Emery (MCSN) collections I have not located the type of *P. daemeli sulcativentris*. However, examination of a *P. hermione* syntype in the Emery collection revealed that it bears a handwritten tag reading '*Polyrhachis sculptiventris* Emery', with the name '*sculptiventris*' crossed-out and replaced by the name '*Hermione*'. Similarly, a syntype of *P. hermione* in the Forel collection, which Emery had apparently sent to Forel before the description of *P. hermione* was published, bears a name tag '*Polyrhachis Dämeli* var. *sculptiventris* n. var. Queensland'. This specimen agrees entirely with the short description of *P. daemeli sulcativentris*, and undoubtedly represents the original specimen to which Forel (1915: 110) referred when he described *P. daemeli exlex*. From Forel's statement it is obvious that he had intended only to point out the similarity of his new species and Emery's '*sculptiventris*', the description of which he thought had already been published. Forel was

evidently unaware of Emery's earlier decision to change that species name before publication from *P. sculptiventris* to *P. hermione*, and clearly misread the handwritten name '*sculptiventris*' on the label of his *P. hermione* specimen as '*sulcativentris*', thus erroneously establishing the name *P. daemeli sulcativentris*, which can now be laid to rest.

LECTOTYPE SELECTION. To establish the identity of both relevant names I have selected the Emery collection syntype as the lectotype of *P. hermione* Emery. It is mounted on its left side on a card, and has the right foreleg and both hind legs missing and the right propodeal spine broken off. It is otherwise in relatively good condition. In addition to the name tag discussed above, it bears the following three labels: a tag in Emery's handwriting reading 'Mt Bellendenker Queensland', 'TYPUS' (in red print), and a yellow tag 'Collezione EMERY'. The syntype in the Forel collection, which is clearly a part of the same series, is mounted on an identical stage card in the same manner, but on its right side. In addition to the original name-tag in Emery's handwriting (see above), it bears a small blue tag reading 'Cotypus' and three additional labels, each in a different handwriting, reading: 'G. *Polyrhachis* Sm', 'S.G. *Hedomyrma* For.' and 'Sp. *Daemeli* Mayr'. This specimen is recognised here as a paralectotype of *P. hermione*. Also, as a result of Forel's (1915) action, I deem both these specimens to be syntypes of *P. daemeli sulcativentris* Forel and have labelled them accordingly.

***Polyrhachis melpomene* Emery, 1897**

Polyrhachis melpomene Emery, 1897: 592. Syntype workers, queen. Type locality: New Guinea, Haveri (L. Loria), MCSN (examined).

Polyrhachis dolichocephala Viehmeyer, 1914: 532, fig. 5. Holotype worker. Type locality: New Guinea, Rawlinsongebirge, MNHU (examined). Syn. nov.

REMARKS. Direct comparison of types of both relevant names shows this to be a straightforward synonymy. Viehmeyer was very likely unaware of Emery's *P. melpomene*, since in the original description of *P. dolichocephala* he compares that taxon with *P. fervens* Fr. Smith rather than *P. melpomene*.

***Polyrhachis tersa* Viehmeyer, 1914 stat. nov.**

Polyrhachis atropos var. *tersa* Viehmeyer, 1914: 52. Holotype worker. Type locality: New Guinea, Sattelberg, MNHU (examined).

REMARKS. Examination of the holotypes of *P. atropos* Fr. Smith and *P. atropos tersa*, shown them to be taxonomically distinct, undoubtedly

representing separate species. The pronotal dorsum of *P. atropos tersa* is more like that of *P. circumdata* (see above). However, in that species the pronotum is widest near the pro-mesonotal suture, while in *P. tersa* the lateral pronotal margins are more rounded with the pronotal dorsum widest in the middle. Also, the mesosomal dorsum in *P. tersa* appears more slender than that of *P. circumdata*, with the sides of the mesonotum strongly convergent posteriorly and the propodeal dorsum distinctly narrower, notably across the propodeal suture. The longitudinal striation of the mesonotal and propodeal dorsa in *P. circumdata* is much less coarse than that on the pronotum, but still apparent, whereas the mesonotal and propodeal dorsa in *P. tersa* are only weakly micro-reticulate and almost smooth. In addition, the head and antennal scapes in *P. tersa* are somewhat longer, with CI 79-83 and SI 158-162, versus CI 86-87 and SI 147 in the three *P. circumdata* syntypes.

Subgenus *Myrmhopla* Forel, 1915

Polyrhachis bicolor species-group

Polyrhachis bicolor Fr. Smith, 1858

Polyrhachis bicolor Fr. Smith, 1858. Holotype queen.

Type locality: Burma, BMNH (examined).

Polyrhachis bicolor var. *concolor* Forel, 1910: 129.

Syntype workers, queen, male. Type locality: Philippines, Luzon, Manila (C.S. Banks), BSMP (types destroyed - see Baltazar, 1966: 282), MHNG (examined). *Syn. nov.*

REMARKS. *P. bicolor* was first reported from Australia (Northern Territory, Darwin) by Clark (1941: 69) and subsequently included by Kohout & Taylor (1990: 511) in their list of Australian *Polyrhachis* species. The identification of Clark's specimens has, however, never been verified. Recent collecting (by A.N. Andersen, H. Reichel, R.J. Kohout) has provided abundant additional material, including several queens. Their comparison with the holotype queen of *P. bicolor* (BMNH) finally establishes that the Australian specimens are conspecific with that species. Subsequent study of several infraspecific forms of *P. bicolor* in the Forel collection (MHNG) demonstrates that the characters used by Forel to separate *P. bicolor concolor* and *P. bicolor* are trivial. I consider them as representatives of a single species.

In the course of this study I have also examined those infraspecific taxa of the *P. bicolor*-complex described by Karavaiev; namely *P. bicolor atrocastanea*, *P. bicolor aurata*, *P. bicolor erecta* and *P. bicolor weyeri*. I consider that most, if not all, represent valid species. However, the *P. bicolor*

species-group, as delimited by Dorow (1995: 49), contains a number of other unresolved taxa and their treatment is beyond the scope of this study. Resolution of the complex will require detailed examination of all specific and infraspecific named entities, types of which are not presently available. Their taxonomy will therefore be dealt with separately.

Polyrhachis dives species-group

Polyrhachis dives Fr. Smith, 1857

Polyrhachis dives Fr. Smith, 1857: 64. Holotype worker. Type locality: Singapore (A.R. Wallace), BMNH (examined).

Polyrhachis (Myrmhopla) dives var. *siwiensis* Santschi, 1932: 20. Holotype queen. Type locality: New Guinea, Siwi (Forêt) (Prince Léopold), IRSN (examined). *Syn. nov.*

(For full synonymy citations see Bolton, 1995: 347 and Dorow, 1995: 52.)

REMARKS. I have compared the holotype queen of *P. dives siwiensis* with numerous *P. dives* queens from a wide distributional range, and believe that the characters given by Santschi do not justify the separate status of the former as a subspecies of *P. dives*. The slightly larger head and the rather short propodeal spines sets the queen of *P. dives siwiensis* somewhat apart, but these differences seem to be taxonomically insignificant. In fact, the holotype compares relatively well with a somewhat aberrant queen collected in N Qld in a nest of 'normal' *P. dives* workers. I am therefore confident in considering the holotype queen of *P. dives siwiensis* to be a variant individual, and consequently a synonym of *P. dives*.

Polyrhachis mucronata species-group

Polyrhachis batesi Forel, 1911

Polyrhachis batesi Forel, 1911: 301. Holotype worker.

Type locality: Indonesia, Seram I. (Bates), ZSSM (examined).

Polyrhachis (Myrmhopla) distincta Karavaiev, 1927: 40, fig. 18. Syntype workers. Type locality: Indonesia, Ambon I. (W. Karavaiev), IZAS, QMBA (examined). *Syn. nov.*

REMARKS. This is a straightforward synonymy. Karavaiev was evidently unaware of Forel's prior available species name.

Polyrhachis bismarckensis Forel, 1901

stat. nov.

Polyrhachis mucronata var. *bismarckensis* Forel, 1901: 33. Holotype worker. Type locality: Bismarck Archipelago, Wunakokur (= Vunakokor [Mt Varzin], New Britain) (F. Dahl), MNHU (examined).

REMARKS. Comparison of the *P. mucronata* and *P. mucronata bismarckensis* holotypes clearly shows them to be representatives of distinct, separate species. The pronotal dorsum is relatively wide, with less prominent humeral teeth and distinctly more divergent propodeal spines in *P. bismarckensis*. However, the most obvious character separating these taxa involves the structure of their petioles. In *P. mucronata* the dorsolateral petiolar spines are rather slender and evenly curved, embracing the base of the first gastral segment. They have between them a pair of very short, posteriorly directed intercalary teeth. In *P. bismarckensis* the dorsolateral spines are relatively thick (thought not as massive as in *P. lucidula* Emery or *P. ridleyi* Forel — see below) and slightly curved at their bases; posteriorly the spines are almost straight, though slightly divergent, with their extreme apices distinctly bent outwards. The acute, obliquely rised intercalary teeth of *P. bismarckensis* are distinctly longer than those of *P. mucronata*.

***Polyrhachis hortensis* Forel, 1913 stat. nov.**

Polyrhachis hippomanes var. *hortensis* Forel, 1913: 138. Syntype workers, queen, males. Type locality: Indonesia, Java, Buitenzorg (= Bogor) (H.v. Buttel-Reepen), MHNG (examined).

REMARKS. Comparison of the *P. hippomanes* and *P. hippomanes hortensis* types shows them to differ widely in a number of characters, including a distinctly more slender body and relatively much longer propodeal and petiolar spines in *P. hippomanes*. The head and mesosoma are also more densely punctate and opaque than in *P. hippomanes hortensis*, where the dorsal sculpturing is distinctly more shallow, with some shine evident on the occiput, at the bases of the propodeal and petiolar spines and over the gastral dorsum. The propodeum in *P. hippomanes hortensis* is relatively narrow, but less so than in *P. hippomanes*. It is armed with rather short, straight, divergent spines. The petiole of *P. hippomanes hortensis* has the lateral spines distinctly shorter, and there are two very short intercalary teeth, which are lacking in *P. hippomanes*. I am confident on these bases that *P. hortensis* represents a distinct species separate from *P. hippomanes*.

***Polyrhachis lucidula* Emery, 1893 stat. nov.**

Polyrhachis hippomanes lucidula Emery, 1893: 254 (footnote). Holotype worker. Type locality: Burma, Tenasserim, Malewoon (L. Fea), MCSN (examined).

REMARKS. I have directly compared the holotypes of *P. hippomanes* and *P. hippomanes lucidula* and consider them to represent separate species. They differ in general appearance and in a number of other characters, including a distinctly more slender body, with relatively thin and long spines in *P. hippomanes*. The head and mesosoma are also rather densely punctate and opaque. In *P. lucidula* the body is wider, superficially sculptured and shiny. *P. lucidula* is obviously closely related to *P. ridleyi* Forel, and like that species it has remarkably massive petiolar spines. However, these two taxa differ in general appearance, with *P. lucidula* being consistently larger and considerably more shiny than *P. ridleyi*.

Examination of modern specimens from Sumatra and Java, which are comparable to *P. lucidula*, demonstrates some variability, notably in size. Even the largest specimen fails to attain the size of the holotype (HL 1.47 versus 1.53). However, all these specimens share an apparently distinctive, shiny appearance and colour pattern, involving a black body, dark brown antennae and light reddish-brown legs. In spite of their smaller size, the Sumatran specimens are very similar to the *P. lucidula* holotype, and I consider them to represent a conspecific population.

***Polyrhachis moesta* Emery, 1887**

Polyrhachis hippomanes var. *moesta* Emery, 1887: 237. Holotype worker. Type locality: Indonesia, Sumatra, Sungei-Bulu (O. Beccari), MCSN (examined).

Polyrhachis paromalus tobias Forel, 1911: 391. Holotype worker. Type locality: Indonesia, Sumatra (Moesch), MHNG (examined). Syn. nov.

Polyrhachis moesta Emery; Wang & Wu, 1991: 599. Raised to species.

REMARKS. Forel noted the similarity between *P. paromalus tobias* and *P. hippomanes moesta*, but he had evidently not compared relevant specimens. I have compared the holotypes of both taxa and confidently declare them to be conspecific and taxonomically inseparable, despite some trivial differences, such as fractionally smaller humeral teeth and slightly less elevated propodeal spines in the *P. paromalus tobias* holotype.

***Polyrhachis armata* species-group**

***Polyrhachis caecilae* Forel, 1912**

Polyrhachis caecilae Forel, 1912: 76. Holotype worker. Type locality: Indonesia, Sumatra, Indrapura (Tritschler), MHNG (examined).

Polyrhachis (Myrmhopla) punctata Karavaiev, 1927: 36. Holotype worker. Type locality: Indonesia, Java, Buitenzorg (Karavaiev #2893). Syn. nov.

REMARKS. The holotype of *P. punctata* is conspecific with that of *P. caecilae*. The only apparent difference between them is the somewhat more solidly built mesosoma, with more downward curved pronotal spines, in *P. punctata*. The dorsal edge of the petiole between its lateral spines is furnished with three subequal intercalary teeth, with the middle tooth situated distinctly more forward than the other two, forming in dorsal view a clearly defined inverted 'v'. The colour of the body and appendages of these holotypes is essentially identical except for the gaster, which is distinctly more reddish in *P. caecilae*. The specific epithet stands as *P. caecilae* in the published original description, and that is formally the correct name for this species. The tag on the holotype, however, reads '*caeciliae*', and *P. caecilae* has been listed incorrectly under that name by all subsequent authors, including Emery (1925: 194), Dorow (1995: 47) and Bolton (1995: 345).

P. caecilae is closely related to *P. gestroi* Emery (1900: 714) and *P. gestroi rufiventris* Forel (1911: 391). However, as Forel (1912: 77) noted in the original description, *P. caecilae* differs from both species in having 3 intercalary teeth on the petiole, while there are only 2 in *P. gestroi* Emery and *P. gestroi rufiventris* Forel.

***Polyrhachis romanovi* Santschi, 1928 stat. nov.**

Polyrhachis (Myrmhopla) acantha dichroa Karavaiev, 1927: 33. Holotype worker. Type locality: Indonesia, Java, Bantam (W. Karavaiev), IZAS (examined). Junior primary homonym of *P. dichroa* Forel, 1893.

Polyrhachis (Myrmhopla) acantha st. *romanovi* Santschi, 1928: 139. Replacement name.

Polyrhachis saevissima romanovi Santschi; Dorow, 1995.

REMARKS. I have examined and directly compared the unique holotypes of *P. romanovi* and *P. saevissima* Fr. Smith, 1860, together with the types of *P. acantha* Fr. Smith, 1860 and *P. acasta* Fr. Smith, 1860, both of which were synonymised with *P. saevissima* by Bolton (1974: 178). I conclude that *P. romanovi* is obviously related to *P. saevissima* and bears a close resemblance, which is most direct with specimens meeting the *P. acasta* diagnosis. This similarity is accentuated by the almost identical colour pattern of the relevant specimens. However, the two species differ in several details, including the outline of the mesosoma, which is relatively high and evenly

curved in *P. romanovi*, while in *P. saevissima* and its cohorts (see below) the profile from the summit towards the propodeal spines is more-or-less sinuate, or almost straight, with a shallow depression at the promesonotal suture. The pronotal spines of *P. romanovi* are somewhat longer and more slender than those of *P. saevissima*, while the propodeal spines are shorter and the posterior face of the petiole distinctly more convex, in fact almost 'inflated'. The colouration of *P. romanovi* is distinctive, with the gaster and appendages light reddish-brown, in contrast to *P. saevissima*, specimens of which are totally black, apart from those formerly assigned to *P. acasta* (see above and under *P. saevissima* below). Comparison of the above specimens with recently collected material shows that these characters, including the colour scheme, are constant in specimens throughout the whole range of their distribution. It thus appears that assignment of specific rank to *P. romanovi* is appropriate.

I have also studied the types of *P. saevissima*, *P. acantha* and *P. acasta* (excluding their infraspecific forms) together with modern material from Sulawesi. Comparison shows *P. saevissima* to be relatively somewhat more slender than the others, with a distinctly narrower mesosomal dorsum (notably across the bases of the pronotal spines). The propodeal spines are also relatively more slender, and stand somewhat isolated. In *P. acantha* and *P. acasta* the bases of the spines are more broad and more-or-less medially contiguous. In profile the propodeal spines in *P. acasta* are strongly raised and virtually straight, while they are distinctly less elevated in the other two taxa. Those of *P. saevissima* are almost straight, while those of *P. acantha* are gently and evenly bent downwards. The petiolar spines in *P. acasta* closely embrace the first gastral segment, while in *P. acantha* the semicircle they form is distinctly more narrow. It is even more so in *P. saevissima*. Uniformly reticulate sculpturation of the mesosomal dorsum in *P. acantha* and *P. acasta* is almost hidden by abundant appressed pubescence, but this is rather dilute in *P. saevissima*. The colour of the body in these taxa is black, with the legs very dark brown to black, except in *P. saevissima*, where the apical portions of the tibiae are a shade lighter, and in *P. acasta*, where the trochanters, femora and tibiae are reddish-brown. I consider these three taxa to be very similar and almost certainly closely related. They appear to form numerous interlocking populations throughout their shared distributional range. As a result of these studies, and despite some

reservations, I currently follow Bolton (1974: 178) in considering *P. saevissima*, *P. acantha* and *P. acasta* to be putatively conspecific. I believe that the taxonomy of these entities could be competently resolved only following detailed study of worker-associated queens and consideration of the various (currently unavailable) relevant types of infraspecific forms.

Bolton (1974: 179) also suggested that the putatively closely related *P. diaphanta* Fr. Smith, 1861 could be a junior synonym of *P. saevissima*. However, concurrent examination of the relevant types has shown *P. diaphanta* obviously to be a distinct species. Its most characteristic feature is the sculpturation of the mesosoma, which is rather densely and deeply rugose-punctate, while merely uniformly reticulate in *P. saevissima*. The pronotal spines in *P. diaphanta* are short and thick, hardly longer than wide, while in *P. saevissima* they are distinctly more slender, and almost twice as long as wide at their bases. In *P. diaphanta* the mesosoma in profile rises strongly to the centre of the pronotum, then descends gently in a virtually straight, uninterrupted line towards the abrupt, almost vertical declivity. In contrast the outline of the mesosoma in *P. saevissima* is more-or-less sinuate, with a shallow depression at the promesonotal suture, and a gently raised mesonotum. The propodeal spines in *P. diaphanta* are relatively long and widely divergent, almost horizontal in profile and gently curved downwards. Their broadly contiguous bases bluntly divides the propodeal dorsum from the declivity. The petiolar dorsum bears a pair of strong, horizontal, relatively long, semicircular spines and two short, acute, dorso-posteriorly directed intercalary teeth. The petiolar spines in *P. diaphanta* embrace the first gastral segment, while in *P. saevissima* the semicircle formed by the spines is much narrower. On the inner surface of each spine in both species there is a distinct furrow, which runs from the base, adjacent to the intercalary teeth, almost to the tip. The colour of the body in *P. diaphanta* is black, with the legs very dark brown to black, in contrast to *P. saevissima*, where the colour of the legs ranges from relatively light reddish-brown to dark brown or black, with the tibiae a shade lighter. The antennae in *P. saevissima* are uniformly very dark brown or black, while in *P. diaphanta* the funiculus is distinctly bicoloured. The first segment is black, save for a narrow, light, apical band. The width of such light coloured bands progressively increases through the series of more distal segments, with the five apical segments entirely light

yellowish-brown. *P. diaphanta* appears to be rather uncommon. I have seen only one other specimen closely comparable to its type.

***Polyrhachis sexspinosa* species-group**
***Polyrhachis esuriens* Emery, 1897 stat. nov.**

Polyrhachis sexspinosa var. *esuriens* Emery, 1897: 591. Syntype workers, queen. Type locality: New Guinea (L. Loria), MCSN, QMBA (examined).

Polyrhachis sexspinosa var. *esuriens* Emery; Bolton, 1975: 12. Junior synonym of *P. sexspinosa* (Latreille, 1802: 126).

Polyrhachis (*Myrmhopla*) *arcuspinosa* Donisthorpe, 1941: 140, fig. 1. Syntype workers. Type locality: New Guinea, Mt Nomo, S of Mt Bougainville (L.E. Cheesman), BMNH, QMBA (examined). Syn. nov.

Polyrhachis (*Myrmhopla*) *juxtaspinosa* Donisthorpe, 1949: 417, fig. 2. Syntype workers. Type locality: New Guinea, Maffin Bay (E.S. Ross), CAS, BMNH (examined). Syn. nov.

REMARKS. Bolton (1975: 12) considered *P. sexspinosa esuriens*, *P. arcuspinosa* and *P. juxtaspinosa* (and several other names), to be synonymous under *P. sexspinosa* (Latreille). I have examined the syntypes of these three taxa, in comparison with the voucher specimen ('paradigm') of *P. sexspinosa* in QMBA (Kohout & Taylor, 1990: 519-520) and I am confident that, while they are clearly conspecific, they are not synonymous with *P. sexspinosa*. The syntypes of these taxa differ from the *P. sexspinosa* paradigm in a number of characters, including distinctly more gracile stature and more slender spines. The petiole has a flat, anteriorly sloping dorsum and more-or-less horizontal, barely elevated, posteriorly directed spines, situated at the apex of the posterior face of the segment. The propodeal spines are very variable in length and degree of elevation, though mostly strongly inclined posteriorly and either parallel or diverging with their tips curved downwards. In *P. sexspinosa* the body is generally more robust and the petiole has a distinctly convex dorsum, with spines rising obliquely from their bases, which are situated well below the apex of the dorsal convexity. The propodeal spines appear less variable, and are mostly vertical or inclined forwards or backwards, and generally straight with only their tips slightly curved. The mainly golden pubescence of *P. esuriens* (including *P. arcuspinosa* and *P. juxtaspinosa*) almost hides the underlying sculpturation, except on the propodeal dorsum, where it is usually somewhat diluted, exposing the characteristic reddish colour of the body. In contrast, the pubescence in *P. sexspinosa* is off-white to silvery, and the body mostly black.

***Polyrhachis waigeuensis* Donisthorpe, 1943**
stat. nov.

Polyrhachis (Myrmhopla) arcuspinosa waigeuensis Donisthorpe, 1943: 467. Syntype workers. Type locality: New Guinea, Waigu I., Cape Nok (L.E. Cheesman), BMNH (examined).

Polyrhachis (Myrmhopla) arcuspinosa waigeuensis Donisthorpe; Bolton, 1975: 12. Junior synonym of *P. sexspinosa* (Latreille, 1802: 126).

REMARKS. Comparison of the syntypes of *P. arcuspinosa waigeuensis* with types and other specimens of closely related taxa of the *P. sexspinosa*-complex indicated that they represent a 'good' species. *P. waigeuensis* stands between *P. esuriens* and *P. sexspinosa*, sharing with *P. esuriens* a flat-topped petiole with barely elevated, posteriorly directed spines, and with *P. sexspinosa* a relatively robust body. However, *P. waigeuensis* differs from both these species (and others of the complex) by a highly convex pronotal dorsum. Subsequent examination of abundant recent material, including several nest series (PNG, West Sepik Prov., Pes Mission, c. 12km WSW of Aitape, 03°11'S, 142°15'E, 31 vii-3 viii 1984; Torricelli Mts, Lumi, 03°28'S, 142°02'E, 4-13 viii 1984; Madang Prov., Naru, Gogol Riv., 20km SW of Madang, 05°21'S, 145°41'E, 22 viii 1984 [all R.J. Kohout]), shows the pronotum ranging from moderately to highly convex, even almost dome-shaped in some individuals. However, despite this variability, it seems always to be higher than in other species of the complex, and this provides a dependable character, setting *waigeuensis* well apart. I thus recommend its separate specific status.

Subgenus **Myrma** Billberg, 1820
***Polyrhachis continua* species-group**
***Polyrhachis conops* Forel, 1901**

Polyrhachis conops Forel, 1901: 28. Syntype workers, queens, males. Type locality: Bismarck Archipelago, Herbertshöhe (F. Dahl), MNHU, MHNG, QMBA (examined).

Polyrhachis (Myrma) conops var. *bismarckensis* Karavaiev, 1927: 46. Holotype worker. Type locality: Bismarck Archipelago, ?MNHU, ?IZAS (location of type unknown). Junior primary homonym of *P. mucronata bismarckensis* Forel, 1901: 33.

Polyrhachis (Myrma) conops var. *stitzi* Santschi, 1928: 139. Replacement name. Syn. nov.

REMARKS. The holotype of *P. conops stitzi* cannot be found in the Karavaiev collection (IZAS), or in the Stitz collection (MNHU). It appears to have been lost. However, during a recent visit to MNHU I located a small bottle containing six unidentified specimens referable to the *P. continua* species-group, labelled 'Ralum Dahl'. The series comprised two workers and four alate queens,

all callows at various stages of pigmentation. However, the workers and two of the queens were suitable for dry mounting. Their later comparison with Karavaiev's brief description, strongly indicates that they are in fact identifiable as *P. conops stitzi*. Judging from the original description ('Gastersegmente, vom dritten an, dunkel ockerfarben'), the *P. conops stitzi* holotype was also callow. It seems reasonable to conclude that the aforementioned specimens are the remainder of the series from which Stitz supplied one specimen to Karavaiev (1927: 46). Their comparison with the syntypes of *P. conops* shows these forms to be essentially identical and undoubtedly conspecific.

***Polyrhachis continua* Emery, 1887**

Polyrhachis continua Emery, 1887: 235, pl. 4, fig. 21.

Holotype worker. Type locality: Indonesia, Ternate, Aquí Conora (O. Beccari), MCSN (examined). [Specimens from Paumotu River (= Angabanga Riv.), New Guinea, L. Loria (Emery det. & coll., MCSN) are wrongly labelled as types].

Polyrhachis continua var. *revocata* Viehmeyer, 1913: 151. Syntype workers. Type locality: Indonesia, Sulawesi (in copal), MNHU (examined). Syn. nov.

REMARKS. Comparison of the *P. continua* holotype with *P. continua revocata* syntypes shows them to be very similar. In both the clypeus is almost straight, with only a shallow depression at the distinctly medially truncate anterior margin. The frontal carinae are markedly close together, leaving the central area rather narrow, and scarcely widened towards the occiput. However, in *P. continua*, the somewhat flattened pronotal spines are shorter, relatively less divergent and minutely emarginated at their bases, while *P. continua revocata* has longer, distinctly more divergent spines, which have their dorsolateral borders continuous posteriorly in uninterrupted alignment with the pronotal margins. The petiolar spines are also slightly longer than in *P. continua*. The head and mesosoma in *P. continua* are very finely, more-or-less regularly, striate-punctate. The sculpturation in *P. continua revocata* is somewhat more distinct and more regular. However, when the types are compared to other New Guinean specimens referable to *P. continua*, it is clear that the characters putatively separating these forms fall well within the limits of variation represented in the material. I therefore conclude that the names *P. continua* and *P. continua revocata* together refer to a single biological species.

***Polyrhachis procera* Emery, 1897 stat. nov.**

Polyrhachis continua var. *procera* Emery, 1897: 581. Syntype workers, queens. Type locality: New Guinea, Haveri (L. Loria), MCSN (examined).

REMARKS. Emery (1897) separated *P. procera* from *P. continua* on the basis of its larger size and the more pronounced striation of its head and thorax ('... sono più grandi e con striatura del capo e del torace più marcata'). However, direct comparison of the types evidences differences in a number of other characters. In *P. procera* the clypeus in profile is gently sinuate, with the anterior margin vaguely obtuse medially (entire in modern specimens) and the medial carina distinct for most of its length. In contrast the clypeal border in *P. continua* is almost straight, with only a shallow depression at the anterior margin, which is distinctly medially truncate. The pronotal spines in *P. procera* are relatively long and more slender, with the lateral margins of mesonotal dorsum clearly converging anteriorly, and its posterior angles broadly rounded. The leading edges of the antennal scapes of *P. procera* carry a few hairs, which are totally lacking in *P. continua*. Comparable pilosity in both species is limited to the head and gaster, where it is rather diluted dorsally. *P. procera* is black with dark reddish-brown appendages, with the tibiae and apical segments of the funiculi a shade lighter. In *P. continua* the colour scheme is similar, except that the appendages are generally light reddish-brown. Examination of the types and other available material clearly demonstrates that *P. procera* is a 'good' species distinct from *P. continua*.

***Polyrhachis sericeopubescens* Donisthorpe, 1941**

Polyrhachis (Myrma) sericeopubescens Donisthorpe, 1941: 61. Syntype worker, queen. Type locality: New Guinea, Japen I., Mt Baduri (for ♀); Mt Eiori (for ♀) (L.E. Cheesman), BMNH (examined).

Polyrhachis inusitata Kohout, 1989: 513, figs 4, 5, 9. Holotype, paratype workers. Type locality: Australia, Qld, Cape York Peninsula, Iron Range (G.B. Monteith & D. Cook), QMBA, ANIC. Syn. nov.

REMARKS. I have examined a syntype worker of *P. sericeopubescens* and the holotype and two paratypes of *P. inusitata*. Despite some relatively minor differences they are remarkably similar. Both taxa appear to be very rare. The only known specimens are their respective type series. The type localities are separated by a great distance, and no specimens have been recorded from intervening areas. However, because of their similarity, I believe these two nominal taxa to represent separate populations of a single biological species.

***Polyrhachis simpla* Santschi, 1928 stat. nov.**

Polyrhachis (Myrma) conops simplex Karavaiev, 1927: 45. Syntype workers, queens, males. Type locality: Indonesia, Aru Is, Wammar I. (W. Kara-

vaiev), IZAS, QMBA (examined). Junior primary homonym of *P. simplex* Mayr, 1862: 682.

Polyrhachis (Myrma) conops st. *simpla* Santschi, 1928: 139. Replacement name.

REMARKS. I have examined syntypes of *P. simpla* together with syntypes of *P. continua* Emery, *P. continua hirsutula* Emery, *P. conops* Forel and *P. conops spinifera* Stitz, and believe *P. simpla* to represent a species separate from the others. Its type stands closest to those of *P. conops spinifera*, sharing with them a relatively wide pronotal dorsum. However, the lateral pronotal margins in *P. conops spinifera* are distinctly raised, while those of *P. conops simpla* are rather flat. The lateral margins of the mesonotal and propodeal dorsa in *P. conops simpla* are more strongly converging posteriorly, with the pilosity much diluted, producing a rather graceful appearance, in comparison with the more robust and rather hairy *P. conops spinifera*. Further examination of abundant modern material confirms these characters to be constant, justifying the elevation of *P. conops simpla* to specific rank.

***Polyrhachis spinifera* Stitz, 1911 stat. nov.**

Polyrhachis conops var. *spinifera* Stitz, 1911: 376, fig. 22b. Syntype workers. Type locality: New Guinea, Tana (Moszkowski), MNHU, MHNG (examined). *Polyrhachis continua* var. *hirsutula* Emery, 1911: 256. Syntype workers. Type locality: New Guinea, R. Digul (= ?Digoel Riv.), MCSN (examined). Syn. nov.

REMARKS. Direct comparison of *P. conops spinifera* and *P. continua hirsutula* syntypes shows them to be very similar, undoubtedly representing a single species. They differ from *P. conops* and *P. continua* by possessing a markedly wider pronotal dorsum and rather abundant semierect to erect pilosity, which is almost completely lacking in these other species.

Stitz (1911: 376, fig. 22c) also described a very similar taxon, *P. conops cuspidata*, in the same article as *P. conops spinifera*. He specified the shape of the petiole, with shorter and divergent petiolar spines and a rather narrow 'thorax' as the main characters separating *P. cuspidata* from *P. spinifera*. Comparison of the syntypes of these nominal taxa to investigate their relative status has proved somewhat inconclusive. Examination of numerous specimens of various *P. continua*-group species, including several nest series of the closely allied *P. simpla* Santschi (see above), has shown a degree of variability in all of the characters given for *P. cuspidata* and *P. spinifera* by Stitz, but never sufficient to bridge the difference

in width of the pronotal dorsum separating their types. I therefore hesitate to consider them conspecific. Only study based on material additional to that now available could establish the true status of *P. conops cuspidata*.

***Polyrhachis relucens* species-group**
***Polyrhachis andromache* Roger, 1863**

Polyrhachis hector Fr. Smith, 1859: 142. Holotype worker. Type locality: Indonesia, Aru Is (A.R. Wallace), OXUM (examined). (Junior primary homonym of *P. hector* Fr. Smith, 1857: 62).

Polyrhachis andromache Roger, 1863b: 8. Replacement name.

Polyrhachis (*Myrma*) *proxima* var. *semirufipes* Donisthorpe, 1943: 469. Holotype worker. Type locality: New Guinea, Waigiu, Camp Nok (L.E. Cheesman), BMNH (examined). Syn. nov.

Polyrhachis (*Myrma*) *sericata pruinosa* var. *harmsi* Karavaiev, 1930: 212. Workers. Original locality: New Guinea (F. Weyer), IZAS (examined). Unavailable name.

(For full reference citations see Kohout, 1988: 430.)

REMARKS. Direct comparison of the *P. proxima semirufipes* and *P. andromache* holotypes, together with a single worker of the '*P. sericata pruinosa harmsi*' original series, shows them undoubtedly to be conspecific. Within the whole range of distribution (which extends from the eastern Indonesian islands, throughout New Guinea, and southwards to Cape York Peninsula in northern Australia) the general appearance of *P. andromache* seems rather constant. Variability appears to be confined to the color of the rather smooth, appressed pubescence, which ranges from silvery to a rich golden colour.

***Polyrhachis decipiens* Roger, 1863 stat. nov.**

Polyrhachis decipiens Roger, 1863a: 156. Syntype workers. Type locality: Indonesia, Batjan I., MNHU (examined).

Polyrhachis relucens decipiens Roger; Emery, 1897: 580.

Polyrhachis restituta Viehmeyer, 1913: 149, figs. Syntype workers. Type locality: Indonesia, Sulawesi (in copal), MNHU (examined). Syn. nov.

Polyrhachis restituta var. *conclusa* Viehmeyer, 1913: 151, fig. Holotype worker. Type locality: Indonesia, Sulawesi (in copal), MNHU (examined). Syn. nov.

REMARKS. Direct comparison of all the relevant, essentially identical, types shows the above nominal taxa undoubtedly to be conspecific. The characters given by Viehmeyer to separate *P. restituta* and *P. restituta conclusa* are trivial, and these names undoubtedly cover a single, albeit variable, biological species. There are slight differences in the length and direction of the pronotal

spines. According to the original illustration, the dorsolateral petiolar spines in *P. restituta conclusa* are distinctly shorter than in the other taxa. In reality, however, the spine conforming to the figure has the tip broken off - the other is only a fraction shorter than those of the *P. restituta* type. Marginal differences are evident in the width of the propodeal dorsum, which, in *P. restituta conclusa*, is relatively a little narrower, with the lateral margins more-or-less parallel, where in *P. restituta* they converge slightly posteriorly. These characters, however, are known to be intergradient throughout species of the subgenus *P. (Myrma)*, and seem only to emphasise the variability among its species.

***Polyrhachis foreli* Kohout, 1989**

Polyrhachis foreli Kohout, 1989: 510, figs 2, 2a, 11. Holotype worker, paratype workers, queens, males. Type locality: Australia, Qld, NE Tully, nr Clump Pt (R.W. Taylor, acc. 69.123), ANIC, QMBA (for a full list of depositories see Kohout, 1989: 510) (examined).

Polyrhachis (*Myrma*) *relucens* r. *andromache* var. *andromeda* Forel, 1915: 110. Workers. Original locality: Australia, Qld, Bellenden Ker (E. Mjöberg), NRMS, MHNG, ANIC (examined). Unavailable name.

Polyrhachis relucens decipiens var. *papuana* Emery, 1897: 580. Workers, queens. Original localities: New Guinea, Dilo, Bara Bara, Goodenough I. (L. Loria), MCSN, MHNG (examined). Unavailable name.

REMARKS. In a review of the Australian ants of the *Polyrhachis relucens* species-group (Kohout, 1989: 512) I noted that the specimens described by Emery (1897: 580) as '*P. relucens decipiens papuana*' are remarkably similar to those of Forel's infrasubspecies '*P. relucens andromache andromeda*' which I considered conspecific with *P. foreli*. I did not absorb Emery's form within *P. foreli* because of features exhibited by the available single queen (Kohout, 1989: 512-513). These quadrinomens cannot, of course, be formally recognised in animal nomenclature, and are technically unavailable. However, I have since located in the Emery and Forel collections 11 specimens of the original '*Polyrhachis relucens decipiens papuana*' series, consisting of 7 workers and 4 queens. Comparison of these specimens, including 3 queens, with *P. foreli* material shows them definitely to be conspecific. However, the single queen examined earlier (see above & Kohout, 1989) clearly represents a different species. I am therefore confident in suggesting that the unavailable name '*P. relucens decipiens papuana*'

was originally applied to New Guinean material of *P. foreli*.

***Polyrhachis litigiosa* Emery, 1897 stat. nov.**

Polyrhachis relucens litigiosa Emery, 1897: 581. Syntype workers. Type locality: New Guinea, Puumu Riv. (= Angabanga Riv.) (L. Loria), MCSN (examined).

Polyrhachis (Myrma) sericata pruinosa Karavaiev, 1927: 48. Syntype workers. Type locality: Indonesia, Aru Is, Wammar I. (W. Karavaiev #2618), IZAS, QMBA (examined). Junior primary homonym of *P. pruinosa* Mayr, 1872.

Polyrhachis (Myrma) sericata var. *pruinosa* Santachi, 1928: 139. Replacement name. Syn. nov.

REMARKS. I have compared the syntypes of *P. relucens litigiosa* with a voucher specimen previously compared to the holotype of *P. relucens* and am confident that they represent separate biological species. *P. relucens litigiosa* is consistently distinguished by its more gracile stature and transversely narrow petiole, with slender, somewhat diverging dorsolateral spines. In contrast the body of *P. relucens* is distinctly broader, notably across the pronotal dorsum and petiole. The latter is armed with a pair of relatively thick spines and a distinct intercalary tooth. Mostly golden, appressed pubescence covers all body surfaces in both species; erect golden hairs are abundant in *P. litigiosa*, but sparse in *P. relucens*, where they are confined to the head, lateral portions of mesosoma and the gaster. Subsequent comparison of *P. sericata pruinosa* and *P. litigiosa* specimens shows them to be virtually identical and straightforward synonyms.

***Polyrhachis nigropilosa* Mayr, 1872**

Polyrhachis nigropilosa Mayr, 1872: 141. Syntype workers. Original localities: Indonesia, Sulawesi (Stevens); Borneo, Sarawak (J. Doria), NHMW (examined).

Polyrhachis nigropilosa var. *conophthalma* Emery, 1900: 713. Holotype worker. Type locality: Indonesia, Sumatra (E. Modigliani), MCSN (examined). Syn. nov.

REMARKS. I have compared the syntypes of *P. nigropilosa* with the holotype of *P. nigropilosa conophthalma* and abundant modern material. Apart from the shapes of their eyes no possibly significant differences between the two taxa could be found. They are remarkably similar and, moreover, a short series of specimens collected at Gombak Forest Reserve, Malaysia (USNM), demonstrates a gradual transition from strongly to rather weakly conical eyes. As mentioned below under *P. rixosa* Fr. Smith, the peculiar ten-

dency of the eyes to vary from 'normal' to posteriorly elongated, or posteriorly truncated, is prominent in several species of subgenus *P. (Myrma)*, and I conclude that these names have been applied to a single biological species.

***Polyrhachis noesaensis* Forel, 1915 stat. nov.**

Polyrhachis villipes var. *noesaensis* Forel, 1915a: 43 (footnote). Syntype workers. Type locality: Indonesia, Java, Nusa Kambangan (E. Jacobson), MHNG (examined).

REMARKS. Direct comparison of the *P. villipes* holotype and a syntype of *P. villipes noesaensis* reveals that they represent distinct species. The former is generally smaller, with the mesosomal dorsum finely longitudinally striate and the petiole with relatively short dorsolateral spines and an almost straight dorsal edge. Rather diluted, silvery, appressed pubescence covers most of the body, except on dorsum of the first gastral segment, where the pubescence has a distinctly reddish tint. In *P. noesaensis* the mesosomal dorsum is very finely shagreened and rather shiny, with only scattered piliferous pits, from which the relatively short, bristle-like pilosity arises. The dorsal edge of the petiole is concave between rather long, moderately diverging spines. The mostly golden or silvery, appressed pubescence is rather dilute on the dorsal surface of the mesosoma and completely absent from the gaster which, besides the piliferous pits, is smooth and shiny. Due to these obvious dissimilarities I am confident in considering *P. noesaensis* a species distinct from *P. villipes*.

***Polyrhachis obesior* Viehmeyer, 1916 stat. nov.**

Polyrhachis mayri var. *obesior* Viehmeyer, 1916: 165. Syntype workers. Original localities: West Malaysia, Melaka, Gunong Angsi; Singapore (H. Overbeck), MNHU (examined).

Polyrhachis illaudata obesior Viehmeyer; Dorow, 1995: 35.

REMARKS. I have compared the holotype of *P. illaudata* Walker (BMNH) with syntypes of *P. mayri obesior* and specimens of *P. mayri* Roger (both MNHU) and am confident that, while *P. illaudata* and *P. mayri* are clearly conspecific (Bolton, 1974: 176), *P. mayri obesior* represents a separate species. In spite of its similar appearance, *P. obesior* is generally relatively robust, with a broadly transverse petiole, which has a distinct intercalary tooth in the centre of its dorsal edge. In lateral view the bases of the dorsolateral spines are situated close to the posterior face of

the petiole, with the spines rising obliquely, and their tips turned slightly downwards. Consequently, the dorsal edge of the petiole, in lateral view, is clearly visible and very prominent. In contrast the petiole in *P. illaudata* is narrowly transverse and, in lateral view, the dorsal petiolar edge is virtually hidden by the more-or-less up-right dorsolateral spines. Examination of numerous, mostly recently collected, specimens shows the characters separating these species to be constant and I confidently raise *P. obesior* to specific rank.

***Polyrhachis obliqua* Stitz, 1911 stat. nov.**

Polyrhachis labella var. *obliqua* Stitz, 1911: 375, fig. 21. Syntype workers. Type locality: Solomon Is., Bougainville I. (= PNG, Nth Solomons Prov.) (H. Schoede S.G.), MNHU (examined).

'*Polyrhachis relucens* r. *litigiosa* var. *aloseana*' Forel, 1901: 28. Workers, queen. Original locality: Bismarck Archipelago, Wunakokur nr Ralum (F. Dahl), MNHU, MHNG, QMBA (examined). Unavailable name.

REMARKS. Comparison of the *P. labella* holotype and syntypes of *P. labella obliqua* shows them to be very dissimilar, clearly representing separate species. In *P. labella*, the sides of the head behind the eyes are gently convergent posteriorly, while in *P. obliqua* they are broadly convex. The leading edges of the antennal scapes in *P. obliqua* bear numerous short erect hairs, which are completely absent in *P. labella*. Moreover, in *P. obliqua* the pronotal spines are divergent from their bases, and the dorsum of the petiole is armed with slender, slightly diverging dorsolateral spines and a more-or-less distinct, small intercalary tooth. In *P. labella* the pronotal spines are directed forwards, the petiole is armed with a pair of relatively long, fairly thick, subparallel spines, and the dorsal edge of the segment is concave, with no indication of intercalary teeth.

Comparison of the *P. obliqua* syntypes and the original series of '*P. relucens litigiosa aloseana*', together with abundant modern material (including several nest series) from Guadalcanal and Bougainville I. to New Britain and New Ireland, clearly shows these forms to be conspecific.

***Polyrhachis rixosa* Fr. Smith, 1858**

Polyrhachis rixosus Fr. Smith, 1858: 68. Holotype queen. Type locality: Indonesia, Sulawesi, BMNH (examined).

Polyrhachis lycidas Fr. Smith, 1861: 43, pl. 1, fig. 23. Holotype worker. Type locality: Indonesia, Sulawesi, Tondano (A.R. Wallace), OXUM (examined). Syn. nov.

REMARKS. Comparison of both relevant types and a series of modern specimens from Dumoga-Bone, Sulawesi, comprising workers and an alate queen, confirms their synonymy and demonstrates that *P. lycidas* is the worker of *P. rixosa*. The recently collected queen compares well with the *P. rixosa* holotype — the only noticeable differences being the somewhat shorter pronotal spines of the holotype and slightly different configuration of the petiolar spines. In the holotype the dorsolateral spines and the intercalary tooth are equal in size, while in the Dumoga-Bone specimen the dorsolateral spines are distinctly longer, with the intercalary tooth much reduced. The Dumoga-Bone workers compare well with the holotype of *P. lycidas* — the only apparent variability being in the thickness of the pronotal spines, intensity of longitudinal striation on the mesosomal dorsum and configuration of the petiolar spines, the intercalary tooth being less distinct in some specimens than others. In the holotype and several specimens of the Dumoga-Bone series the eyes show a mild tendency towards posterior protraction, a feature not uncommon in species of subgenus *P. (Myrma)* (see above under *P. nigropilosa* Mayr).

P. rixosa is very similar to *P. sculpturata*. However, the dorsolateral petiolar spines in *P. rixosa* are much shorter, and the dorsal edge of the petiole bears a more-or-less distinct intercalary tooth which is completely lacking in *P. sculpturata*. Also, in *P. sculpturata* the pronotal spines are distinctly longer and more slender and divergent than in *P. rixosa*.

***Polyrhachis rufofemorata* Fr. Smith, 1859**

Polyrhachis rufofemoratus Fr. Smith, 1859: 142. Holotype worker. Type locality: Indonesia, Aru Is (A.R. Wallace), OXUM (examined).

Polyrhachis merops Fr. Smith, 1860b: 98, pl. 1, fig. 17. Holotype worker. Type locality: Indonesia, Batjan I. (A.R. Wallace), OXUM (examined). Synonymy by Bolton (1974: 178).

Polyrhachis biroi Forel, 1907: 40. Holotype worker. Type locality: Indonesia, Ambon I. (L. Biró), HNHM (examined). Syn. nov.

Polyrhachis biroi var. *bidentata* Stitz, 1912: 512. Syntype workers. Type locality: New Guinea (Lauterbach), HNHM, MHNG (examined). Syn. nov.

Polyrhachis biroi var. *paprika* Forel, 1911: 296. Holotype worker. Type locality: Indonesia, Waigiou I. (Bates), ZSSM (examined). Syn. nov.

REMARKS. Comparison of the types listed above demonstrates that all fall within the parameters of *P. rufofemorata* variability, as discussed by Kohout (1989: 514). The specimens differ primarily in the development of the petiolar node which, in *P. rufofemorata*, *P. merops*, *P.*

biroi and *P. biroi paprika*, is simply angulate or at most minutely dentate, while it is clearly bispinose in *P. biroi bidentata*. Some series exhibit occasional variability in the length and thickness of the pronotal spines, with Indonesian specimens (Seram, Ambon I.) having relatively long, more slender pronotal spines than their New Guinean and Australian counterparts. However, when specimens from the whole range of distribution are considered, no taxonomically significant variability can be detected — the above synonymy follows readily.

***Polyrhachis sculpturata* Fr. Smith, 1860**

Polyrhachis sculpturatus Fr. Smith, 1860a: 70. Syntype worker, queen. Type locality: Indonesia, Sulawesi, Makassar (A.R. Wallace), OXUM (worker examined). *Polyrhachis sumatrensis* r. *hamulata* Emery, 1887: 234. Syntype workers, queen. Type locality: Indonesia, Sulawesi, Kandari, iii 1874 (O. Beccari), MCSN (worker examined). Syn. nov.

REMARKS. Emery was evidently unaware of *P. sculpturata* when he described *P. sumatrensis hamulata*. Comparison of the types shows these forms to be essentially identical and undoubtedly conspecific.

***Polyrhachis semitestacea* Emery, 1900 stat. nov.**

Polyrhachis andromache var. *semitestacea* Emery, 1900: 334. Syntype workers. Type locality: New Guinea, Friedrich-Wilhelmshafen (= Madang) (L. Biró), HHNM, MCSN, QMBA (examined).

REMARKS. I have compared the holotype of *P. hector* Fr. Smith, 1859 (= *P. andromache* Roger, 1863) with syntypes of *P. andromache semitestacea* Emery, and abundant modern material comprising several complete nest series, and am confident that these types represent separate, distinct species. The differences separating them are rather subtle, but appear to be constant and to set both species apart. *P. semitestacea* is characterised by more gracile stature, petiole with dorsal spines closer together and without an intercalary tooth, and by the distinctly light honey-yellow colour of the gaster, which is covered with very pale appressed pubescence. *P. andromache* appears generally more robust with the colour and pubescence of the gaster matching that of the rest of the body. The petiolar spines are further apart than in the *P. semitestacea* types, and the dorsal edge of the petiole is furnished with a minute intercalary tooth.

***Polyrhachis striata* Mayr, 1862**

Polyrhachis striatus Mayr, 1862: 686, pl. 19, fig. 8 (1865: 44, pl. 2, figs 11a, b, c). Syntype workers.

Type locality: Indonesia, Java (Novara Exp.; Kirsch & Thorey), NHMW (examined).

Polyrhachis striata r. *assamensis* Forel, 1902a: 289. Syntype workers. Type locality: India, Assam (Smythies), MHNG (examined). Syn. nov.

REMARKS. Forel separated the race *P. striata assamensis* from *P. striata* principally on the basis of its more robust build, less divergent pronotal spines, more dense and more regular striations and the lack of lateral longitudinal ridges on the gaster ('Abdomen ... sans trace de rides longitudinales.'). However, following comparison of the available types of both names I find Forel's statement to be not entirely accurate. Although relatively less prominent than in *P. striata*, the lateral gastral ridges are more-or-less evident in all *P. assamensis* syntypes examined. Forel's reference to the less divergent pronotal spines in *P. striata assamensis* holds for the types, but abundant recent material indicates gradual transition between the extremes. Examination of the types together with modern material shows that this variation clearly falls well within the limits expected in a species with such a wide distributional range. I have no hesitation in considering *P. striata* and *P. striata assamensis* conspecific.

***Polyrhachis striatorugosa* Mayr, 1862 stat. rev.**

Polyrhachis striatorugosus Mayr, 1862: 686, pl. 19, fig. 9. Syntype workers. Type locality: Indonesia, Java (Sichel), NHMW (examined).

Polyrhachis sumatrensis r. *striatorugosa* Mayr; Emery, 1887: 234 (footnote). Reduced in rank to race of *P. sumatrensis* Fr. Smith.

Polyrhachis sumatrensis striatorugosa Mayr; Emery, 1925: 203.

Polyrhachis striatorugosa var. *exophthalma* Forel, 1913: 136. Syntype worker, queens. Type locality: Indonesia, Sumatra, Beras Tagi, Bandar Baroe (H.V. Buttel-Reepen), MHNG (examined). Syn. nov.

REMARKS. I have examined the holotype queen of *P. sumatrensis*, a syntype worker of *P. striatorugosa*, and specimens from Java (including a queen), and consider that Emery's reduction of *P. striatorugosa* to a subspecies of *P. sumatrensis* was unjustified. As mentioned elsewhere in this paper, I deem *P. sumatrensis* to be conspecific with *P. villipes* Fr. Smith. Consequently, I have no hesitation in reinstating *P. striatorugosa* to its original specific rank.

Further comparison of the *P. striatorugosa* syntype with syntypes of *P. striatorugosa exophthalma* and available specimens from Java and Sumatra shows clearly that all represent a single species. As its name suggests, the eyes of *P.*

striatorugosa exophthalma are neither prominent nor posteriorly protracted. In all other aspects, however, it and *P. striatorugosa* are closely similar. I regard them as conspecific.

***Polyrhachis vestita* Fr. Smith, 1860**

Polyrhachis vestitus Fr. Smith, 1860a: 71. Holotype worker. Type locality: Indonesia, Sulawesi, Makassar (A.R. Wallace), OXUM (examined).

Polyrhachis vestita var. *unicolor* Emery, 1898: 242. Syntype workers. Type locality: Indonesia, Sulawesi, (H. Fruhstorfer), MCSN (2 examined). Syn. nov.

REMARKS. I have compared the types of *P. vestita* and *P. vestita unicolor* together with numerous recently collected specimens. Despite their similar general appearance they vary in many details. The eyes of both types are moderately convex, and only marginally exceed the lateral cephalic outline in frontal view, while those of modern specimens from Dumoga-Bone Nat. Park, Sulawesi, range from moderately convex (in dark-legged specimens) to strongly convex (in light-legged specimens), extending clearly beyond the outline of the head. In a series of specimens from Lore-Lindu Nat. Park, Sulawesi, however, the eyes are only weakly convex and do not attain the cephalic borders in full-face view. The antennae are relatively longer (SI 192-200) in the type of *P. vestita* (and dark-legged specimens from Dumoga-Bone), than in the type of *P. vestita unicolor* (and light-legged specimens from Dumoga-Bone and Lore-Lindu material) (with SI 172-185). In profile the anterior portion of the clypeus ranges from almost straight to shallowly or distinctly concave, with the basal margin only shallowly impressed, and the anterior margin entire and only occasionally shallowly truncated medially. The lateral margins of the pronotal dorsum are almost parallel, but, in some specimens, they converge anteriorly and are widely but shallowly emarginate at the bases of the horizontal, anteriorly or anterolaterally projecting pronotal spines. The mesonotum is more-or-less transverse, with the lateral margins parallel or slightly convergent posteriorly. The propodeal dorsum is almost quadrate, sloping posteriorly in a gentle curve towards the declivity. The posterior propodeal angles are produced as short upturned denticles, which are rather obscure in some specimens from Dumoga-Bone, but distinct and well defined in specimens from Lore-Lindu. However, intermediates are common, and in both types the posterior angles are only moderately distinct. The transition between the propodeal dorsum and declivity is either medially

uninterrupted, or in some specimens there is a rather indistinct 'U' shaped transverse carina vaguely dividing the faces. The petiole is scale-like, with the lateral angles ranging from indistinct to short, upturned, rather acute teeth. The dorsal edge of the petiole is mostly semicircular and entire, though in many specimens it is somewhat obtusely angulate, with a single or double shallow emargination in the centre. In specimens from Lore-Lindu, an additional pair of dorsolateral teeth is situated just above the lateral angles, and the dorsal edge is almost straight or weakly bowed and medially emarginate. The types and most specimens examined are totally black, but in a short series from Dumoga-Bone the trochanters and femora, save for their extreme distal ends, are light reddish-yellow. The appressed pubescence ranges from silvery, with a greenish or yellowish tint, to a rich golden hue. The mostly golden, medium to long pilosity varies from rather dilute to dense, covering most of the body, except in the specimens from Lore-Lindu, where it is almost completely absent from the dorsa of the gaster and petiole.

It is obvious that Emery, when describing *P. vestita unicolor*, considered the bicoloured form of this species to be typical *P. vestita*. However, the types of both taxa are in fact unicolored with black legs and, considering the variability of this species, I am confident that *P. vestita unicolor* is taxonomically inseparable from *P. vestita*, and that both should be treated as a single, albeit rather variable, species.

***Polyrhachis vigilans* Fr. Smith, 1858**

Polyrhachis vigilans Fr. Smith, 1858: 69, pl. 4, fig. 39. Holotype queen. Type locality: China, Hong Kong, BMNH (examined).

Polyrhachis (Myrma) vigilans Fr. Smith; Donisthorpe, 1937: 626, fig. 7. Description of worker.

Polyrhachis pyrgops Viehmeyer, 1912: 9, fig. 10. Holotype worker. Type locality: China, DEIE (examined). Syn. nov.

REMARKS. Bolton (1995: 355) erroneously listed the provenance of *P. pyrgops* as New Guinea, probably because the original description was published in a paper entitled 'Ameisen aus Deutsch Neuguinea'. Viehmeyer (1912: 9) described this species from a single specimen without a locality label ('1 Stück ohne Vaterlandsangabe...'). He did, however, refer to a second specimen in the Forel collection originally from China ('Forel erwähnt die Art aus der Provinz Kien [China]), and obviously accepted China as the true provenance of *P. pyrgops*. In the

introduction to his paper he listed this species as '22. [*Polyrhachis*] *pyrgops* sp. n. China'.

I have examined types of both *P. vigilans* and *P. pyrgops*, including the Chinese specimen from the Forel collection, together with numerous recently collected specimens (Hong Kong, Aberdeen Wood, 5 viii 1994, J. Fellowes; S. China, Guangdong Prov., 27 ix 1995, J. Fellowes). All are remarkably similar. The posteriorly elongated eyes are a prominent feature. I am confident that *P. vigilans* and *P. pyrgops* represent a single biological species.

***Polyrhachis villipes* Fr. Smith, 1857**

Polyrhachis villipes Fr. Smith, 1857: 61. Holotype worker. Type locality: Borneo, Sarawak (A.R. Wallace), OXUM (examined).

Polyrhachis sumatrensis Fr. Smith, 1858: 65, pl. 4, fig. 43. Holotype queen (alate). Type locality: Indonesia, Sumatra (A.R. Wallace), BMNH (examined). Syn. nov.

Polyrhachis striata r. *tritschleri* Forel, 1912: 111 (footnote). Syntype workers. Type locality: Indonesia, Sumatra, Indrapura (Tritschler), MHNG (examined). Syn. nov.

REMARKS. Comparison of the *P. villipes* holotype and *P. striata tritschleri* syntypes shows them to be very similar and undoubtedly conspecific. They are very closely related to *P. striata* Mayr, but, the latter is easily separable by the reticulate-punctate sculpturation of its gaster and the presence of more-or-less distinct lateral carinae on the first gastral segment. In contrast, the gaster in *P. villipes* (including the *P. striata tritschleri* syntypes) is microscopically shagreened and covered with a pile of short appressed pubescence which has a distinct reddish tint on the dorsum.

Subsequent comparison of the holotype of *P. sumatrensis* with the holotype of *P. villipes* and the syntypes of *P. striata tritschleri* was somewhat hindered by the relatively poor condition of the *P. sumatrensis* queen. It is pinned, and has a damaged mesosoma and detached gaster, while the antennae, petiole and both right wings are missing. Nonetheless, the types compare relatively well and differ only in the sculpturation of the occiput, which is more distinctly striate and closely microsculptured in *P. sumatrensis*. This character is, however, accentuated by sculpture associated with the ocelli, which are, of course, not present in the *P. villipes* and *P. striata tritschleri* workers. The striation on their occiputs is somewhat vague and the microsculpture relatively less coarse, yielding a more glossy appearance. Other possibly relevant features, including

the outline of the head, sculpturation and pubescence of the pronotal collar and gaster, and the (mostly black) pilosity, are similar in all three nominal forms. *P. villipes* and *P. striata tritschleri* are clearly synonyms. The above proposed synonymy of *P. sumatrensis* should, however, be considered conditional until worker associated *P. villipes* queens become available for study.

***Polyrhachis inermis* species-group *Polyrhachis carbonaria* Fr. Smith, 1857**

Polyrhachis carbonarius Fr. Smith, 1857: 60. Holotype worker. Type locality: West Malaysia, Melaka (A.R. Wallace), OXUM (examined).

Polyrhachis orsyllus subcarinata Emery, 1900b: 712. Syntype workers. Type locality: Indonesia, Mentawai I., Sipora, Sereinu (E. Modigliani), MCSN (examined). Syn. nov.

Polyrhachis (*Myrma*) *orsyllus* var. *dentulata* Stitz, 1925: 135. Syntype workers. Type locality: Indonesia, Sumatra, Fort de Kock (W. Midcolitz), MNHU (examined). Syn. nov.

Polyrhachis (*Aulacomyrma*) *carbonaria* Smith; Donisthorpe, 1932: 445. Combination in *P. (Aulacomyrma)*.

REMARKS. The holotype of *P. carbonaria* lacks almost all traces of fine appressed silvery pubescence and thus appears more black and shiny than the syntypes of *P. orsyllus subcarinata* and *P. orsyllus dentulata* and other recently collected specimens. The sculpturation is also more distinct in the *P. carbonaria* and *P. orsyllus dentulata* types, notably on the head, where the striae are more shiny than in the *P. orsyllus subcarinata* type. Examples of such sculptural diversity are not, however, uncommon, even in a single series of *P. inermis*-group specimens (e.g. material from Singapore, Bukit Timah, 2 i 1990, R.J. & E. Kohout). The eyes in *P. carbonaria* are fairly convex and exceed the lateral outline of the head in full face view. In contrast, those of *P. orsyllus subcarinata*, *P. orsyllus dentulata* and modern material either do not attain, or at most only marginally exceed the cephalic outline. The relevant types are otherwise very similar. Their few minor differences seem merely to represent infraspecific variation. I am thus confident that *P. carbonaria*, *P. orsyllus subcarinata* and *P. orsyllus dentulata* represent a single biological species.

***Polyrhachis hosei* Donisthorpe, 1942**

Polyrhachis (*Myrma*) *hosei* Donisthorpe, 1942: 708. Syntype workers. Type locality: Borneo, Santubong, i. 1907 (J. Hose), BMNH (examined).

Polyrhachis inermis Fr. Smith; Bolton, 1974: 176. Spurious synonymy.

REMARKS. Bolton (1974: 176) synonymised *P. hosei* with *P. inermis* Fr. Smith. However, following direct comparison of their types I consider them to represent separate biological species. *P. hosei* differs from *P. inermis* (and other species of their group) in a number of details, including its rather flat, somewhat posteriorly truncated eyes (those of *P. inermis* are distinctly convex, with simply rounded posterior margins). The outline of the mesosomal dorsum in *P. hosei* is rather evenly curved, with only slight interruption at the propodeal declivity, while the declivity is abrupt and concave in profile in *P. inermis* and other species of the group, except *P. ritsemai*. The lateral margins of the propodeal dorsum of *P. hosei* terminate posteriorly in short, blunt, up-turned denticles, leaving the dorsal and declivous faces of the propodeum medially uninterrupted. The propodeal dorsum and declivity in other species of the group, including *P. inermis*, are divided by a distinct, transverse ridge. The propodeal declivity in *P. hosei* is laterally delimited by distinct carinae, which run from the bases of the propodeal denticles to the propodeal spiracles.

***Polyrhachis aculeata* species-group**

***Polyrhachis numeria* Fr. Smith, 1861**

Polyrhachis numeria Fr. Smith, 1861: 42, pl. 1, fig. 25. Holotype worker. Type locality: Indonesia, Sulawesi (A.R. Wallace), OXUM (examined).

Polyrhachis (Johnia) schizospina Karavaiev, 1927: 44, fig. 20. Holotype queen. Type locality: Indonesia, Princen Eiland in Sundastrase (Karavaiev #2397) IZAS (examined). Syn. nov.

Polyrhachis schizospina Karavaiev; Hung, 1967: 402. Combination in *P. (Aulacomyrma)*.

REMARKS. Comparison of the *P. numeria* holotype worker, the holotype queen of *P. schizospina*, and additional specimens from BMNH (Andaman Is, 30 v 04, G. Rogers), demonstrates that (apart from the characters identifying full sexuality) they are very similar. Numerous features are essentially identical, including the shape of the head, the posteriorly truncated eyes, the sculpturation being partly covered by rich silvery pubescence, and similarity in the outline of the petiole. There is clear indication that these nominal taxa are conspecific. I therefore consider their types be the worker and queen of a single biological species.

Subgenus *Cyrtomyrma* Forel, 1915

***Polyrhachis doddi* Donisthorpe, 1938**

Polyrhachis (Cyrtomyrma) doddi Donisthorpe, 1938: 263, fig. 13. Syntype workers, queen. Type locality: Australia, Qld (F.P. Dodd), BMNH (examined).

Polyrhachis (Cyrtomyrma) townsvillei Donisthorpe, 1938: 251, fig. 4. Syntype workers, queen, male. Type locality: Australia, Qld, Townsville (F.P. Dodd), BMNH (examined). Syn. nov.

REMARKS. Comparison of the syntypes of both the above nominal species, together with QMBA specimens from the original series of *P. doddi* (Townsville, Qld, 15.2.1902, F.P. Dodd) and abundant modern material clearly demonstrates that these names represent a single biological species. These specimens are virtually identical, except that the colour of their legs is dark to medium reddish-brown in the *P. doddi* types but light yellow in those of *P. townsvillei*. I accept the opinion of Than (1978: 103) that Donisthorpe described both species from a single conspecific series.

***Polyrhachis goramensis* Emery, 1887 stat. nov.**

Polyrhachis rastellata var. *goramensis* Emery, 1887: 239. Syntype workers. Type locality: Indonesia, Goram I. (L.M. D'Albertis), MCSN (examined).

Polyrhachis (Cyrtomyrma) euryalus var. *goramensis* Emery; Donisthorpe, 1938: 260.

Polyrhachis (Cyrtomyrma) obsidiana Karavaiev, 1927: 50, fig. 21. Syntype workers, queens, males. Type locality: Indonesia, Ambon I., Amboina (W. Karavaiev), IZAS, QMBA (examined). Junior primary homonym of *P. obsidiana* Emery, 1921: 21.

Polyrhachis (Cyrtomyrma) coronata Santschi, 1928: 140. Replacement name. Syn. nov.

REMARKS. I have compared syntypes of both the above taxa with material from BMNH (Indonesia, Seram I., Solea, vii 1987, M.C. Day) and am confident that all are conspecific. They are characterised by a moderately impressed promesonotal suture, short, acute propodeal spines, which are sometimes reduced to a pair of short tubercles, and distinctly elongated lateral petiole spines. *P. goramensis* was originally described as a subspecies ('variety') of *P. rastellata* (Latreille, 1802) and later placed by Donisthorpe (1938: 260) as a subspecies of *P. euryala* Fr. Smith (1863: 16). The characters given above clearly set it well apart from both these species, and I have no hesitation in raising it to specific rank.

***Polyrhachis jurii* Karavaiev, 1935**

Polyrhachis (Cyrtomyrma) jurii Karavaiev, 1935: 116, fig. 30. Holotype worker. Type locality: Cambodia, Ream, Prov. Kampot, Gulf of Siam (K. Davydov #5781), IZAS (examined).

REMARKS. The holotype of *P. jurii* was presumed lost by Than (1978: 13). My search of the Karavaiev collection has, however, unearthed a specimen labelled as the holotype of '*P. (Cyratomyrma) reamensis*', a name apparently never published. It bears two identification labels with that name and two additional tags reading: 'Ream, Cambodge, K. Davidov' and '5781 - Coll. Karawaiev', data identical to those given by Karavaiev for *P. jurii*. This specimen conforms totally with the original description of *P. jurii* and is undoubtedly its 'missing' holotype. '*P. reamensis*' was undoubtedly a manuscript name subsequently changed to *P. jurii*, an action not without precedent in myrmecology (see notes above under *P. hermine*). To avoid future confusion, I have added a red tag to this specimen reading: 'HOLOTYPE *Polyrhachis (Cyratomyrma) jurii* Karavaiev'.

SPECIES INQUIRENDAE

Polyrhachis eudora Fr. Smith, 1860

Polyrhachis eudora Fr. Smith, 1860: 99, pl. 1, fig. 19.

Syntype queen, worker. Type locality: Indonesia, Batjan I. (A.R. Wallace), OXUM (queen), BMNH (worker) (both types presumed lost).

Polyrhachis eudora Fr. Smith; Emery, 1925: 183. Combination in *P. (Myrmothrinax)*.

REMARKS. The syntypes of *P. eudora* Fr. Smith cannot be found in the OXUM or BMNH collections and must be considered lost. Donisthorpe (1932: 460) reported their absence from both collections when he wrote: '11. *Polyrhachis eudora* Smith ... Emery [1925] p. 183 = *Polyrhachis (Myrmothrinax) eudora* Smith, ♀. The insect from Oxford does not agree with Smith's description or figure; it is not a *Myrmothrinax*, and is in fact *Polyrhachis (Myrma) proxima* Roger. *P. eudora* is not represented in the B.M. Coll.'.

I have examined the queen and worker specimens labelled as *P. eudora* in the OXUM and BMNH collections, and agree with Donisthorpe assignment of them to subgenus *P. (Myrma)*. However, they are not conspecific with *P. proxima* Roger as he suggested, but with *P. decipiens* Roger. I here formally declare *P. eudora* to be a species inquirenda, unable to be confidently identified because of its inadequate original description, and the absence of relevant type material.

Polyrhachis latreillei (Guérin-Méneville, 1838)

Formica latreillii Guérin-Méneville, 1838: 205.

?Holotype worker. Type locality: Australia, ?MNHN (type presumed lost).

Polyrhachis latreillii (Guérin-Méneville); Fr. Smith, 1858: 73. Combination in *Polyrhachis*.

REMARKS. The type of *P. latreillei* cannot be found in MNHN or other examined collections and must be considered lost. Since its description, specimens of a number of different Australian species, including *P. gab* Forel, *P. lata* Emery, *P. senilis* Forel and *P. vermiculosa* Mayr, have been regarded by authors to represent *P. latreillei* and lodged in collections under that name. In fact, the majority of Australian *P. (Chariomyrma)* species fit the original description of *P. latreillei*, and comments made by various authors (e.g., Roger, 1863: 155-158; Emery, 1887: 229) do not help to solve its identity. In the absence of type material the status of *P. latreillei* is soundly ambivalent. I thus formally consider it a species inquirenda.

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