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# A Guide to the Ants of South-western Australia

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**Abstract** – This work constitutes a review of what is known about the ants of the South-West Botanical Province, a region internationally recognized as having a megadiverse flora. The ant fauna is also highly diverse, including no fewer than 12 subfamilies, 61 genera and at least 500 species. The author includes three illustrated taxonomic keys to the 13 Australian subfamilies, 61 genera and the workers of 497 morphospecies, respectively. The last-mentioned key includes all species described for the region, but excludes a tiny handful that cannot be identified with assurance because the information in the original description is too scant or the type specimens have been lost. Also included in the species key are workers of all the other morphospecies known from the Province that appear to constitute recognizable species, and are at present allocated voucher numbers in the Curtin Ant Collection. Many of the south-west ants (almost 50%) appear to be undescribed. All of the above ant taxa, described or undescribed, are included in a discussion following the keys. Novelties mentioned in the key to genus include the first WA record of the genus *Mayriella*, and the genus *Rogeria* (tentatively assigned to two species). The genus *Anillomyrma* is removed from the WA checklist, as the local species is now considered a *Monomorium*. Four species (*Iridomyrmex argutus* Shattuck (under *Iridomyrmex innocens* Forel), *Iridomyrmex occiduus* Shattuck (under *I. innocens* Forel), *Pachycondyla* (*Trachymesopus*) *clarki* Wheeler (under *Pachycondyla* (*Trachymesopus*) *rufonigra* Clark), and *Crematogaster perthensis* Crawley (under *Crematogaster frivola* (Forel)) here pass into synonymy, and *Tapinoma rottnestense* Wheeler becomes *Doleromyrma rottnestensis* (Wheeler) in a new combination. Also included in this work are short discussions on a variety of topics not well covered in the Australian ant literature, a comprehensive glossary of terms, a complete ant check list (Appendix 1) and a table showing known ant species distributions within the seven botanical districts that together make up the South-West Botanical Province (Appendix 2).

**Key words:** South-West Botanical Province, ant fauna, taxonomic keys

## INTRODUCTION

The phytogeographic region in Western Australia known as the South-West Botanical Province, (hereafter, SWBP) (Figure 1), is well known as a hotspot of mega-diversity for vascular plants (e.g. Beard *et al*. 2000). However, this region also has a rich ant fauna, with, for example, approximately ten times the number of ant species found in the United Kingdom. Twelve of the thirteen subfamilies currently recognized as occurring in Australia can be found in the SWBP. The thirteenth subfamily, Aenictinae, has been recorded south-east of Newman (Pilbara region) and may well occur in the far north of the SWBP. For this reason, the key to subfamilies provided below includes the Aenictinae.

At a generic and species level, the ant fauna is also very diverse: the actual number of species possibly exceeds well over 500. At the present time, to the author's knowledge, sixty-one described ant genera, including almost 500 identifiable morphospecies, have been recorded for this Province. These are the species that appear in the key to worker ants for the Province. Over half-a-dozen additional names for ants described from the region can be found in the literature, but their status is uncertain and the bulk of these are likely to become junior synonyms in future revisions. The paucity of novel taxa now being identified by Curtin staff and students, along with myself, suggests that additional species to those covered in this monograph are likely either to be very rare, or at the fringes of a distribution that mostly lies outside of the SWBP.

Despite the high ant biodiversity at a species level, only six of the twelve subfamilies are represented by two or more genera. On the generic level, several important recent changes from the genera discussed in Shattuck (1999) are noted here:

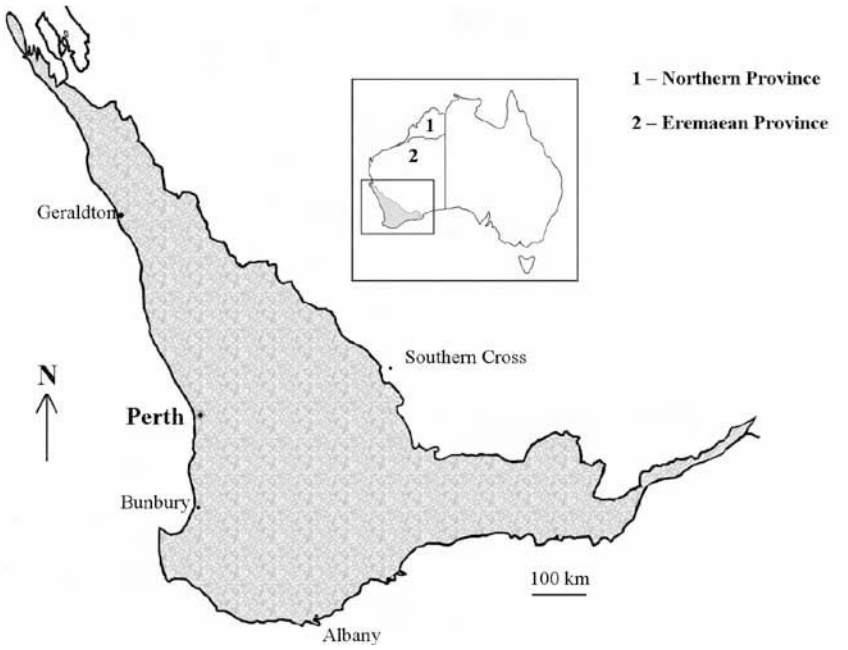


**Figure 1** The South-West Botanical Province, showing major cities in the Province. Inset: The South-West Botanical Province in relation to the rest of the Australian land mass. (Revision of the Interim Biogeographic Regionalisation for Australia (IBRA) Version 5.1; modified in the NE portion following Gunawardene and Majer, 2004).

*Oligomyrmex* (one species) now becomes *Carebara*, following Fernandez's (2004) revision of the group; the monotypic genus *Nebothriomyrmex* has been erected for a tiny dolichoderine known only from the SWBP (Dubovikov 2004); *Bothriomyrmex* is now *Arnoldius* (Dubovikov 2004); and Shattuck's (1999) myrmicine genus indet. no. 2 (with two species occurring in the SWBP) is here tentatively identified as *Rogeria*, based on Bolton (2003). This latter genus, which is widely distributed in the Neotropical and Indo-Australian region, has not previously been recognized from the Australian continent. Incidentally, Shattuck's myrmicine genus indet. no. 1 (Shattuck 1999) is identified in this Guide as a *Monomorium*, i.e. *Monomorium elegantulum* Heterick.

In addition, this work records and discusses genera not previously recorded for the Province in the existing literature. *Mayriella*, a genus formerly believed to be restricted to the eastern half of Australia, was recently discovered in a DEC (Department of Environment and Conservation) survey of the Nuyts Wilderness area near Walpole, on the south coast, and the latest addition to the list, a species of *Ponera*, has been found in a pitfall trap sample taken from an Alcoa mine site near Jarrahdale. Of the previously recognized genera, *Nothomyrmecia*, described many years ago from workers taken from somewhere near the Russell Range (in the far south-east of the SWBP), has not been seen in WA for many years, and may be extinct in this State. Moreover, as far as is known, the myrmicine genus *Anillomyrma* is not present in Australia, and the small blind ants formerly placed in this genus are more properly assigned to *Monomorium*. One undescribed species occurs in the south-west.

## BOTANICAL DISTRICTS WITHIN THE SWBP IN RELATION TO THE ANT FAUNA

Seven botanical districts, identified by their own distinctive phytogeographic features, can be found within the SWBP. These are the Avon Wheatbelt (AW), characterised by open eucalypt woodland with areas of scrub-heath, the Esperance Plains (ESP), which is mainly mallee-heathland, the Geraldton Sandplains (GS), predominantly scrub-heath with some taller trees, the Jarrah forest (JF), which originally was mainly medium-height eucalypt forest but has now been much modified by farming and urban development, the Mallee (MAL), consisting of eucalypt shrubland, patches of scrub-heath and a mosaic of woodland and mallee in the north-east, the Swan Coastal Plain (SWA), originally a mix of jarrah woodland, banksia low woodland, teatree swamps and thicket (*Acacia*, *Allocasuarina* and *Melaleuca*), but which, like the Jarrah forest, has now been much modified by urban development, and, finally, the Warren (WAR), a distinctive wet sclerophyll region of tall forest, including some of the largest trees in WA.

To some degree, the diversity of the ant fauna of a region reflects the floristic communities in which it lives, but probably soils are a more important factor

governing nest establishment for a given species in the SWBP (here, it should be noted that WA has very few truly arboreal ants, or species that are specialist nesters, e.g. in rotten logs or twigs). While a number of species from the most abundant genera, e.g. *Iridomyrmex*, *Monomorium* and *Rhytidoponera*, can be found anywhere in the SWBP, other species, including those from genera with more specialized behaviours, tend to be localised. Hence, some ants may be found only on sand-plain, whether this sand-plain be in the form of coastal dune systems, or sand dunes many kilometres inland. Others appear to be restricted to laterite soils. Within a single locality, nests of some species are found only on the swales whilst others are located only on the dune crests. Cryptic species may not be restricted to a particular floristic community, but may be absent from any area that lacks the requisite litter layer in which they prefer to live. Conversely, many species of *Melophorus* and some *Iridomyrmex* require open ground and highly insolated sandy soils for their nests.

The very small number of ant species that appear to have an entire global distribution limited to a few square kilometres are almost completely unstudied, and the reasons for their restricted distribution are unknown. These taxa include several species of *Myrmecia* and *Monomorium*, *Carebara* sp. JDM 440 and *Notoncus* sp. JDM 487. The bulldog ants, from the subfamily Myrmeciinae, probably include the bulk of the genuinely rare and potentially threatened species. The isolated occurrence of these species, their small colony size, and their vulnerability to disturbance make them candidates for special protection under future legislation. In the case of other ants that are very restricted in WA but much more abundant on Australia's east coast, climate and environment are clearly factors affecting their distribution. *Myopias tasmaniensis* Wheeler is one such species. Their distribution often follows a typical Gondwanan pattern, i.e. they are found in cool, wet habitats in thick forest.

A list of all ant species (including morphospecies) known by myself to be recorded from the SWBP is given in Appendix 1, while their known distributions are listed in Appendix 2. The latter is intended as a guide only, as it reflects an inevitable bias towards those districts that are closest to research institutions (especially in Perth), and hence more accessible to researchers. Nonetheless, several areas have been found to be particularly ant rich. These include the eastern flanks of the Darling Range, embracing the eastern JF District and western AW District, and kwongan heath in the GS district, north of Perth. At mineral sand minesites near Eneabba, in the heart of the GS, upwards of 115 species have been collected within a few hectares. The ESP and MAL Districts have been relatively little collected, and their fauna counts are likely to rise steeply as more attention is directed towards collecting in those districts. Conversely, the count for the WAR District is unlikely to rise substantially, since the relatively cool and moist climate and the thick closed forest are not conducive to a high ant biodiversity. Those species recorded from this District are typically cool climate specialists and cryptic species, many of which are rare taxa, found in small nests under stones and logs. Species distributions in Appendix 2 are based primarily on type locality data, Curtin holdings and information from published sources, especially recent monographs. Additional species are likely to be held in other institutions, as well as specimens collected from outside of their distribution as listed in this work.

## NOMENCLATURE

Subspecies categories in ant research are a relic of earlier nomenclature and modern revisions invariably eliminate these, either by erecting the subspecies to full species status or by relegating them to synonymy. As this work is not meant to be a formal revision, I have refrained from synonymising taxa, except (after the urging of a colleague) for a small handful of cases in which I have looked carefully at the relevant type specimens. These alterations are indicated in bold font and by the use of round brackets in Appendix 1. A number of other species appear to me likely candidates for synonymy, and I have drawn attention to those taxa when discussing them in the text and by enclosing them in square brackets in Appendix 1.

Where possible, ant species in this work are primarily designated by their scientific name. Genuine common names barely exist and would be meaningless in view of the number of ants involved, though an effort by Andersen (2002) to supply names of his own devising for very many mainly northern and desert-dwelling species should be mentioned here. In a few cases I have indicated common names for genera where these appear to be in widespread use, both in Australia and overseas. Where the scientific name is unknown or the ant is undescribed, a Curtin Ant Collection (JDM) voucher number has been used. In a small number of cases a voucher number assigned by the Australian National Insect Collection (ANIC) in Canberra exists, and this is preferred to the former voucher number because of its greater currency.

## WHAT'S IN A NAME?

The concept of 'species' is not the simple matter supposed by the person-in-the-street. As indicated

above, I personally consider that there are around 500 ant species in the SWBP, but are they all what is known in scientific circles as 'good species'? Indeed, what is a 'species'? The question is far from simple, and has implications for conservation and pest management, to name just two important areas.

For some people, individual species are simply those living entities that can be recognised by their unique appearance. Yet populations of apparently identical organisms can have quite different behaviours. Others will point to the fact that animals mate with their own kind – but, just like their domestic counterparts, wild animals can produce hybrids in some situations. A slightly more sophisticated approach is to determine which animals share a similar DNA profile. However, even DNA or RNA analysis does not necessarily provide a definitive answer as to whether two organisms are different. In some cases 'good species' show very slight differences in DNA profile while others show considerable variation. In fact, in very few cases are all individuals of a species identical, either morphologically or genetically, with most species showing weak to strong geographic variation.

While these considerations form part of the answer to the question 'what is a species?', they do not provide the whole answer. The question can be approached from a number of different directions, and the interested reader is referred to recent works by Ereshefsky (1989), Howard and Berlocher (1998), and Coyne and Orr (2004). Harrison (chapter 2 in Howard and Berlocher 1998) places the more popular species concepts under seven headings. In the interests of economy, just five of the seven species concepts will be discussed briefly here.

Until recently, the 'biological species' concept has predominated in scientific circles (heading 1 in Harrison's listing). Mayr (1942, 1963, 1982) popularised the concept, and his 1963 work is the most widely cited. He defined species as 'Groups of actually or potentially interbreeding natural populations which are reproductively isolated from other, such groups' (Mayr 1963, p. 19). Mechanisms that maintain a separation between species (defined as 'isolating mechanisms' by Mayr) include disparate morphology (particularly of the reproductive parts), and various behavioural and geographic factors. A superficially similar but subtly different concept is that of Paterson (1978, 1981, 1982, 1984, 1985, 1988, 1993) called the 'Specific Mate Recognition System' or SMRS (heading 2 in Harrison's list). Paterson's theory states that a species is a 'most inclusive population' of male and female organisms that shares a common fertilisation system. To ensure successful procreation, all sexual organisms have co-evolved structures or behaviours that ensure either of the two sexes mate only with their own kind.

Another species theory dealing with biological process is the 'Cohesion Species Concept' (Harrison's heading no. 3). This states that a species is 'The most inclusive population of individuals having the potential for phenotypic cohesion through intrinsic cohesion mechanisms' (Templeton 1989, p. 12). By 'cohesion' is meant those mechanisms that direct organisms to mate with their own species rather than another species. While both Mayr and Paterson emphasise genetic cohesion, additional factors such as host plant associations, life cycle, courtship display or even occupation of the same ecological niche need to be considered in the above theory.

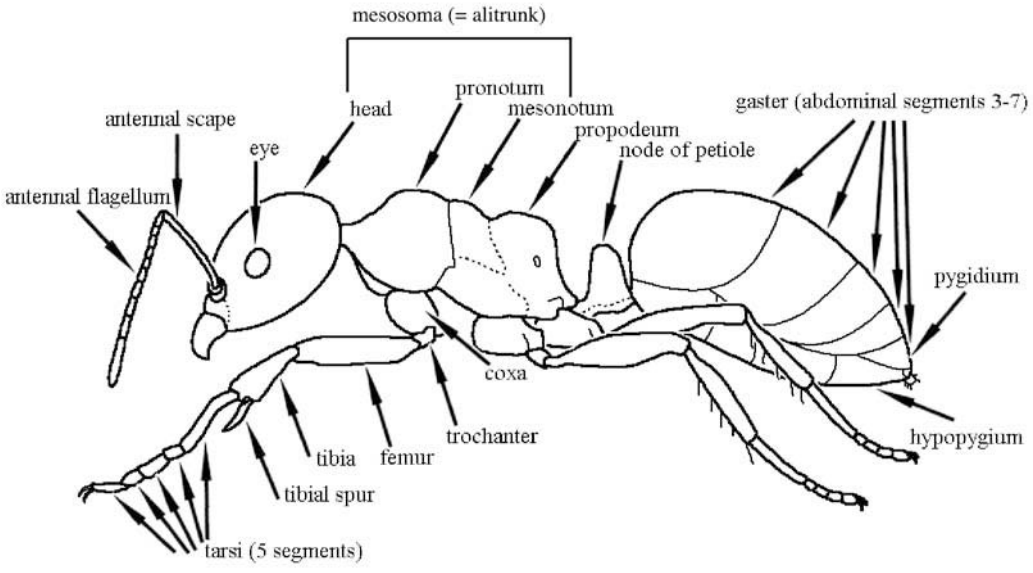


**Figure 2** External anatomy of a theoretical worker ant (one-segmented waist).

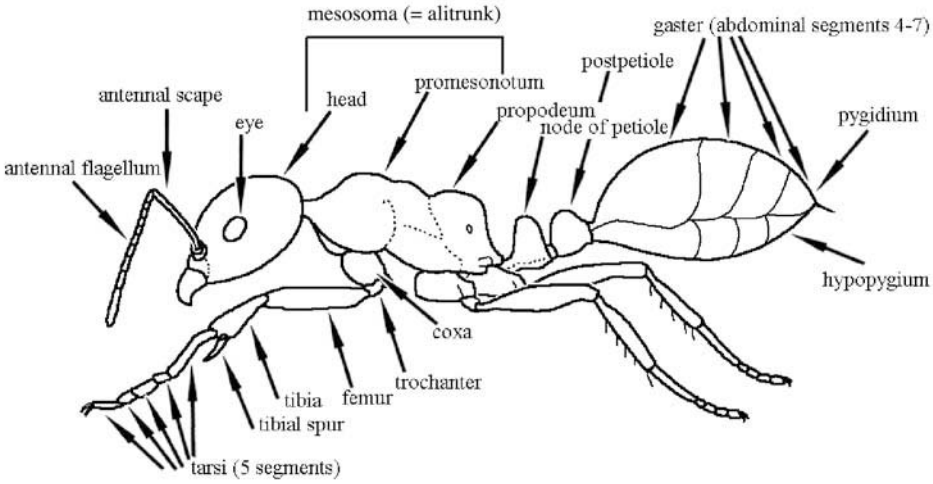


**Figure 3** External anatomy of a theoretical worker ant (two-segmented waist). (n.b. Some subfamilies with a two-segmented waist do not have a fused pronotum and mesonotum.)

Whatever their merits, one pressing practical issue with theories based on the biology of the organism is that the collector or ecologist is often not in a position to test a particular theory. Invertebrates pose an especial problem because they are highly diverse, usually very small and even general aspects of their biology are often not known. Invertebrates, moreover, are mostly collected as dead specimens in traps, and dead animals do not mate.

In recent years, an alternative set of concepts has arisen that adopts quite a different approach and does not necessarily require knowledge of the behaviour of live organisms. These concepts focus less on the speciation process and more on the nature of individual characters possessed by an organism. Character states can be electronically sorted to produce diagrams ('tree diagrams') that are interpreted using hennigian cladistic analysis. A typical and popular theory is that of Cracraft (1983), who states that a species is the smallest

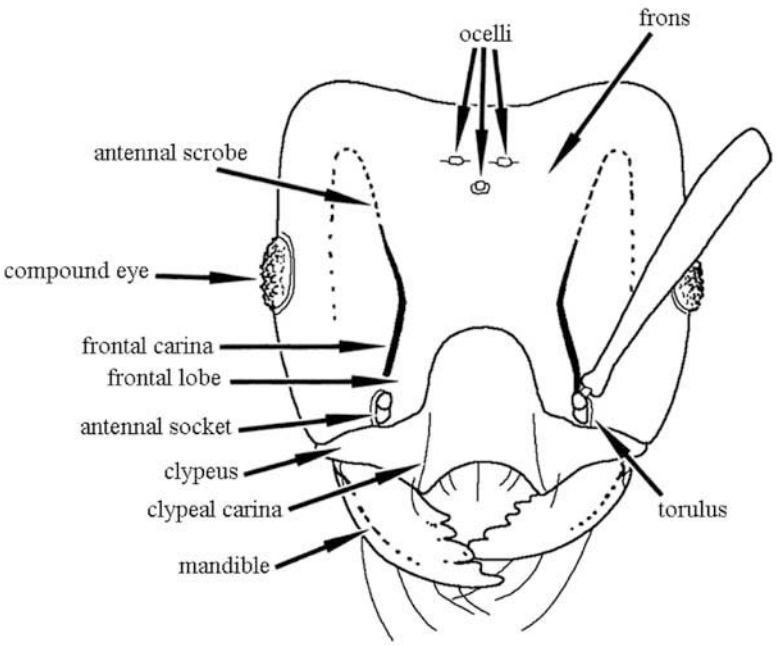


**Figure 4** Full-face view of head of ant showing features mentioned in this text. This is a composite drawing: many species lack one or more of the structures illustrated above.

diagnosable cluster of individual organisms within which there is a parental pattern. To arrive at a species, a researcher needs to identify (1) any heritable diagnostic character or series of characters and (2) reproductive cohesion. Davis and Nixon (1992) apply a version of this theory to practical examples. This approach constitutes heading no 4 in Harrison's analysis, the 'Phylogenetic Species Concept'. Other modifications of this approach are found in Mischler and Brandon (1987) and Mallet (1995). Mallet looks more particularly at genes. The latter's approach constitutes 'The Genotypic Species Cluster Definition', Harrison's heading no 7. With Mallet, the concept of 'species' is reduced to genotypic clusters. If the latter's theory is applied, say, to non-recombinant DNA molecules (as in those from mitochondria), additional assumptions are needed. Yet another potential problem, in this case with interpreting the output of RNA analysis, occurs if tree reconstruction artefacts (caused by fast evolving gene sequences) go unrecognised (e.g. Philippe *et al*. 2005).

The chief difficulty with the character-based theories is quite different to that encountered with biologically-based concepts. With the latter, the process, though logical and coherent, cannot be easily identified, whereas the process in the former is unknown, vague or treated as irrelevant in favour of diagnosable characters. Other complications include inappropriate algorithms used to construct the cladograms or other tree diagrams; i.e. the particular algorithm being used can bias the output. Harrison, himself, proposes a synthesis, in which various species definitions are appropriate to a population of organisms as it evolves over time.

In the context of this monograph, the question of 'species' is important, but as I have just indicated, it is a difficult concept to pin down. Where does that leave the person who simply wants to identify an ant? Fortunately, most taxa are so distinctly and unvaryingly morphologically different from other taxa that sufficient genetic distance can be assumed for them to be treated as separable reproductive units – i.e. 'species' – under any theoretical construct. This certainty is enhanced where the male and female reproductive castes (in the case of ants) are well known, and are equally distinguishable. Other ant taxa may not be so easily separated, but consistent differences do exist and can be recognised by experienced workers, and molecular work confirms substantial genetic differences. What is left is a usually small residue of more difficult forms. The responsible reviser should indicate his or her assumptions of 'good species' or otherwise, and provide reasons for their decision, and that is all that can be done. Flagging these difficult taxa leaves the way open for more refined research that may elucidate their affinities. This is what I have done here, and my hope is that some of the uncertainties currently left unresolved may be addressed at a later date.

I conclude this section by simply noting that 'species' is the only category recognised by organisms other than human beings. Genera, families, orders, phyla, etc. are purely theoretical constructs and have no objective reality. If the entire tree of life, past and present, were to be reconstructed, and all the forms that link other forms were known, only 'species' could be separated at the end.

## WHAT MAKES AN ANT AN ANT?

Ants belong to the insect order Hymenoptera, an order that also contains bees and wasps. Basically, hymenopterous insects can be distinguished from other insect orders (1) by the way that their first pair of wings is coupled to the second pair of wings (i.e. though rows of tiny hooks called hamuli found on the leading edge of the hind wing), and (2) by the close association of the first abdominal segment with the metathorax. In the Apocrita, the more advanced group of Hymenoptera that includes the ants, the first abdominal segment is actually incorporated into the metathorax and is usually separated from the remaining abdominal segments by a constriction, a true 'wasp-waist'!

Living ants constitute a single family, the Formicidae. One morphological character separates all adult ants from other Hymenoptera: this is the presence of a special mouth-pouch, the infrabuccal pouch. Since adult ants are not able to ingest solid food particles of any size, the infrabuccal pouch acts as a filter for such solid, particulate matter. In a few groups the pouch serves a special purpose, e.g. in leaf-cutter ant queens it acts as a carrier for fungal spores used as propagules for the fungus from which these ants feed. This character is small and difficult to see, but, fortunately, most ants possess other, more easily recognisable characters that, taken together, will separate them from other Hymenoptera. The most important of these are: (1) the presence of a metapleural gland, unique to ants, above the hind pair of coxae (secondarily lacking in many males and in the queens and workers of some formicine groups, e.g. sugar ants); (2) the presence of a wingless worker caste (secondarily lost in a few parasitic species that have queens and males only); (3) the possession of one or two discrete waist segments (the petiole and postpetiole), a character only shared with a few, mostly rare and minute wasps; and (4) elbowed ('geniculate') antennae in queens and workers.

In general, living ants are mainly seen by the layperson as wingless, social insects, quickly resolving any doubt as to their identity. The

following figures (Figures 2, 3 and 4) show the parts of the body found in the worker ant, the caste most often seen by the non-specialist. For purposes of economy, the terms are not explained here and the reader is referred to the glossary at the end of the monograph. Here I note, however, that in a few groups of ants, such as the subfamily Cerapachyinae, the postpetiole is not clearly defined. In these cases the abdominal segments are referred to by number. Additional information on various anatomical parts can be found in pp. 11–15 of Shattuck's (1999) Australian ant guide.

## WHERE AND HOW DO ANTS LIVE IN THE SWBP?

This monograph will not repeat general information on the ant colony, life cycle, caste, task differentiation and other particulars that is already covered admirably by Shattuck (1999), Greenslade (1979) and Andersen (1991, 2000). However, the actual ecology and life histories of individual ant species in the SWBP are not merely poorly known; they are almost unknown.

What records exist are often those in which information on ants is incidental to that on other targeted organisms, very often the caterpillars of butterflies. Some additional information has been gleaned on granivorous species that eat seeds or arils (elaiosomes). What can be said with certainty is that very few SWBP ants nest within sound timber, such as the trunks of living trees and shrubs. Those that are known to do so include species of *Podomyrma*, *Ochetellus*, *Camponotus* (*C. macrocephalus* species-group and *Camponotus claripes nudimalis* Forel), at least one *Polyrhachis*, and several *Anonychomyrma* and *Crematogaster* species. Ants that live in twigs or small branches are even fewer.

While these wood-nesting ants probably utilize burrows in the wood made by beetle and moth larvae or other organisms, at least some ants may also enlarge existing chambers or even excavate new chambers in living timber: the author has seen workers of *Polyrhachis femorata* (F. Smith) removing fresh sawdust from their nest holes in a healthy jacaranda (see comments under 'Species Description').

By far the majority of ants in the SWBP live in soil, but others will occupy rotting wood, and *Pachycondyla* (*Brachyponera*) *lutea* (Mayr) is an example of a species that is frequently uncovered in termitaria, where workers prey on the termite brood or adults. In one nest of *P. lutea* uncovered north of Boxwood Hill (ESP) by the author, paralyzed adult termites, probably of *Coptotermes* sp. (Rhinotermitidae), were found. *Technomyrmex jocosus* Forel and species of *Ochetellus* and *Camponotus* will nest in dead wood or stone structures or under the bark of standing trees; other species may occupy crevices in rock or other materials. Although few ants actually nest in trees in the SWBP, many will forage on living trees and shrubs for prey, nectar and honeydew. While soil nesters can often be found under rocks and stones, recent research in the Perth area suggests that coarse woody debris (e.g. logs, branches and thick sheets of bark) may not be a preferred cover for most woodland ant species. However, this research is preliminary only.

The nest entrances of ants in the SWBP are very varied in construction, from mere holes in the ground, barely larger than the individual workers, to large mounds of small pebbles, several metres in diameter in the case of some meat ant species. The nests of some *Myrmecia* and *Rhytidoponera* species are built around the main stem of shrubs with a prostrate habit, which may give the upper levels of the nest added protection. The interface between soil and the large boles of tall eucalypts in laterite uplands is a favoured nest site for large *Camponotus* species such as *C. nigriceps* (F. Smith) and *C. dryandrae* McArthur and Adams. Nest entrances directly into soil are often more than mere holes: Some small, sand-nesting species, such as *Amblyopone clarki* Wheeler, extend their nest vertically to form a tiny turret of sand. At the other size extreme, clay turrets more than 30 cm high are constructed by a large *Myrmecia* sp. (probably *gratiosa* Clark) that lives in the Calingiri district. Sticks may be used in some nest constructions, and a large stick nest mixed with soil or pebbles is characteristic of the *Iridomyrmex conifer* species-group. Other ants, such as *Papyrius* spp., cover their runways along timber with frass. A tiny number of ants in the SWBP may follow an army ant life-way, though this is not known for certain. Judging from the author's observations, such may be the case for the blind *Cerapachys edentatus* (Forel) and, based on the biology of related overseas species, *Leptanilla swani* Wheeler.

Most ants in the SWBP are probably generalist scavengers, though, as mentioned above, this is a 'default' position in lieu of recorded observations. Dead and live arthropods, some vegetable material such as flowers, seeds or seed parts (especially elaiosomes), nectar and honeydew probably account for most of the food that ants in the SWBP eat. Elaiosome-collecting ants (rather than specialized seed harvesters) have been documented as very important seed dispersal and storage agents in the wetter parts of the SWBP. For example, in the northern Jarrah forest *Rhytidoponera inornata* Crawley and *Melophorus turneri perthensis* Wheeler (as '*Melophorus* ANIC sp. 1') were found to be the most significant ant species involved in this way (Majer 1982). Dacetine ants, which are speciose

though hardly numerous in the Province, are ambush hunters of small organisms such as springtails (Collembola). *Odontomachus ruficeps* F. Smith, not uncommon in drier areas of the SWBP, is an ambush hunter of larger prey. The meat ants, in addition to taking arthropods, probably also act as a disposal unit for dead vertebrates in bushland. Sluggish, minute forms, such as *Carebara* and *Discothyrea* are probably specialised food gatherers, perhaps of arthropod eggs (by analogy with studied species overseas; see also Greenslade 1979, Shattuck 1999), but nothing is known of the biology of the WA fauna.

## PEST ANTS AND TRAMP ANTS

While the ant species present in an area are very often inoffensive and are rarely noticed by members of the public, a relatively small number of taxa are regarded as a human nuisance or worse. Ants can achieve such pest status in a number of ways: (1) they can cause injury through their bite or illness through their sting; (2) they can enter homes and other premises and invade food containers or refrigerators; (3) the same species that invade homes may vector disease, generally through mechanical means (i.e. through transporting pathogens on their hairs or cuticle and depositing these onto food or even into drips in hospitals); (4) some species are prone to chew through electrical wiring, causing damage and occasionally even precipitating dangerous situations in towns and cities (e.g. blackouts, or failure of vital electrical equipment); (5) introduced species can eradicate native invertebrates or even small vertebrates in disturbed sites, and, in some cases, areas of natural vegetation: a few (e.g. the Argentine ant) can also change the dynamics of floral communities by interfering with seed dispersal mechanisms; (6) some pest ants feed on cultivated fruits, vegetables and, more rarely, grains, while aggressive species may attack and even kill small domestic animals or young livestock: bee hives may also be raided by pest ants; (7) while many ants obtain much of their nutrition from honeydew, the watery faeces excreted by bugs (Order Hemiptera) that feed on plant sap, pest ant species are particularly effective at protecting such bugs, some of which are notorious as transmitters of plant viruses, and; (8) a few species (e.g. the extralimital black carpenter ant *Camponotus pennsylvanicus* (de Geer)) can cause structural damage to wood.

Some native ants carry moderately painful stings. (Incidentally, the sting in ants (and bees and wasps) is confined to females of the species, since it is no more than a modified ovipositor). Among the native stingers are various species of bulldog ants (*Myrmecia*) that can cause pain and occasionally an allergic reaction. Fortunately, Western Australia lacks those taxa, especially *Myrmecia gulosa* (Fabricius) and *Myrmecia pilosula* F. Smith, that make envenomation by bulldog ants a life-threatening issue in some of the eastern capitals. Other ants that can literally make their presence felt include *Rhytidoponera metallica* (F. Smith) and *Pachycondyla* (*Brachyponera*) *lutea*, but the stinging sensation is much less severe in these species. Biters are mostly species of *Iridomyrmex*, with meat ants (*Iridomyrmex purpureus* species-group) leading the way, mainly in rural areas. The large major workers of *Camponotus* can also draw blood with their mandibles, and *Camponotus terebrans* (Lowne) is an unusually aggressive sugar ant that, according to anecdotal information, is suspected of attacking patients in a Perth nursing home.

Ants that achieve pest status, apart from the stingers and biters, are often exotic. They include the so-called 'tramp ants'. True tramp species tend to have shared characteristics such as multiple queens in a nest, a wide range of food preferences, an ability to exist in ephemeral or strongly altered habitats (including urban areas), an ability to compete for food resources more successfully than native species, and a strong tolerance of other nests of their own species ('unicolonialism') but intolerance towards native ants. Typically, such ants disperse through budding off from existing colonies rather than through nuptial flights of queens. The literature on tramp ants is voluminous and increasing at a massive rate. For the interested reader, the anthologies by Vander Meer *et al*. (1990) and Williams (1994) provide a comprehensive introduction to applied myrmecological research, the latter including articles by Western Australian ant researchers on exotic ants in the SWBP.

Among the sorts of ants that constitute pests, the red imported fire ant (*Solenopsis invicta* Buren) is far and away the most injurious, being able to cause severe envenomation as well as environmental, horticultural and structural damage. Fortunately, this ant, although a major source of angst in Brisbane where it has been introduced, has not been recorded from WA thus far. Nonetheless, a survey of the literature and anecdotal reports (e.g. from the Department of Agriculture), as well as examination of the Curtin Ant Collection, reveals that at least eighteen ant species from five subfamilies have been introduced to the SWBP. Most of these species are from overseas. The origin of some of the introductions is obscure, but the most likely provenance of the best-known tramp ants is either India or South Africa (South America only in the case of the Argentine ant).

The majority of the pestiferous species occurring in the SWBP that are peridomestic nuisances, as opposed to stingers and biters, belong to the subfamilies Dolichoderinae, Formicinae and

Myrmicinae. The most serious of the dolichoderine pests is the Argentine ant (*Linepithema humile* (Mayr)). This species has increased rapidly in the Perth region in recent years, possibly coinciding with the cessation of heptachlor spraying (e.g. Majer and Brown 1986; May and Heterick 2000; Heterick *et al*. 2000). *Technomyrmex jocosus* Forel, for long confused with its notorious sister, the white-footed house ant, *Technomyrmex albipes* (F. Smith), is an Australian native (perhaps also a WA native) with invasive habits. This species may occur naturally on or near the south coast of WA, but was described from Victoria. Around Perth it is most commonly seen on trees and fences and will enter homes and even make its nest in car engines (such as one belonging to the author!). Fortunately, it is not normally implicated in structural damage. *Tapinoma melanocephalum* (Fabricius), which belongs to a genus that is easily confused with *Technomyrmex* because of the lack of a petiolar node, is primarily a pest of the tropics. However, the author is aware of one Perth record of this species from disturbed urban parkland and another from a flowerpot. Among native species, *Iridomyrmex chasei* Forel nests on open ground but will forage in homes and so qualifies as a minor pest, while *Ochetellus glaber* group sp. JDM 19 often lives up to its common name of Little black house ant in the SWBP. *Papyrius nitidus* (Mayr) is another occasional dolichoderine pest in ceilings and wooden structures in the SWBP.

Probably the most commonly seen of the introduced formicines in the Perth area is a large, black *Paratrechina*. The ant, native to the eastern states and to the north of WA, is awaiting positive confirmation from Dr. Steve Shattuck (ANIC), but could be *Paratrechina obscura* (Forel). This species is often seen in parks and gardens and other urban microhabitats where a humid environment is artificially maintained. *Paratrechina longicornis* (Latreille) is a potentially more serious pest, but is fortunately rare in Perth, although the author has collected it from the heart of Fremantle. This species is very common near the Broome region in the Kimberley, and has been introduced to Barrow Island. *Paratrechina braueri glabrior* (Forel), known from one specimen collected by the author a number of years ago from the Point Walter foreshore on the Swan River, is probably a non-native in the Perth region, although it is a common species in the north and north-west of WA. The notorious carpenter ant, *Camponotus pennsylvanicus* De Geer, has been intercepted by WAQIS officers, but is not included among the imports, as it has not established nests in this State. Native formicines rarely come under notice, but a few *Camponotus* spp., most notably *Camponotus claripes nudimalis* Forel, will enter houses looking for sweet foods, scraps and even dead insects. Ants being what they are, however, unpleasant surprises cannot be ruled out: the author has had *Notoncus gilberti* Forel from an outdoor nest raid a food cupboard in his home – by all accounts unparalleled behaviour for this normally inoffensive formicine!

Myrmicines include the largest number of pest species in the SWBP, and some of these, like the aforementioned red imported fire ant, also carry an unpleasant sting. The recent destruction of nests of *Solenopsis geminata* (Fabricius) near the centre of Perth by Department of Agriculture officers hopefully has prevented the establishment of this venomous species here, and the same may apply to *Monomorium floricola* (Jerdon), which undoubtedly also occurs in the tropical areas of the State. Other noxious myrmicines, unfortunately, are well established. These include the notorious coastal brown or big-headed ant (*Pheidole megacephala* (Fabricius)). The latter species is certainly the best known of the introduced ant pests in the wider Perth area, and is responsible for the great bulk of complaints about house-infesting ants received by the WA Department of Agriculture (M. Widmer, pers. comm.). Two other major cosmopolitan pests, the Singapore ant (*Monomorium destructor* (Jerdon)) and the Pharaoh ant (*Monomorium pharaonis* (L.)), also occur in Perth, but for whatever reasons have not achieved the notoriety here that they have achieved elsewhere in the world.

Other exotic myrmicines of lesser pest status, e.g. *Tetramorium bicarinatum* (Nylander), *Tetramorium simillimum* (Smith) and a couple of *Pheidole* spp., rarely come under notice, and seem to live amicably with the natives. *Cardiocondyla 'nuda'* (Mayr) is possibly an introduced species, but is another inconspicuous member of the local ant fauna. The few apparently introduced taxa that belong to other subfamilies, e.g. *Cerapachys longitarsus* (Mayr) and *Hypoponera eduardi* (Forel) (the identity of the latter has to be confirmed, though it is most likely exotic) are likewise inoffensive.

## ANTS AS BIOINDICATORS

Because of their ubiquity, their abundance, the ease with which they may be trapped, and their relatively simple identification (genitalia mounts and the like are not required), ants have been favoured as environmental indicators in Australia for a number of years now. Since the first paper on the use of ants as bioindicators (Majer 1983), studies using ants in this way have focussed on aspects of land rehabilitation (e.g. following mining or grazing), general environmental management and the effects of burning regimes or wildfire. In a series of seminal papers, P. J. M. Greenslade (1978) and Alan Andersen (e.g. 1990, 1991b , 1995) have placed ants used for monitoring purposes in discrete guilds called 'Ant Functional Groups'.

These Groups represent the supposed roles of the various ant taxa in the Australian environment, and are mostly predicated by taxon behaviour or preferred environment, e.g. 'Subordinate Camponotini' or 'Cold Climate' and 'Hot Climate Specialists'. Andersen has also suggested analogies between Ant Functional Groups and vegetation forms (Andersen 1995). The resolution of the groups, originally based mostly on entire ant genera, has been refined in successive publications. Now, some genera have been split, as more biological information on individual species-groups within these genera becomes available.

Because of the applied nature of the Department of Environmental Biology at Curtin University, that department has been at the forefront of much of the research in Australia that uses ants as bioindicators. Typically, trapping involves the use of vials as pitfall traps, and in recent years many studies have involved Curtin University students. As a sideline of this work, the ant fauna of the SWBP has been extensively sampled in most major ecosystems that occur within the SWBP, although faunal systems in the south-east and north-east of the Province are less well-known.

Valuable as it has been as a collecting tool and monitoring device, however, straight-forward pitfall trapping has severe limitations when seen from a taxonomic or even a conservation perspective. Individual ant workers collected in vials cannot be assigned to nests, thus limiting information on variability within an ant species, major and minor workers of polymorphic species cannot readily be matched, and valuable information on the behaviour of living individuals is absent. An increasing concern is the unwanted by-catch collected by large pitfall traps, especially when this includes small vertebrates or potentially endangered invertebrates from relictual bushland areas within suburbia. The way of the future in all of this work requires that more refined and varied trapping methods need to be adopted, with modifications to prevent ingress of small vertebrates into pitfall traps (where these are still used). Also desirable would be a greater emphasis on studies of live ant populations, as well as theoretical analysis of the Ant Functional Group concept, so as to give it greater scientific rigour; the more so as costs and overheads become increasingly important to farmers, industrialists and conservationists.

The remainder of this monograph will be devoted to the taxonomic keys and discussion of the physical characteristics and behaviour of the species found in the SWBP. The subfamily keys and discussion follow Bolton (2003), the subfamilies being introduced in order of their earliest fossil record as at the time of Bolton's publication.

## KEY TO THE ANT SUBFAMILIES OF THE SOUTH-WEST BOTANICAL PROVINCE

1. Dorsum of pygidium flattened, margins of flattened area armed laterally, posteriorly, or both, with a series of denticles or short spines (Figure 5); abdominal segments V – VII with spiracles visible in intact specimen; promesonotal suture usually completely absent (absent in all known Australian species)..... **Cerapachyinae**

   Dorsum of pygidium without series of denticles or short spines; abdominal segments V – VII with spiracles visible only when abdomen is distended or dissected (except for Aenictinae) (e.g. Figures 6, 7); promesonotal suture present or absent ..... **2**

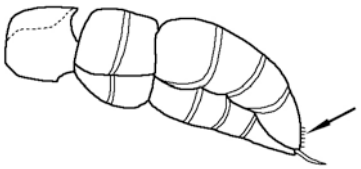

**Figure 5**

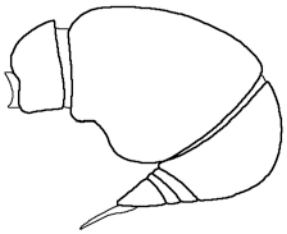

**Figure 6**

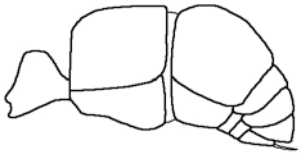

**Figure 7**

2. Waist consisting of a single distinct segment (the petiole); abdomen may be more-or-less deeply impressed behind segment III (Figures 2, 7) ... ..... **3**

   Waist consisting of two distinct segments (the petiole and postpetiole), segment III being distinctly separate from remaining abdominal segments, which are smoothly rounded (Figure 3) ..... **10**

3. Apex of hypopygium with a circular or semicircular cone (the acidipore), usually projecting as a nozzle and modified to spray formic acid and often fringed with hairs (Figures 8, 9)..... **Formicinae**

Apex of hypopygium without an acidipore..... **4**

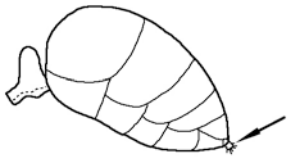

**Figure 8**

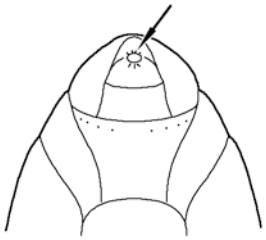

**Figure 9**

4. Apex of abdomen (junction of hypopygium and pygidium) with a transverse slit (Figures 10, 11); abdomen without an impression between the third and fourth abdominal segments, often soft, flexible and easily collapsed; mandibles triangular with teeth along entire inner margin.....**Dolichoderinae**

   Apex of abdomen with a sting; abdomen may be deeply impressed between third and fourth abdominal segments (Figure 7); cuticle stronger, less flexible, not normally collapsible; mandibular shape various..... **5**

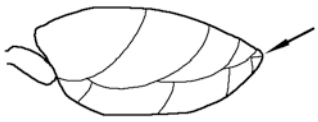

**Figure 10**

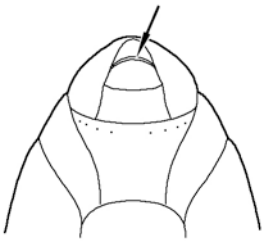

**Figure 11**

5. Petiole broadly articulated to abdominal segment III (Figure 12); dentiform (i.e. tooth-like) clypeal setae present (Figure 13) (one genus, *Amblyopone*)..... **Amblyoponinae**

   Petiole with distinctly descending posterior face; dentiform clypeal setae absent ..... **6**

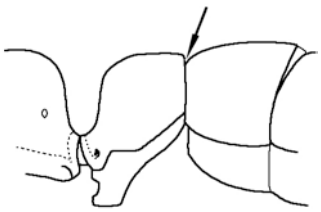

**Figure 12**

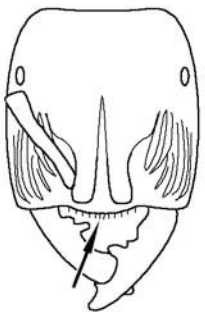

**Figure 13**

6. Petiole approximately as long as to slightly longer than abdominal tergite III (Figure 14); mandibles elongate-triangular, intermeshing (15 or more small teeth present) (Figure 15) .... ..... **Myrmeciinae (pt.)**

   Without the above combination of characters.... **7**

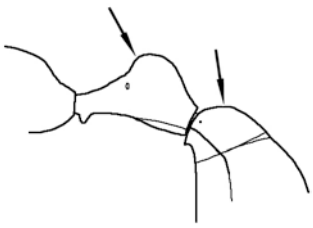

**Figure 14**

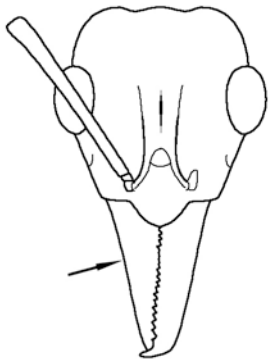

**Figure 15**

7. In profile, metapleural gland orifice a longitudinal to oblique curved slit or crescent, directed upward by a strip of cuticle (Figure 16) (one genus, *Rhytidoponera*) ..... .....**Ectatomminae**

In profile, metapleural gland orifice elliptical to circular and opening laterally or posteriorly, not bounded by strip of cuticle that directs orifice upward (Figure 17) ..... **8**

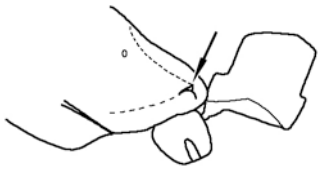

**Figure 16**

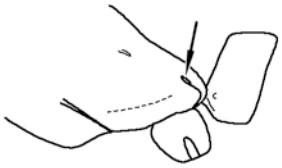

**Figure 17**

8. Promesonotal suture either completely absent or present and reduced and fully fused, so pronotum and mesonotum are incapable of independent movement (Figure 18); antennal sockets mostly to completely exposed (Figure 19) (one genus, *Discothyrea*) ..... **Proceratiinae**

Promesonotal suture fully developed, so pronotum and mesonotum capable of independent movement (Figure 20); antennal sockets covered by developed frontal lobes (Figure 21)..... **9**

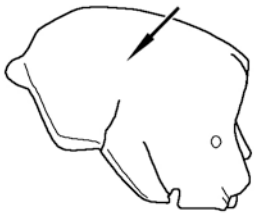

**Figure 18**

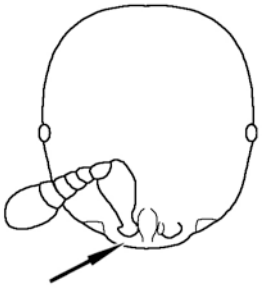

**Figure 19**

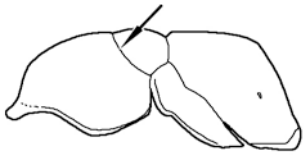

**Figure 20**

9. Torulus of antenna completely fused to frontal lobe; frontal lobes are rounded or triangular, and in full-face view have a decidedly 'pinched in' appearance posteriorly (Figure 21); anterior clypeal margin without lamellate rim; in full-face view, head capsule without median longitudinal carina (Figure 22) ..... **Ponerinae**

Torulus of antenna not completely fused to frontal lobe; frontal lobes not rounded or triangular in appearance, and not 'pinched in' posteriorly, anterior clypeal margin with lamellate rim; in full-face view, head capsule with median longitudinal carina (one genus, *Heteroponera*) ..... **Heteroponerinae**

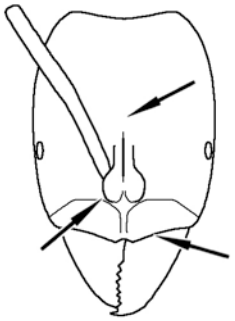

**Figure 21**

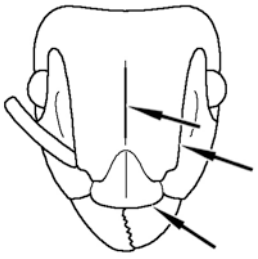

**Figure 22**

10. Mandibles long and more or less linear, usually with teeth along entire inner margin; eyes very large, situated on or near the anterior margin of the clypeus (Figure 23) ..... **Myrmeciinae (pt.)**

Mandibles usually triangular, but if elongate, then without teeth on inner margin (teeth at mandibular tip only), and eyes small or medium-sized, situated away from anterior margin of clypeus ..... **11**

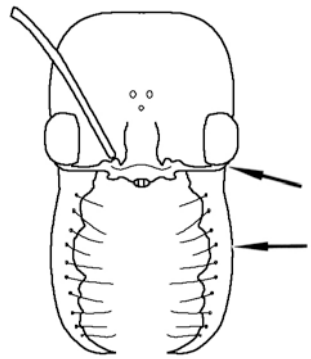

**Figure 23**

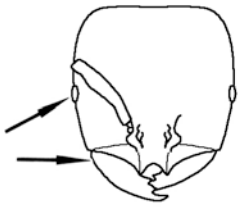

**Figure 24**

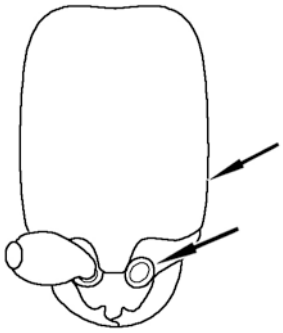

**Figure 25**

11. Eyes normally present, but if absent then frontal lobes expanded so that the latter cover all or part of antennal insertions (Figure 24) ..... **12**

    Eyes absent or represented by a single facet; frontal lobes absent, so that the antennal insertions are completely exposed (Figure 25) ..... **13**

12. Pronotum and mesonotum fused to form one segment (the promesonotum) (Figure 26); hind tibiae with at most a simple spur, but this may be lacking; tarsal claws simple (Figure 27) ..... **Myrmicinae**

    Joint between pronotum and mesonotum flexible (Figure 28); hind tibiae with pectinate spurs; tarsal claws toothed (Figure 29) (one genus, *Tetraponera*)..... **Pseudomyrmecinae**

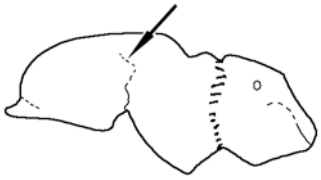

**Figure 26**

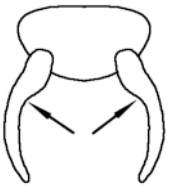

**Figure 27**

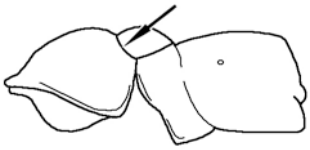

**Figure 28**

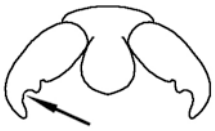

**Figure 29**

13. Pronotum and mesonotum fused to form one segment; antennae 10-segmented; length greater than 3 mm (Figure 30) (one genus, *Aenictus*)..... **Aenictinae**

    Joint between pronotum and mesonotum flexible (Figure 31); antennae 12-segmented; length less than 2.5 mm (one genus, *Leptanilla*) ..... **Leptanillinae**

**Figure 30**

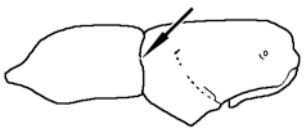

**Figure 31**

## PLATES







**Plates 1-6:** Botanical Districts of the SWBP. **1**, Avon wheatbelt: a rich ant habitat – note strongly stratified vegetative structure. **2**, Esperance sand plain: the low canopy height means most ant species are epigaeic foragers. **3**, Geraldton sandplain: the kwongan, in particular, is an endemic floral hotspot and has a rich ant fauna with many sandplain species. **4**, Jarrah forest: the ant fauna of this district is probably the best known among the respective districts. Ant diversity appears greatest on the eastern side of the Darling scarp. **5**, Mallee: the ant fauna of this sparsely settled region is not well known and could yield surprises. **6:** Swan coastal plain: the ant fauna largely mirrors that of the southern sector of the Geraldton sandplain, with many species in common (B. E. Heterick).


**Plate 7** Warren: ant diversity is low in this cool, wet district, but the presence of a number of rare and specialised endemics gives it particular significance to the student of ants. (B. E. Heterick)


**Plate 8** Rare, undescribed *Notoncus* species (*Notoncus* sp. JDM 487), currently only known from a tiny reserve in suburban Perth (B. E. Heterick)


**Plate 9** Exposed gallery of native carpenter ants (*Camponotus claripes nudimalis* Forel) in trunk of red-flowering gum (*Corymbia calophylla* (Lindl.) K. D. Hill & L. A. S. Johnson) (B. E. Heterick)

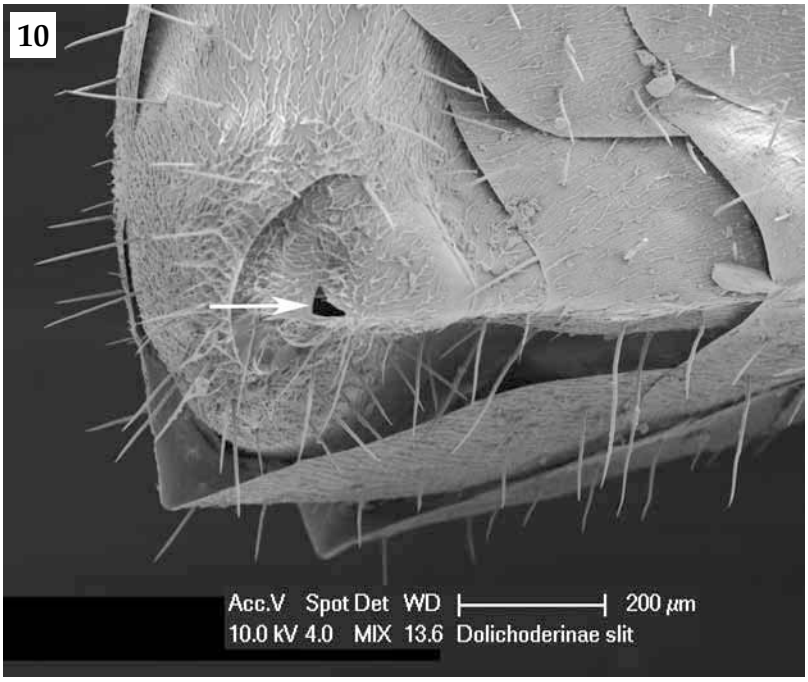


**Plate 10** Slit under gaster of meat ant (Dolichoderinae: *Iridomyrmex*): a cocktail of powerful chemicals exuded from this slit help to subdue prey or enemies.

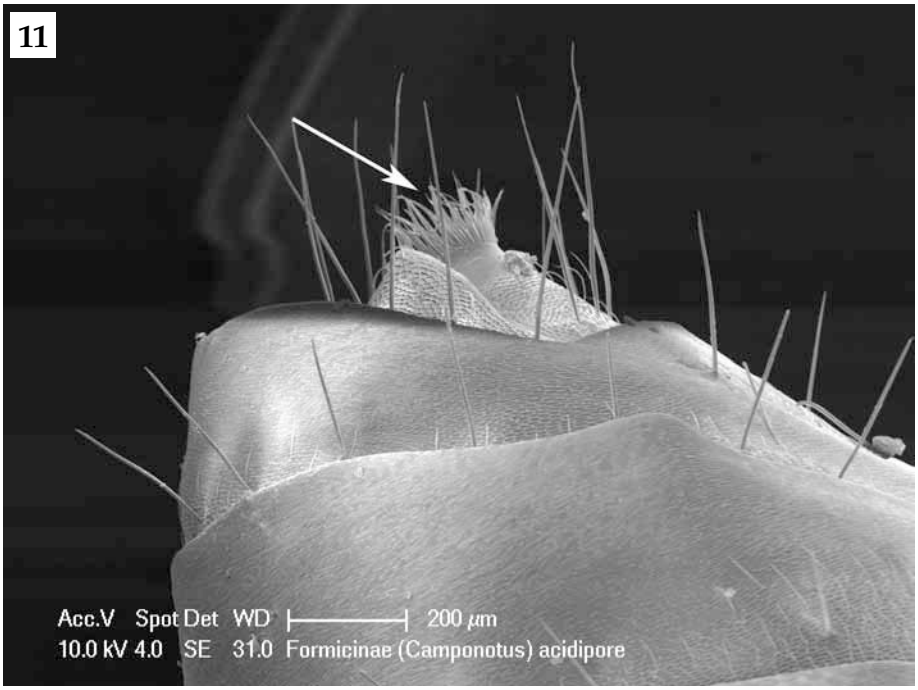


**Plate 11** Acidipore of sugar ant (Formicinae: *Camponotus*): this structure directs an aerosol of corrosive formic acid at attackers.


**Plate 12** Full-face view of head of typical bulldog ant (Myrmeciinae: *Myrmecia*) showing the formidable mandibles. However, what is often referred to as the 'bite' of the bulldog ant is the consequences of the sting at the other end!

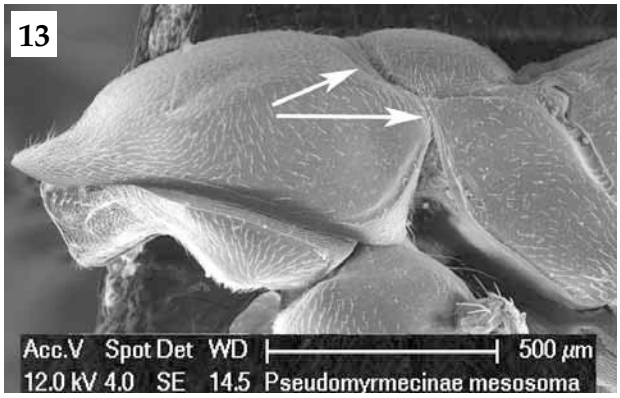


**Plate 13** *Tetraponera* (Pseudomyrmecinae) worker showing the flexible joint of the pronotum and mesonotum. In superficially similar myrmicine ants the joint is fused.

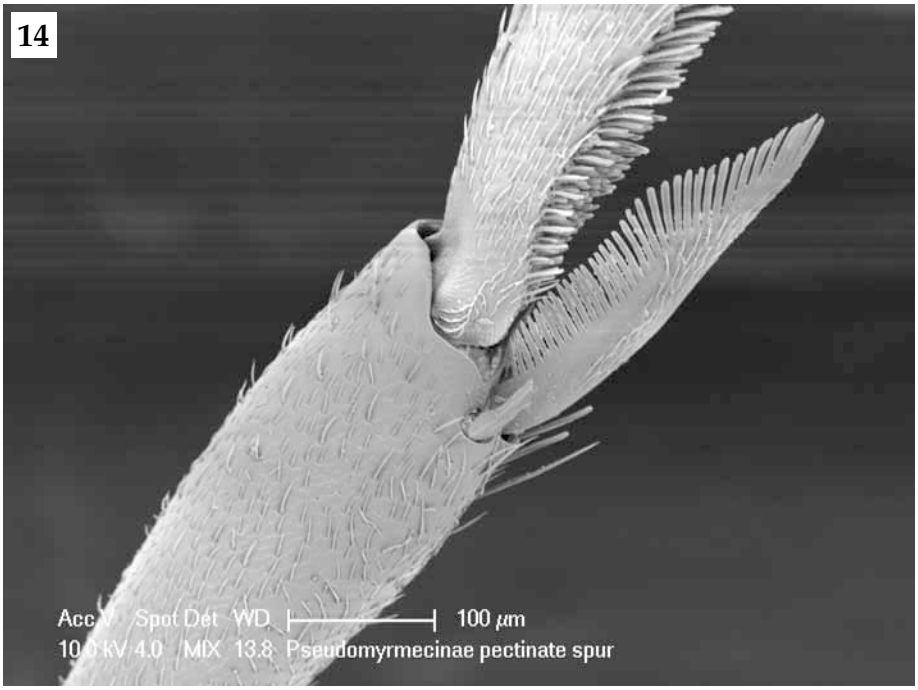


**Plate 14** Pectinate tibial spur of *Tetraponera*, another typical pseudomyrmecine feature (same worker as in Plate 13).

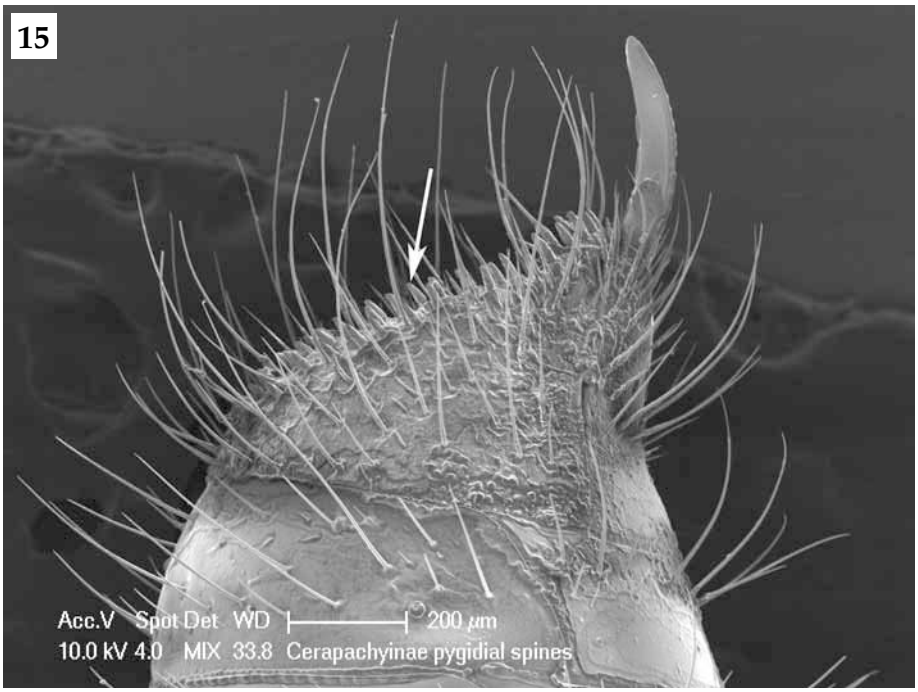


**Plate 15** Pygidial spines in *Cerapachys* (Cerapachyinae).

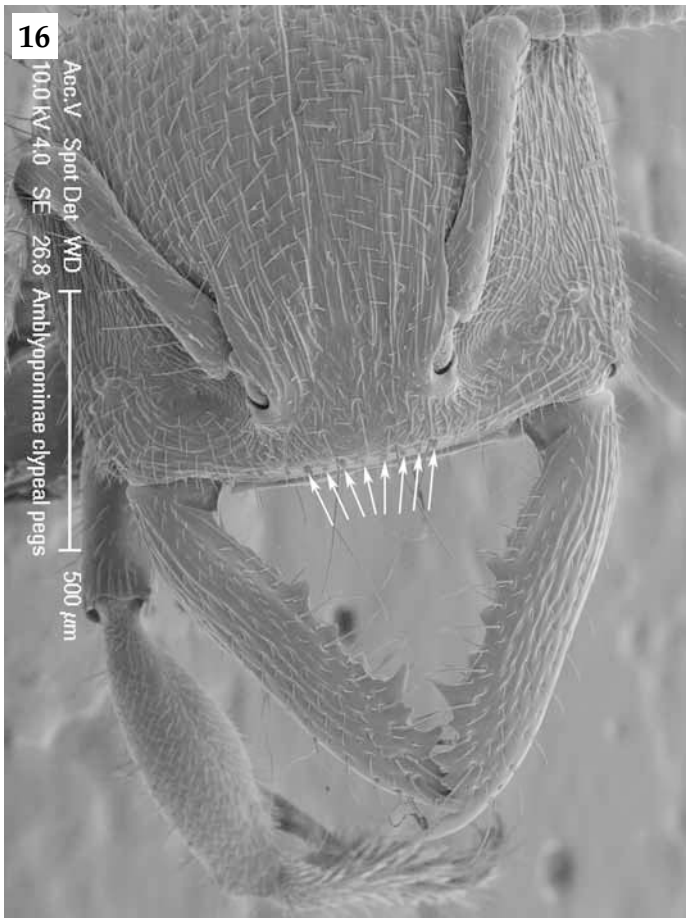


**Plate 16** Full-face view of *Amblyopone* (Amblyoponinae) showing the clypeal pegs (dentiform setae), a diagnostic feature of this subfamily.

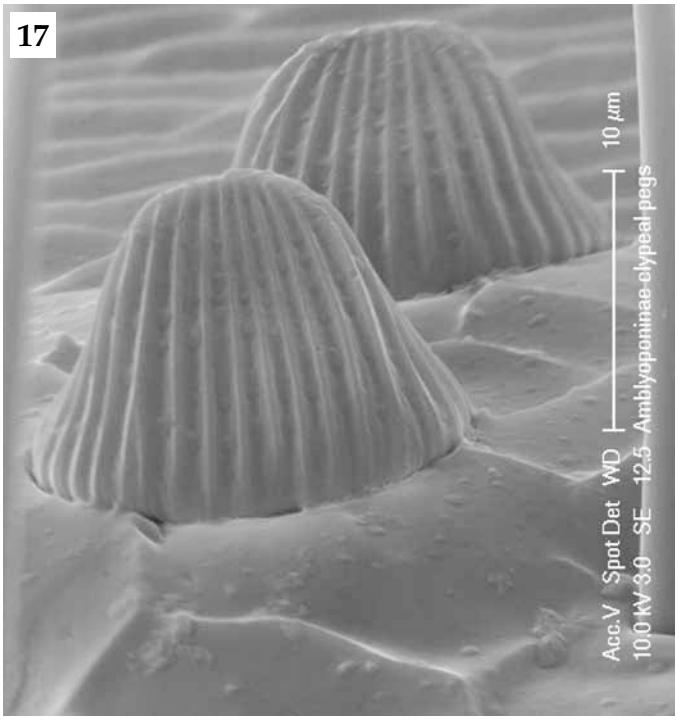


**Plate 17** Two clypeal pegs from *Amblyopone* (same worker as shown in Plate 16) seen under high magnification. These modified setae may be gustatory (taste) receptors.

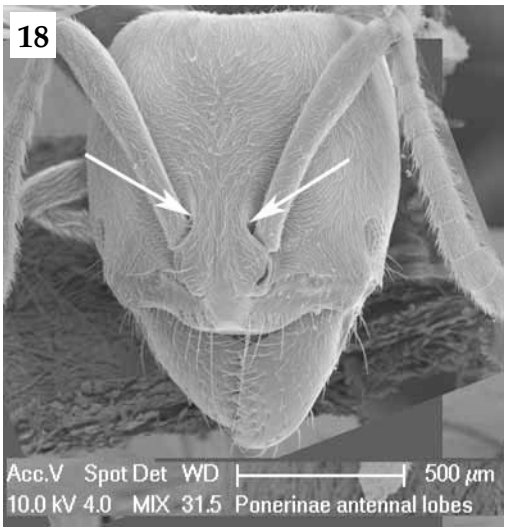


**Plate 18** 'Pinched-in' frontal lobes typical of ponerine ants (Ponerinae: *Pachycondyla*).

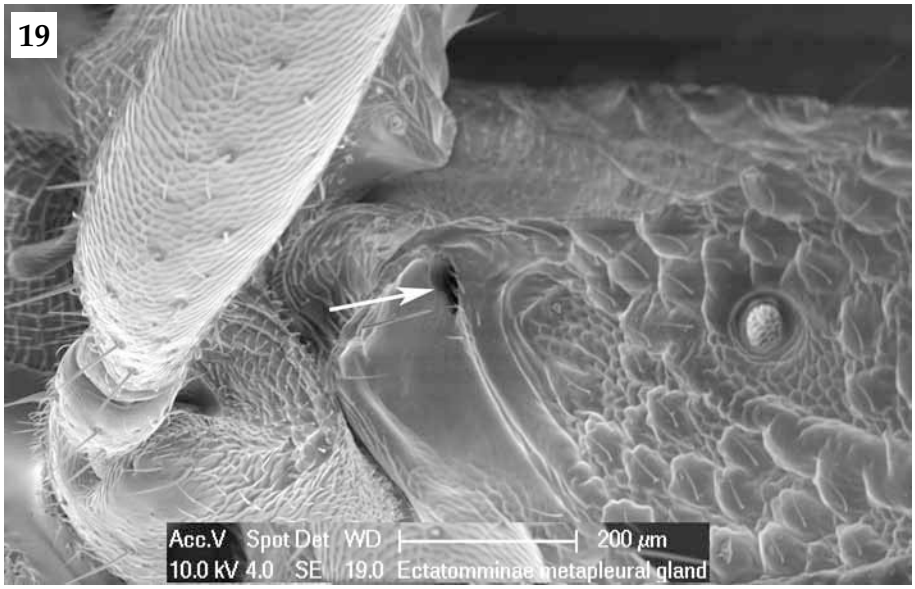


**Plate 19** Detail of propodeum of ectatommine ant (Ectatomminae: *Rhytidoponera*), revealing the strip of cuticle characteristic of this subfamily that directs the orifice of the metapleural gland dorsally or posterially. A white arrow denotes the orifice of the metapleural gland.

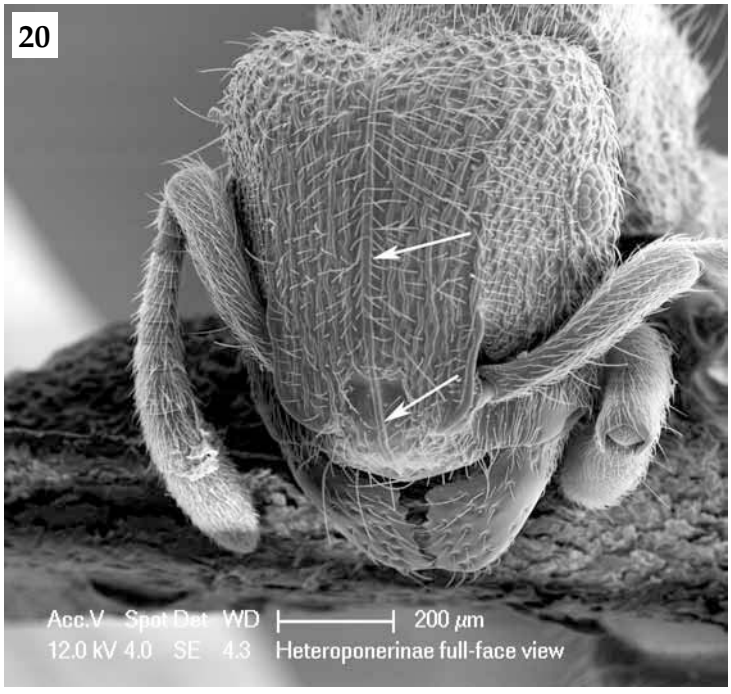


**Plate 20** Full-face view of a heteroponerine worker (Heteroponerinae: *Heteroponera*) revealing the median longitudinal carina that runs the length of the head capsule

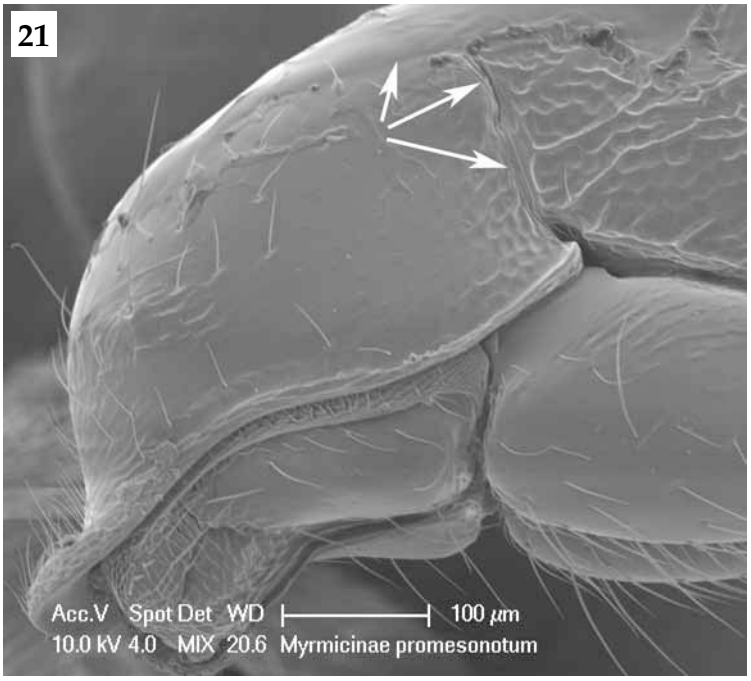


**Plate 21** The promesonotal suture of this myrmicine worker (Myrmicinae: *Monomorium*) is evident in this specimen but fully fused, so that pronotum and mesonotum form a promesonotum (the join is arrowed). Often, the suture is completely absent.

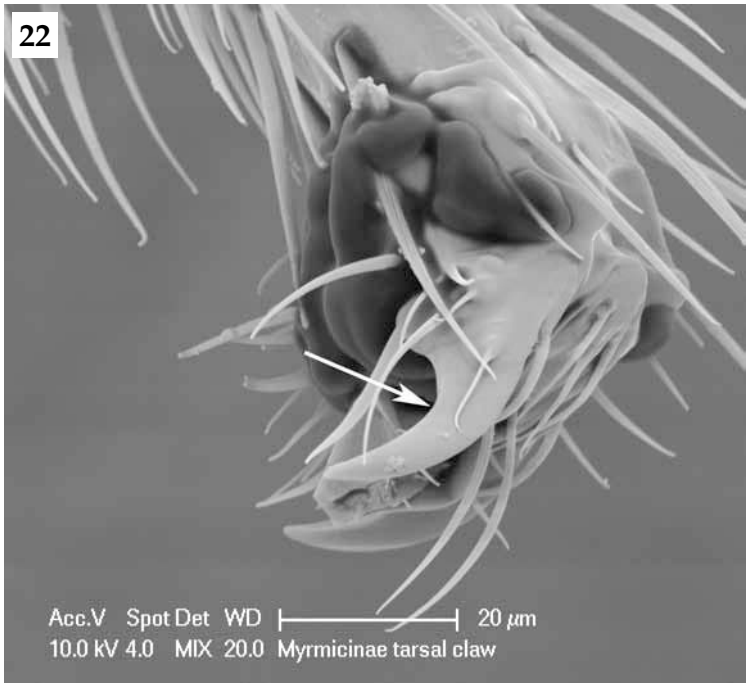


**Plate 22** Simple claw of myrmicine (same worker as illustrated in Plate 21). (All SEM photographs E. Miller, Curtin University)

## KEY TO THE ANT GENERA OF THE SOUTH-WEST BOTANICAL PROVINCE

This key is designed to enable researchers to identify ants of south-western Australia to genus, and may not have validity for species found in northern or eastern Australia. Only subfamilies with multiple genera occurring in the SWBP are included in this key. (n.b. The orientation of Figures 38a, 39, 40, 51, 52, 65, 66, 67, 79, 80 follows Shattuck (1999), as these orientations show diagnostic features most clearly.)

**(a) Dolichoderinae:**

1. Petiole without a distinct node (Figure 32); posterior margin of clypeus a broad, even arc (Figures 184, 185) ..... **2**

   Petiole with a distinct node (Figure 34), or, if node weakly indicated (Figure 33), posterior margin of clypeus elliptical or forming a shallow rectangle, with medial sector often more-or-less straight (Figures 133b, 134b) ..... **3**

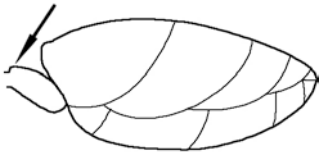

**Figure 32**

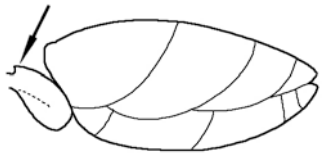

**Figure 33**

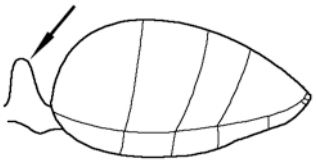

**Figure 34**

2. Gaster with five plates (tergites) on its upper surface (Figure 32); pronotum generally with erect setae; larger (≈ 3 mm); black..... ..... ***Technomyrmex***

   Gaster with four plates on its upper surface (as in Figure 33); pronotum without setae in WA spp.; smaller (1–1.5 mm); brown or yellowish ..... ***Tapinoma***

3. Propodeal angles produced as distinct spines on the same plane as the mesosoma (Figure 35); ant red-and-black ..... ***Froggattella***

   Propodeal angles usually not produced as spines (eg. Figures 36, 37), if spines present then not on same plane as the mesosoma and ant with black body ..... **4**

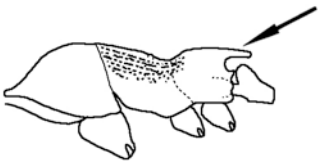

**Figure 35**

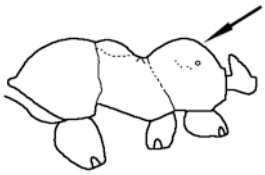

**Figure 36**

**Figure 37**

4. Underside of head near mandibular insertion with a weak to well developed flange (Figures 38a); head and mesosoma usually strongly sculptured; propodeum often concave (Figure 38b) or propodeal angle produced as spines) (Figure 38c)..... ***Dolichoderus***

   Underside of head near mandibular insertion rounded or with a ridge, but never with a flange (Figure 39); head and mesosoma at most with very weak shagreenate sculpture; propodeum usually rounded, may be concave but never with spines ..... **5**

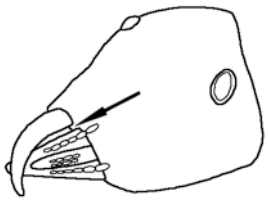

**Figure 38a**

**Figure 38b**

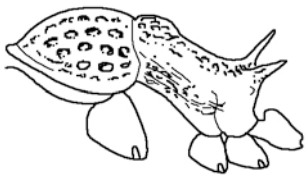

**Figure 38c**

5. Palps very short (PF 2,2) (Figure 40); eyes small (about 50 facets); clypeus with several to many downwardly curved setae which are about the same length as the closed mandibles..... .....***Arnoldius*** **(formerly, *Bothriomyrmex*)**

   Palps longer (PF 6,4 or 5,3) (see Figure 39); eyes generally larger (50 facets >); clypeus (except *Nebothriomyrmex*) with several to many short, occasionally curved setae, which are much shorter than the closed mandibles ..... **6**

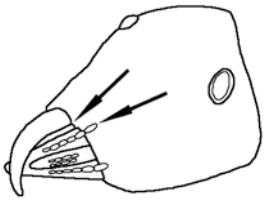

**Figure 39**

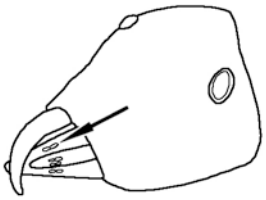

**Figure 40**

6. Declivitous face of propodeum concave (Figure 41); head and mesosoma usually dull black, gaster often shiny with purple or blue iridescence, very rarely with red head and mesosoma, black gaster; nearly always associated with wood or man-made structures ..... ***Ochetellus***

   Declivitous face of propodeum never concave, propodeum usually rounded, occasionally flattened or square (Figures 42, 43); often brown, black or bicoloured, appearance rarely as above; most species ground nesting..... **7**

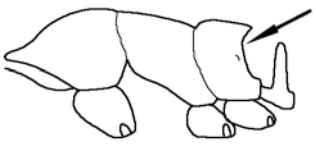

**Figure 41**

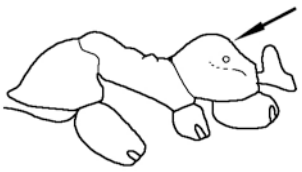

**Figure 42**

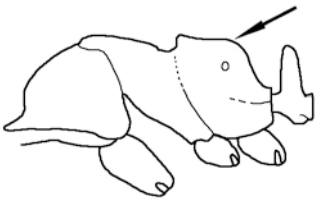

**Figure 43**

7. Mesosoma consisting of three compact segments, the two thoracic segments higher than long with the propodeum often obliquely flattened; petiolar node a small to minute scale, sometimes barely visible (ant very *Tapinoma*-like) (Figure 37); small to minute species (≈ 1–1.5 mm) ..... **8**

   Mesosoma not so compact, the propodeum in particular broader, at least as high as long, and generally rounded or square; petiolar node more robust (see Figures 42, 43); most species of at least medium size (2–5 mm) ..... **9**

8. Pronotum rising abruptly at approximately 90° to form a small protuberance (Figure 44); eyes small (≈ greatest width of antennal scape)..... ..... ***Nebothriomyrmex***

   Pronotum moderately to strongly convex but not rising abruptly to form a protuberance (Figure 45); eyes large (2 × greatest width of antennal scape ≥) ..... ***Doleromyrma***

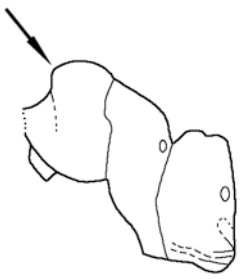

**Figure 44**

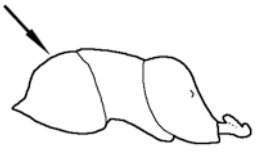

**Figure 45**

9. Palps shorter (PF 5,3); propodeum square in shape, sometimes with small lip anteriad (Figure 43); odour of fresh specimens aromatic (like perfume); colony often covers its nests and trails with frass (plant fibres, chewed up wood fragments and faeces)..... ***Papyrius***

   Palps longer (PF 6,4); propodeum at least gently rounded (Figure 42); fresh specimens either without odour or with strong acrid or chemical odour, rarely that of perfume; colonies do not use frass ..... **10**

10. Anterior margin of clypeus with central protuberance (lacking in one black, iridescent species with a low broad node and propodeal spiracles placed at the propodeal angles); eyes placed rather high on sides of head capsule (about the mid-point) (Figure 46) ..... ***Iridomyrmex***

    Anterior margin of clypeus without a central protuberance, either broadly convex, straight or broadly concave; eyes placed below mid-point of head capsule (Figures 47, 48)... **11**

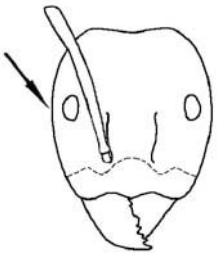

**Figure 46**

**Figure 47**

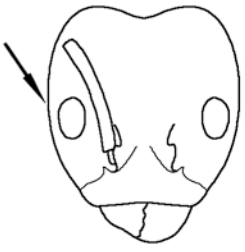

**Figure 48**

11. Outline of mesosoma smooth except for gently rounded propodeum (Figure 49); widest point of head capsule above eye; posterior margin of head capsule slightly concave or straight (Figure 47); brown ants; little or no odour; exotic tramp species found mostly in highly disturbed environments ..... ***Linepithema***

    Outline sinuate (strongly rounded propodeum and usually also mesonotum) (Figure 50); widest point of head capsule near eye; posterior margin of head capsule moderately to strongly concave (Figure 48); black ants; strong chemical odour; native species found in woodland..... ***Anonychomyrma***

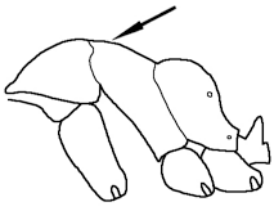

**Figure 49**

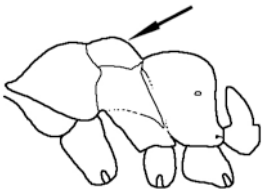

**Figure 50**

**(b) Formicinae:**

1. Antenna with 10 or 11 segments (including the scape) ..... **2**

   Antenna with 12 segments (including the scape) ..... **4**

2. Palps short (PF 2,3) (Figure 51); eyes minute; soft-looking, yellowish ants with large gaster (SW species rarely collected, probably spends most of its life underground; also in the Kimberley region)..... ***Acropyga***

   Palps long (PF 6,4) (Figure 52); eyes normal size; other features variable ..... **3**

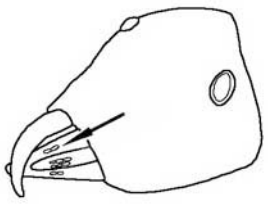

**Figure 51**

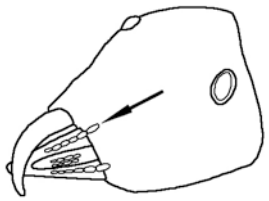

**Figure 52**

3. Propodeum with one or more pairs of spines, teeth or protuberances, often including pair over propodeal spiracle; petiolar node often with pair of spines or lateral processes (Figure 53) ..... ***Stigmacros***

   Propodeum and petiolar node always without spines, teeth or protuberances. (Figure 54) ..... ***Plagiolepis***

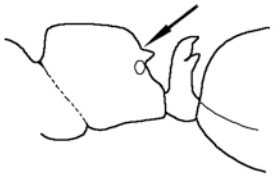

**Figure 53**

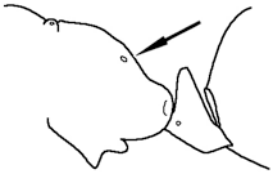

**Figure 54**

4. Lower corner of mesosoma below propodeum without an opening (to the metapleural gland) fringed with long setae, though a few scattered setae may be present (Figure 55) ..... **5**

   Lower corner of mesosoma below propodeum, just above hind coxa, with an opening that is often fringed with long hairs (Figure 56)..... **6**

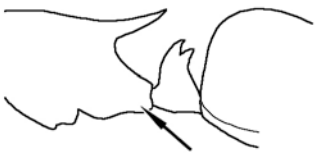

**Figure 55**

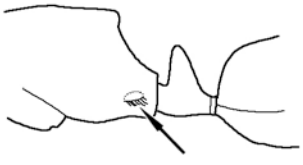

**Figure 56**

5. Upper plate of first gastral segment (first tergite) approximately half total length of gaster; spines or sharp angles present on propodeum and petiolar node (Figure 57); one worker caste..... ***Polyrhachis***

   Upper plate of first gastral segment much less than half total length of gaster; spines always absent on body segments in West Australian species; propodeal angle (if present) rounded (Figure 58); major and minor worker castes, at least, always present, media workers often present ..... ***Camponotus***

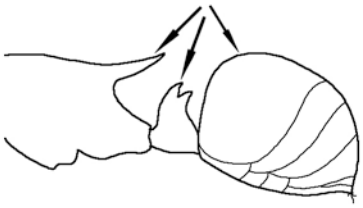

**Figure 57**

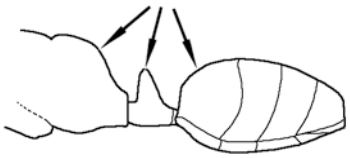

**Figure 58**

6. Eyes very large and placed on posterior corners of head capsule (Figure 59)..... ***Opisthopsis***

   Eyes of moderate size and placed at sides or front of head capsule, but not near posterior corners (Figure 60) ..... **7**

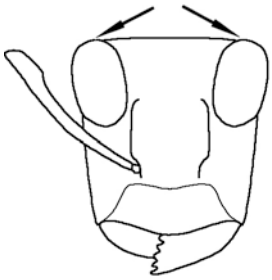

**Figure 59**

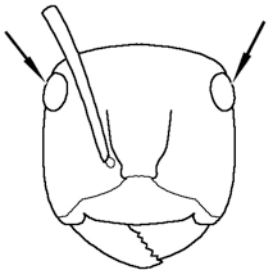

**Figure 60**

7. Antennal sockets separated from the posterior margin of the clypeus by a distance greater than the smallest diameter of the antennal scape (Figure 61) ..... ***Calomyrmex***

   Antennal sockets very close to posterior margin of the clypeus separated, at most, by a distance less than the smallest diameter of the antennal scape (Figure 62) ..... **8**

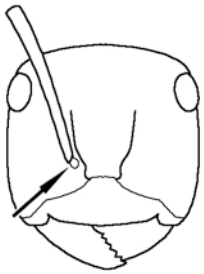

**Figure 61**

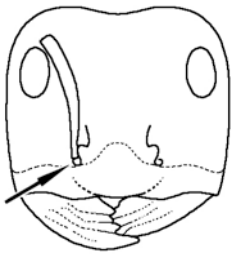

**Figure 62**

8. Propodeal spiracle slit or comma-like (Figure 63a); clypeus and underside of head and mandibles usually with profuse, long, curved hairs (Figure 63b); major, media and minor castes present (i.e. species polymorphic); species very active in the heat of the day ..... ***Melophorus***

   Propodeal spiracle oval or round (Figure 64); clypeus and underside of head and mandibles with few or no long curved hairs; single worker caste (i.e. species monomorphic) ..... **9**

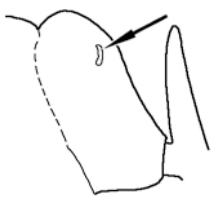

**Figure 63a**

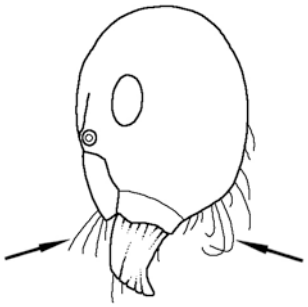

**Figure 63b**

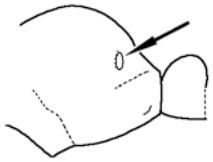

**Figure 64**

9. Dorsum of head, pronotum and mesonotum, at least, with multiple conspicuously paired, stout, dark setae (the latter also present on propodeum in *P. minutula* group) (Figure 65); ocelli very small to absent in WA species ..... ***Paratrechina***

   Dorsum of head, pronotum and mesonotum usually with well-separated, thin, pale setae (Figure 66) (setae sometimes lacking), but if stout and dark, then maximum of one or two conspicuously paired pairs on pronotum (Figure 67); two or three ocelli placed in a triangle usually evident ..... **10**

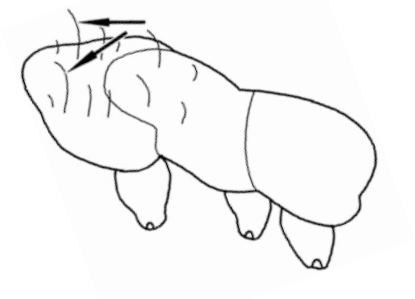

**Figure 65**

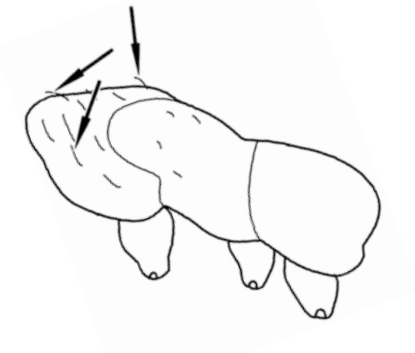

**Figure 66**

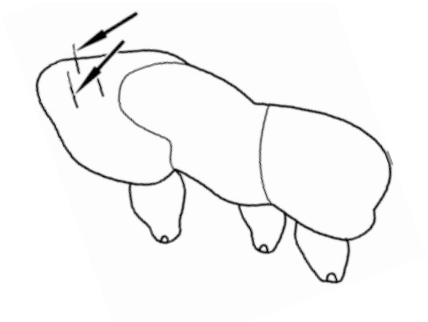

**Figure 67**

10. Propodeal spiracle located near posterior face of propodeum (Figure 68a); antennal scapes exceed posterior margin of head capsule by more than one third of their length (Figure 68b); outline of mesosoma smooth ..... ***Prolasius***

    Propodeal spiracle located at least its diameter anterior of the posterior face of the propodeum (Figure 69); antennal scapes exceed posterior margin of head capsule by less than one third of their length (Figure 70); mesosoma often with processes on pronotum..... **11**

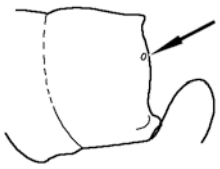

**Figure 68a**

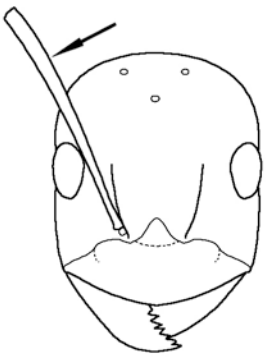

**Figure 68b**

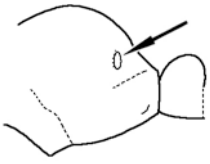

**Figure 69**

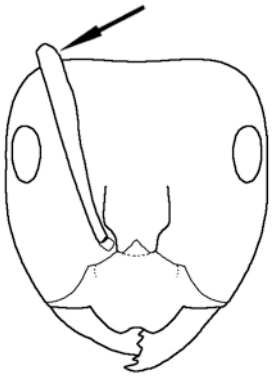

**Figure 70**

11. Projecting central anterior margin of clypeus rectangular; frontal carinae distinctly arched; mandible with 10–13 teeth in minors, as few as six in majors; frontal carinae strongly arched (Figure 71); workers polymorphic; dorsum of mesosoma always smooth in outline (rare, SW and eastern wheatbelt) ..... ***Myrmecorhynchus***

    Anterior margin of clypeus convex or sinuate in outline, often with a central notch or groove; mandibles with six or seven teeth; frontal carina weakly arched or straight (Figure 72); workers monomorphic in Western Australian species (one or more Eastern states species weakly polymorphic); dorsum of mesosoma may have angular or rounded pronotal and metanotal processes ..... ***Notoncus***

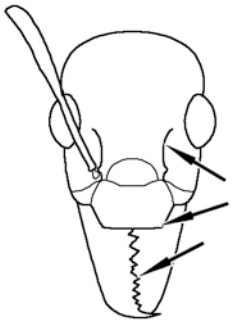

**Figure 71**

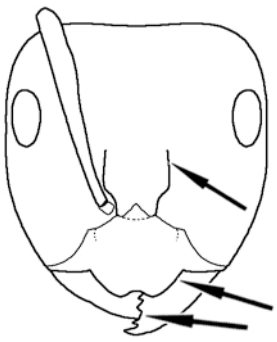

**Figure 72**

**(c) Myrmeciinae**

1. Mandibles elongate-triangular with many tiny, intermeshing teeth along their entire margin; eyes placed well above posterior margin of clypeus (Figure 73); one distinct waist segment ..... ***Nothomyrmeci***a

   Mandibles elongate and narrow, curved, with several larger teeth, and one or two smaller teeth in between each of these, mandibular dentition may be reduced towards base of mandible; eyes abutting posterior margin of head capsule (Figure 74); two distinct waist segments.....***Myrmeci***a

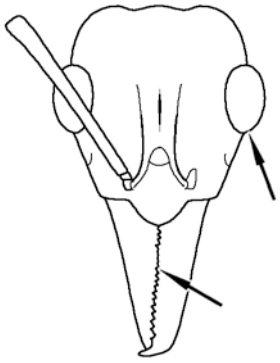

**Figure 73**

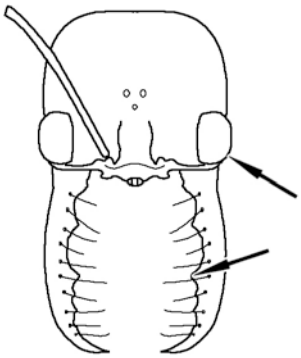

**Figure 74**

**(d) Cerapachyinae**

1. Abdominal segments III-VII with divisions smoothly joined, so that the outline is even (Figure 75) .....***Cerapachys***

   Abdominal segments III-VII with distinct constrictions between divisions so as to present an uneven outline (Figure 76) ..... .....***Sphinctomyrmex***

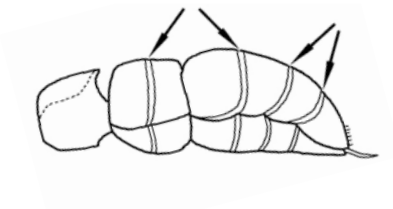

**Figure 75**

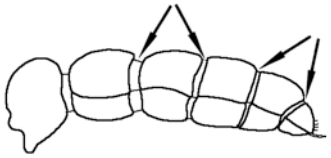

**Figure 76**

**(e) Ponerinae;**

1. Mandibles long and linear, inserted in central anterior margin of head (Figure 77)..... **2**

   Mandibles triangular or elongate, curved, inserted at sides of head (Figures 78)..... **3**

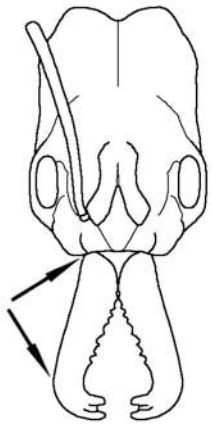

**Figure 77**

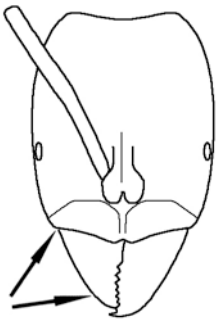

**Figure 78**

2. Top of head with V-shaped lines converging to form a groove on upper front of head (Figure 79) .....***Odontomachus***

   Top of head without V-shaped lines and with broad uninterrupted curved ridge; weak groove present or absent (Figure 80)..... .....***Anochetus***

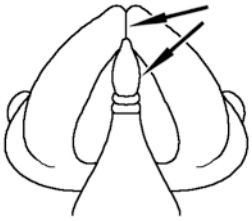

**Figure 79**

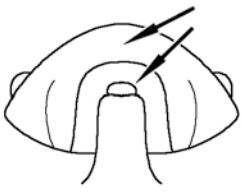

**Figure 80**

3. Mandibles elongate, curved (Figure 81) ..... **4**

   Mandibles triangular (Figure 82) ..... **5**

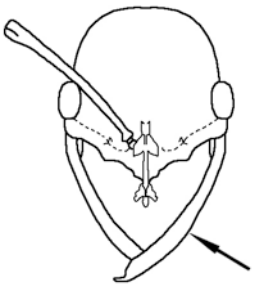

**Figure 81**

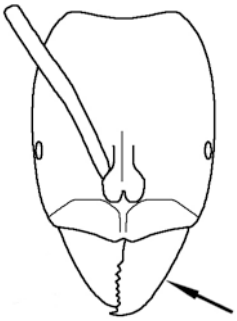

**Figure 82**

4. Pretarsal claws of hind leg equipped with one or more teeth on inner curvature (Figure 83), and usually pectinate ..... ***Leptogenys*** **(pt.)**

   Pretarsal claws of hind leg simple (Figure 84) ..... ***Myopias***

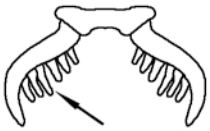

**Figure 83**

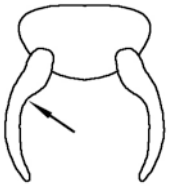

**Figure 84**

5. Tibia of hind leg with two distinctly pectinate spurs at or near its base (Figure 85a); clypeus broadly inserted between frontal lobes (Figure 85b) ..... ***Platythyrea***

   Tibia of hind leg with a single pectinate spur at or near its base (Figure 86), a simple spur may also be present; clypeus narrowly inserted between frontal lobes as a slender triangle or linear, indented strip (Figure 87) ..... 6

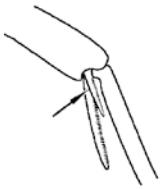

**Figure 85a**

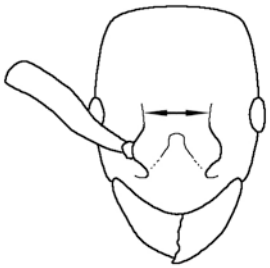

**Figure 85b**

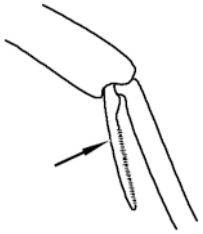

**Figure 86**

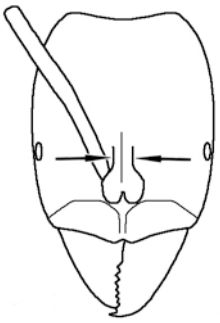

**Figure 87**

6. Pretarsal claws of hind leg equipped with one or more teeth on the inner curvature and usually pectinate (Figure 83); clypeus produced anteriad as an acute V-shaped projection (Figure 88) ..... ***Leptogenys* (pt.)**

   Pretarsal claws of hind leg simple (Figure 84); clypeus straight or broadly convex; not produced anteriad as an acute V-shaped projection (Figure 89) ..... **7**

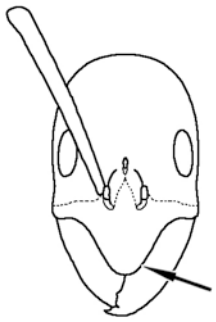

**Figure 88**

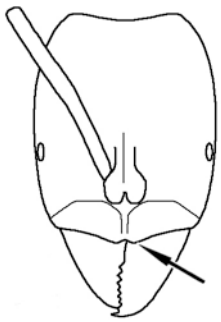

**Figure 89**

7. Tibia of hind leg with both a single large pectinate spur and a smaller simple spur (Figure 85a) ..... ***Pachycondyla***

   Tibia of hind leg with a single large pectinate spur (Figure 86) ..... **8**

8. PF2,2; anteroventral process of petiole simple, without thin, circular translucent area anteriad (Figure 90) ..... ***Hypoponera***

   PF1,2 or 1,1; anteroventral process of petiole with thin, circular translucent area anteriad (Figure 91) ..... ***Ponera***

**Figure 90**

**Figure 91**

**(f) Myrmicinae:**

1. Distinctive ants with triangular, deeply emarginate heads (e.g. Figures 92, 94, 95); antennal segments (including the scape) less than nine; mandibles usually elongate, sometimes tongs-like..... **2**

   Ants not as above, heads more rounded (Figure 93); antennal segments nine or more; mandibles triangular..... **6**

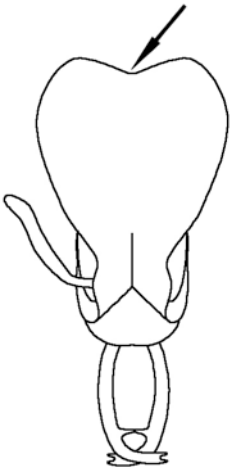

**Figure 92**

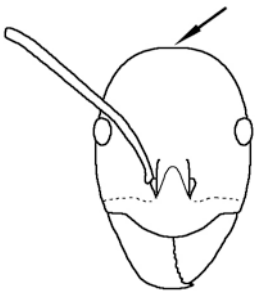

**Figure 93**

2. Mandibles long and thin, meeting only at the tips (Figure 94)..... **3**

   Mandibles more elongate-triangular in shape, meeting along their entire length (Figure 95) ..... **5**

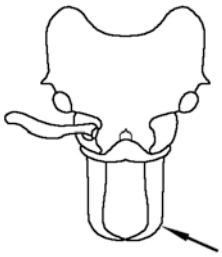

**Figure 94**

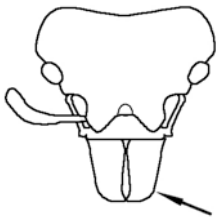

**Figure 95**

3. Antennal scape at rest passing below the eye (Figure 96a); head capsule about as long as wide (Figure 96b); nodes without foam-like material around them ..... ***Epopostruma***

   Antennal scape at rest passing above the eye (Figure 97); head capsule much longer than wide (Figure 98); nodes may have foam-like cuticular material attached..... **4**

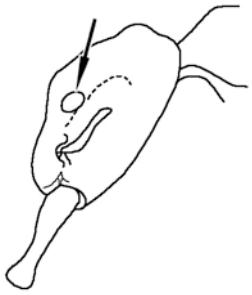

**Figure 96a**

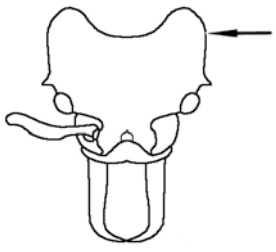

**Figure 96b**

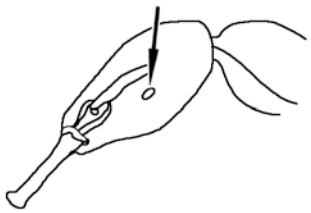

**Figure 97**

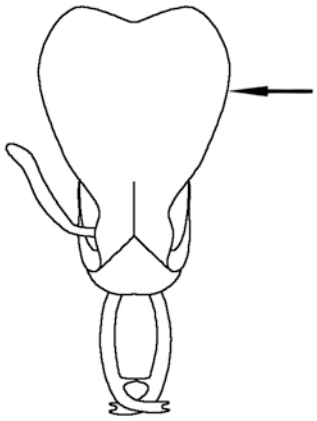

**Figure 98**

4. Antenna with five segments, the third segment being longer than the other three segments of the flagellum (Figure 99); PF 5,3; waist segments without foam-like cuticular material attached (SW, one rare species) ..... ..... ***Orectognathus***

   Antenna with four or six segments (Figure 100); third segment at most the same length as the other segments; PF 1,1; waist segments often with foam-like material attached ..... ..... ***Strumigenys***

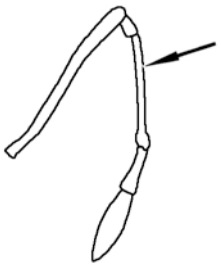

**Figure 99**

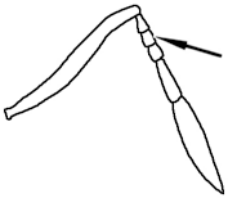

**Figure 100**

5. Lateral margins of both petiole and postpetiole with thin, wing-like flanges (Figure 101) ..... ..... ***Colobostruma***

Wing-like flanges found only on postpetiole (petiole has at most a slight ridge) (Figure 102) ..... ***Mesostruma***

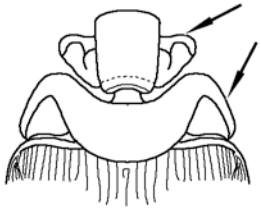

**Figure 101**

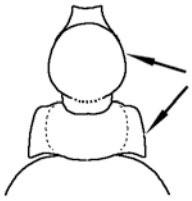

**Figure 102**

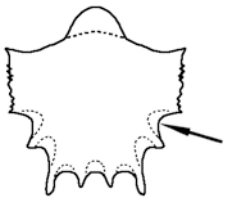

**Figure 103**

6. Antenna with nine segments; dorsum of anterior mesosoma flattened and projecting to form a shield, often with regular protruding edges and translucent 'windows' between these edges (Figure 103) ..... ***Meranoplus***

   Antenna with 10 or more segments; dorsum of mesosoma never forming a shield as above .... ..... **7**

7. Postpetiole attached to upper surface of gaster, which is heart-shaped when seen from above; petiole flattened; viewed from above, postpetiole often distinctly bilobed (Figure 104) ..... ***Crematogaster***

   Postpetiole attached to the front of the gaster, which is not distinctly heart-shaped; petiole usually with a node, not flattened (Figure 105); postpetiole not bilobed as above ..... **8**

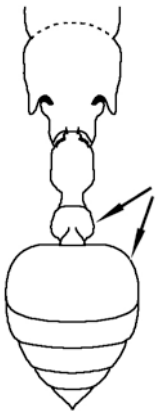

**Figure 104**

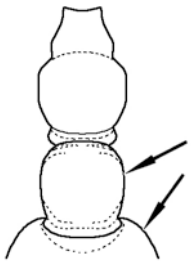

**Figure 105**

8. Eyes absent or (rarely) single faceted (Figure 106); antennal club 3-segmented ..... ..... ***Monomorium*** **(pt.)**

   Eyes usually present, though may be small (Figure 107); if minute or absent (in some specimens of *Solenopsis belisarius*), then antennal club 2-segmented..... **9**

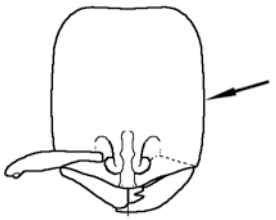

**Figure 106**

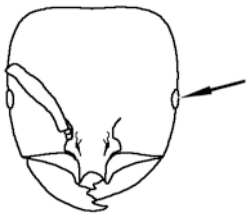

**Figure 107**

9. Viewed from front, area of clypeus below antennal sockets raised into a sharp ridge (Figure 108a); tip of sting with a triangular or club-like appendage projecting upwards from the shaft (Figure 108b); propodeal angle usually a pair of stout spines, sometimes flanges ..... ***Tetramorium***

   Viewed from front, area of clypeus below antennal sockets smooth or a dull ridge (Figure 109); tip of sting usually thin and pointed, occasionally slightly flattened, but without appendage (Figure 110); propodeal angle often absent or with pair of protuberances only ..... **10**

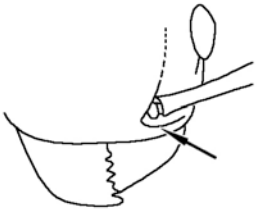

**Figure 108a**

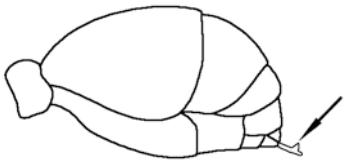

**Figure 108b**

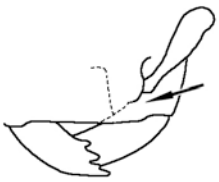

**Figure 109**

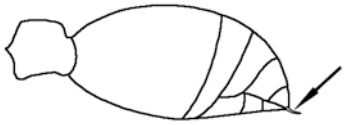

**Figure 110**

10. First and second antennal segments much longer than remaining segments and forming a distinct two-segmented club (Figure 111) ..... ..... **11**

    Antenna either without a club (Figure 112) or with a club of three or more segments (Figure 113)..... **13**

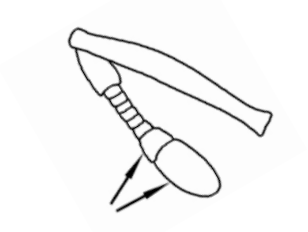

**Figure 111**

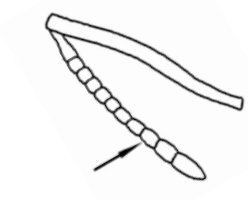

**Figure 112**

**Figure 113**

11. Deep, elongate antennal scrobes present, able to accommodate entire antenna; eyes elongate, with lower sector oblique and narrow (Figure 114)..... ***Mayriella***

    Antennal scrobes absent; eyes small and round (Figure 115) or vestigial..... **12**

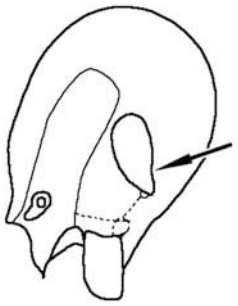

**Figure 114**

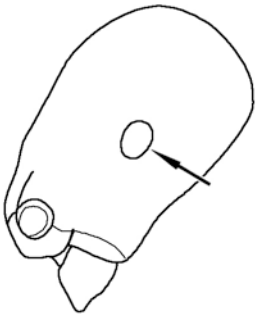

**Figure 115**

12. Rear face of propodeum rounded, never with teeth, spines or flanges (Figure 116a); midpoint of anterior clypeal margin with a single seta, often surrounded by paired setae (Figure 116b); WA species monomorphic or weakly polymorphic..... ***Solenopsis***

    Rear face of propodeum with spines, teeth or flanges (Figure 117a); clypeus with a pair of setae that straddle the midpoint of the anterior clypeal margin (Figure 117b); strongly dimorphic, major workers with a pair of short horns on the vertex of the head capsule in some Eastern states species (major of SWBP species not known) ..... ***Carebara***

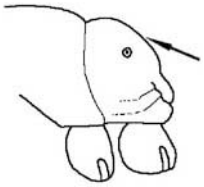

**Figure 116a**

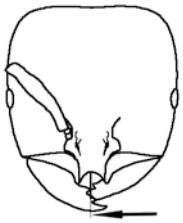

**Figure 116b**

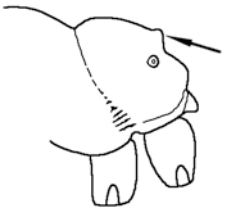

**Figure 117a**

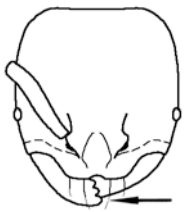

**Figure 117 b**

13. Antennal segments 10..... ***Monomorium*** **(pt.)**

    Antennal segments 11 or 12..... **14**

14. Antennal segments 11..... **15**

    Antennal segments 12. ..... **17**

15. Femora and often tibiae of middle and hind legs greatly swollen; petiole round in cross-section, long and low, usually with a pair of short spines or teeth or acuminate (Figure 118); arboreal ants..... ***Podomyrma***

    Femora and tibiae not or only weakly swollen; petiole short or long with a node, but without processes (e.g. Figure 119); species wholly (e.g. *Adlerzia*) or predominantly (e.g. *Monomorium*) terrestrial..... **16**

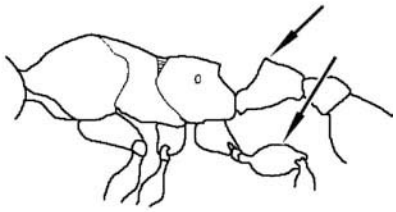

**Figure 118**

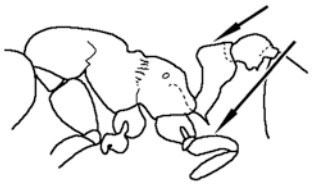

**Figure 119**

16. Central anterior margin of clypeus with a pair of setae surrounded by other setae (Figures 120a and 120b); major and minor workers (i.e. dimorphic worker caste) (Note: Also look for circular striations on the promesonotum.) ..... ..... ***Adlerzia***

    Central anterior margin of clypeus with single seta, which is surrounded by paired setae (Figure 121); single worker caste only (i.e. monomorphic) ..... ***Monomorium*** **(pt.)**

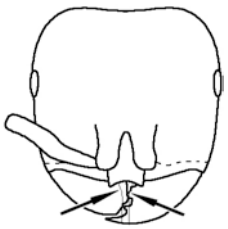

**Figure 120a**

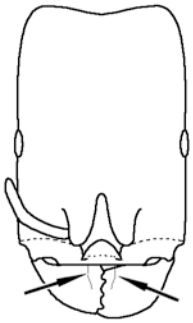

**Figure 120b**

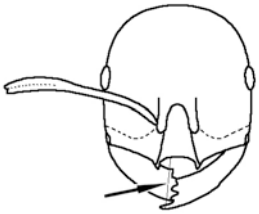

**Figure 121**

17. Central anterior margin of clypeus with single seta, which is surrounded by paired setae ..... **18**

    Central anterior margin of clypeus with pair of setae, or with numerous setae or lacking setae ..... **19**

18. Maxillary palp (outer palp) five segmented; clypeus not bicarinate; postpetiole (seen from above) much more massive than petiole (Figure 122) ..... ***Cardiocondyla***

    Maxillary palp with one or two segments; clypeus often bicarinate with the central clypeal region depressed; viewed from above the postpetiole usually smaller or the same size as the postpetiole (Figure 123) ..... ***Monomorium* (pt.)**

**Figure 122**

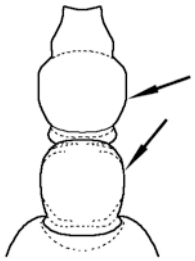

**Figure 123**

19. Antenna with loose, four-segmented club (Figure 124); monomorphic (medium-sized yellow or orange ants that have a distinctive nest formed of a deep, wide tunnel surrounded by a pile of loose dirt)..... ***Aphaenogaster***

    Antennal club three-segmented (Figure 125); *Rogeria* is monomorphic, the other genera are dimorphic (*Pheidole*) or polymorphic (*Anisopheidole*) ..... **20**

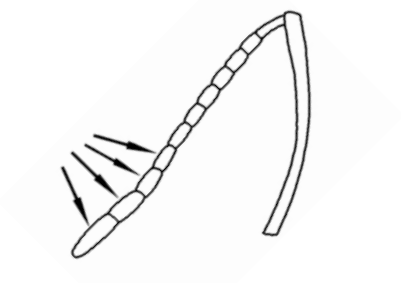

**Figure 124**

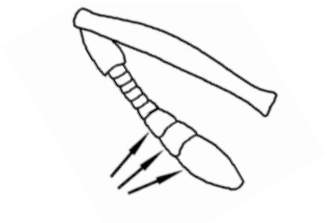

**Figure 125**

20. In lateral view promesonotum steeply sloping down to the propodeum; dimorphic (Figure 126) ..... ***Pheidole***

    In lateral view all segments of mesosoma more-or-less on the same plane, interrupted only by the shallow metanotal groove; monomorphic or polymorphic (Figure 127) ..... **21**

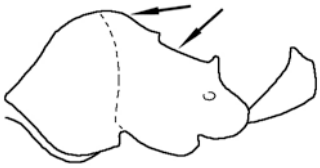

**Figure 126**

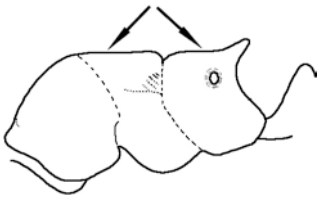

**Figure 127**

21. Eyes minute (four facets wide at widest point) (Figure 128); polymorphic..... ***Anisopheidole***

    Eyes moderate (at least eight facets wide at widest point) (Figure 129); monomorphic ..... ***Rogeria***

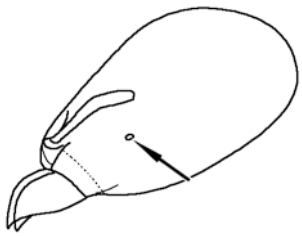

**Figure 128**

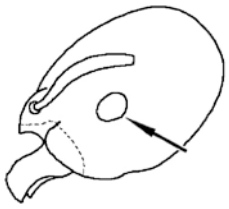

**Figure 129**

## KEY TO THE ANT SPECIES OF THE SOUTH-WEST BOTANICAL PROVINCE

As far as is currently known, the two subfamilies Pseudomyrmecinae and Leptanillinae are represented by only one genus and one species in the SWBP. Sixteen genera in the subfamilies Dolichoderinae, Formicinae, Myrmeciinae, Ponerinae and Myrmicinae are also represented by just one species in the SWBP. In the case of the above, keying out the genus – or subfamily, in the case of the Pseudomyrmecinae and Leptanillinae – will also provide the species name (i.e. if the ant has been described). The taxa believed to be monotypic for the SWBP are as follows:

**Dolichoderinae:**

*Linepithema – Linepithema humile* (Mayr)

*Nebothriomyrmex – Nebothriomyrmex majeri* Dubovikov

*Technomyrmex – Technomyrmex jocosus* Forel

**Formicinae:**

*Myrmecorhynchus – Myrmecorhynchus emeryi* André

*Opisthopsis – Opisthopsis rufithorax* Emery

**Myrmeciinae:**

*Nothomyrmecia – Nothomyrmecia macrops* Clark

**Pseudomyrmecinae:**

*Tetraponera – Tetraponera punctulata* Smith

**Leptanillinae:**

*Leptanilla – Leptanilla swani* Wheeler

**Ponerinae:**

*Anochetus – Anochetus armstrongi* McAreavey

*Myopias – Myopias tasmaniensis* Wheeler

*Odontomachus – Odontomachus ruficeps* Smith

*Ponera – Ponera* sp. JDM 1122

**Myrmicinae:**

*Adlerzia – Adlerzia froggatti* (Forel)

*Anisopheidole – Anisopheidole antipodum* (F. Smith)

*Cardiocondyla – Cardiocondyla 'nuda'* (Mayr) (possibly two closely-related species)

*Carebara – Carebara* sp. JDM 440

*Mayriella – Mayriella occidua* Shattuck

*Orectognathus – Orectognathus clarki* Brown

The species-level key provided below covers the remaining 45 ant genera represented in the SWBP. *Caution:* the species level key is comprehensive only for the species known by the author to exist in the SWBP. It is completely possible, indeed likely, that holdings in institutions other than the Curtin Ant Collection may contain additional species. Continuing collecting efforts may also uncover new, unknown species as well as those known previously only from areas outside of the SWBP. However, the discovery of additional genera is far less likely. *(n.b. Within the key, the specification 'erect setae absent from antennal scape' or 'erect setae absent from femora' excludes those setae that are nearly always present at the extreme distal end of those structures.)*

## A NOTE ON TAXONOMIC DECISIONS MADE IN THIS WORK

I have here made a taxonomic decision on eight species mentioned in this work, i.e. *Doleromyrma rottnestensis* (Wheeler) (formerly *Tapinoma rottnestense* Wheeler), *Iridomyrmex argutus* Shattuck, *Iridomyrmex innocens* Forel, *Iridomyrmex occiduus* Shattuck, *Pachycondyla* (*Trachymesopus*) *clarki* Wheeler, *Pachycondyla* (*Trachymesopus*) *rufonigra* Clark, *Crematogaster frivola* (Forel) and *Crematogaster perthensis* Crawley. In a number of other cases I have suggested likely synonymy, based on a cursory examination or textual indicators, but this needs to be confirmed by a more rigorous analysis, hence should not be taken as definitive. The position of *Rogeria* is also provisional: the two species here placed under that head might still require the erection of a new genus.

## SPECIES KEY AND DISCUSSION OF SPECIES

### SUBFAMILY DOLICHODERINAE

The dolichoderine ants include some of the best-known ants in Australia. Several of the meat ants (which include at least a dozen species) are synonymous with rural Australia. The native odorous ant, *Iridomyrmex chasei* Forel, is ubiquitous on pavements and in backyards in Perth. However, in some other capital cities, other members of the *Iridomyrmex rufoniger* species-group rival it in importance. A nominate subspecies of *I. chasei*, *Iridomyrmex chasei concolor* Forel, swarms in all degraded sites in drier woodlands and pastures. In general, the large number of *Iridomyrmex* species found in temperate Australia, and their dominance where they occur, attest to the success of the genus in colonizing this country (Greenslade 1979). This subfamily also includes notorious pests such as the Argentine Ant, the ghost ant and the white-footed house ant, the first two of which can be found in Perth. Members of this subfamily are the only ants with a slit-like opening on the tip of the gaster, from which they can release a cocktail of chemicals for various purposes, including offence and defence.

***Anonychomyrma***

1. In full-face view, head capsule about as long as wide, vertex shallowly concave (Figure 130); small setae constituting pubescence almost semi-erect; mesonotum not prominent (terrestrial)..... ***A. itinerans perthensis*** **(Forel)**

   In full-face view, if head capsule as long as wide, then vertex deeply concave (Figures 131, 132); small setae constituting pubescence appressed or weakly decumbent; mesonotum often prominent (arboreal) ..... **2**

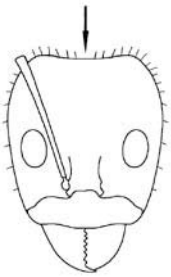

**Figure 130**

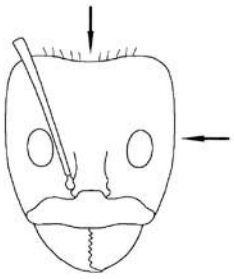

**Figure 131**

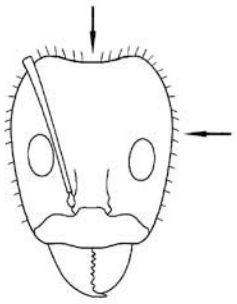

**Figure 132**

2. Erect setae absent from sides of head capsule; vertex deeply concave; head capsule as long as wide (Figure 131); mandibles usually brown or orange, contrasting with darker head..... ..... ***A. nitidiceps*** **(André)**

   Erect setae present on sides of head capsule; vertex shallowly concave; head capsule distinctly longer than wide; mandibles often black or dark brown, concolorous with head (Figure 132)..... ***Anonychomyrma*** **sp. JDM 835**

These ants are readily recognizable, not so much because of their appearance as by the acrid smell they release when disturbed. *Anonychomyrma* species are mainly shiny, black ants that were formerly included in *Iridomyrmex*. Shattuck (1992a,b) removed them from *Iridomyrmex* on the basis of features of their clypeus, deeply concave head and placement of the compound eyes. For the most part they are arboreal foragers for dead or live prey, but will collect plant juices and may be associated with caterpillars (Shattuck 1999). However, one species in the SWBP is a terrestrial nester, and is rarely found on trees.

*Anonychomyrma nitidiceps* (André) is a large-headed arboreal species with a dome-shaped mesonotum, which also forages on the ground near standing trees or fallen wood. If disturbed, this species emits an odour plume that can easily be detected several metres away. *Anonychomyrma nitidiceps* is found in a range of woodland types in the south-west and south of the State. *Anonychomyrma* sp. JDM 835 is another arboreal form that can be distinguished from the above species by slight but consistent characters of pilosity, head shape and, often, colour of the mandibles. This ant has mostly been collected from near Perth. Workers of *Anonychomyrma itinerans perthensis* (Forel) are distinguished from the other two species by their more shallowly concave vertex, erect pubescence and non-prominent mesonotum. The turret nests of *A. itinerans perthensis* are one of the most characteristic sights on sandy soils in the Perth region. The smooth, shiny *A. itinerans*

*perthensis* workers will often be seen moving slowly and deliberately in and out of these nests. This species prefers wetter areas in the south-west of the State.

### *Arnoldius*

*Arnoldius scissor* (Crawley) was described from a queen, and so the taxon is not formally recognized in this key to workers.

1. Eye larger, eye width > greatest width of antennal scape; brown species..... ..... ***Arnoldius* sp. JDM 433**

   Eye smaller, eye width ≤ greatest width of antennal scape; yellowish species ..... .....***Arnoldius* sp. JDM 170**

Their short palps (PF 2,2), small compound eyes and the presence of downwardly curved clypeal setae easily identify these small, cryptic ants. The genus was recently split from the Holarctic and Oriental genus *Bothriomyrmex* by Dubovikov (2004) on the basis of its low PF count and features of the reproductive wing veins. Workers in the SWBP have mostly been found in heavy litter, and in rotten wood. One of the local species is most probably a social parasite of *Iridomyrmex*, and temporary social parasitism is definitely known for overseas species (Santschi 1906; Donisthorpe 1944).

Neither of the two described SWBP species can currently be identified with certainty from material held in the Curtin Ant Collection, but judging from the description in Crawley (1922) the small, yellow *Arnoldius* sp. JDM 170 is most probably identical with *Arnoldius flavus* (Crawley). This ant has been found in Jarrah-Marri woodlands south of Perth to as far north as the Zuytdorp region, north of Kalbarri. *Arnoldius scissor* (Crawley) was described from two queens by Crawley (1922). The peculiar character of the queen mandible (with its reduced dentition and sharp, curved, concave inner edge) strongly supports the notion that the queen is a social parasite. The queens were collected from a colony of *Iridomyrmex innocens* Forel, and Crawley was of the opinion that this species was parasitic on *I. innocens*. The relatively large, brownish *Arnoldius* sp. JDM 433 has a known range in the SW corner of the State, and also SE to Jerramungup, but it may well extend eastward in suitable habitat to at least the Esperance region. What appears to be the same species has also been recorded from Barrow Island, off the Pilbara coast and from the Pilbara region itself.

### *Doleromyrma*

1. Node prominent, rising well above the articulation of the peduncle with the propodeum (Figure 133a); in full-face view head usually not distinctly rectangular, without evenly convex sides above and below midpoint of head (Figure 133b)..... ..... ***Doleromyrma darwiniana fida* (Forel)**

   Node indistinct, *Tapinoma*-like, barely rising above the articulation of the peduncle with the propodeum (Figure 134a); in full-face view, head typically strongly rectangular, the sides of the head evenly convex above and below the midpoint (Figure 134b)..... .....***Doleromyrma rottnestensis* (Wheeler)**

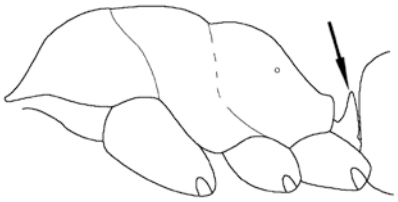

**Figure 133a**

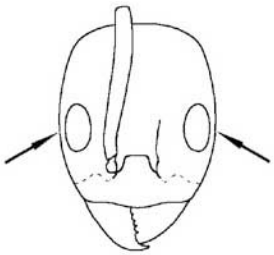

**Figure 133b**

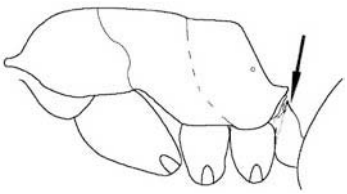

**Figure 134a**

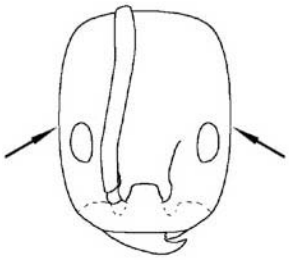

**Figure 134b**

The standard separation of *Doleromyrma* from *Tapinoma* based on the presence or absence of a scale-like node does not work very well for species of both genera in the SWBP. *Doleromyrma* populations from the Darling Range and from near the south coast are larger ants with a small but distinct node. However, *Doleromyrma* populations

from the Swan coastal plain and the edge of the Darling scarp tend to be smaller. These workers often have a node so reduced that it is no more than an oblique fracture in the petiolar peduncle. The clypeus in local *Tapinoma* and *Doleromyrma* includes both straight and downwardly directed setae, and the mandibular angle is only worthwhile as a character if the mandibles are agape. Moreover, the diagnostic curve of the setae in *Doleromyrma* is distinct only in larger specimens. Whereas Shattuck (1999) also states that the number of teeth in *Doleromyrma* is fewer than in *Tapinoma*, in the case of the SWBP fauna, the situation is reversed! In fact, the most common local *Tapinoma* species usually has three distinct teeth, i.e. the apical tooth and two preapical teeth, while the remainder are lacking or reduced to indistinct serrations. On the other hand, *Doleromyrma* have distinct teeth along the masticatory margin of the mandible. Local *Doleromyrma* species can also be recognized by their uniformly brown appearance (local *Tapinoma* are either yellow, or brown with light ochre mesonotum and appendages). The head tends to be broader in *Tapinoma*, and the peduncle of the petiole is longer and has no hint of a node.

In seeking for a reliable character to distinguish *Doleromyrma* from *Tapinoma*, I examined the posterior margin of the clypeus between the frontal carinae. I found that, whereas the posterior margin was a broad, even arc in fifteen *Tapinoma* species examined (as pinned material or as images on http://www.antweb.org/)[1], this margin was a narrower ellipse and more-or-less straight posteromedially in WA species (three) identified as *Doleromyrma*. This character may have universal applicability, and is being investigated by Dr. Steve Shattuck (ANIC).

Based on comparison with syntypes held at the ANIC (*Doleromyrma darwiniana fida* (Forel) and likely syntypes held at the Western Australian Museum (WAM) (*Tapinoma rottnestense* Wheeler), I believe there are at least two species of *Doleromyrma* in the SWBP. *Doleromyrma darwiniana fida* is unproblematic, since it possesses an obvious node plus the other features associated with the genus. However, *Tapinoma rottnestense* is, in my opinion, a *Doleromyrma*, despite the vestigial node. The petiole of this species is short, like that of *D. darwiniana fida*, the mandible is oblique but with just 5 distinct teeth and several tiny denticles, and the clypeal setae are long, reaching almost to the base of the closed mandibles. The habitus, on the other hand, and particularly the appearance of the head capsule, is very similar to that of *Tapinoma*. However, the posterior margin of the clypeus between the frontal carinae is a narrow ellipse that is straight posteromedially, typical of *Doleromyrma* as discussed above. In this work, this species is placed under *Doleromyrma*, despite the difficulties posed by its very *Tapinoma*-like morphology. ***Doleromyrma rottnestensis* (Wheeler) comb. nov.** is therefore recognized here.

These ants are a common, if inconspicuous part, of the fauna in wetter parts of the SWBP, and also occur in Perth suburban gardens. They can be found directly nesting into soil or under stones or logs, or (in the case of metropolitan populations) discarded debris. In NSW, *Doleromyrma* is an occasional pest in houses (Nitikin 1979), but has never come under adverse notice in WA (P. Davis, Agriculture Department of WA, pers. comm.).

***Dolichoderus***

1. Propodeum armed with a pair of sharp spines (*ypsilon* group) ..... **2**

   Propodeum unarmed ..... **5**

2. Femur, tibia and tarsi light red or orange..... **3**

   Femur, tibia and tarsi dark reddish-brown or black ..... **4**

3. Viewed from front, propodeum spines directed upward at angle of greater than 60° to horizontal plane (may be almost vertical) (Figure 135) ..... ***D. angusticornis* Clark**

   Viewed from front, propodeal spines directed upward at angle of 45° or less to horizontal plane (Figure 136)..... ***D. ypsilon* Forel**

**Figure 135**

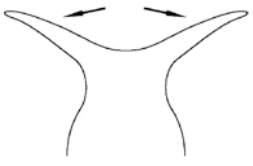

**Figure 136**

[1] The species viewed were *Tapinoma ambiguum* Emery, *T. annandalei* Wheeler, *T. erraticum* Latreille, *T. fragile* F. Smith, *T. litorale* Wheeler (*sensu lato*), *T.* '*mad*04', *T. pallipes* F. Smith, *T. pomone* Donisthorpe, *T. sessile* Say, *T. subtile* Santschi, and *T. williamsi* Wheeler. Examined as pinned specimens were *T. melanocephalum* Fabricius, vouchers of WA species '*Tapinoma* sp. JDM 78' and '*Tapinoma* sp. JDM 918' and a *Tapinoma* sp. indet. from Queensland.

4. Femur, tibia and tarsi black; pubescence on gaster off-white..... ***D. ypsilon nigra*** **Crawley**

   Femur, tibia and tarsi dark reddish-brown; pubescence on gaster yellow..... .....***D. ypsilon rufotibialis*** **Clark**

5. Declivitous face of propodeum straight (Figure 137); head smooth and shining..... .....***D. glauerti*** **Wheeler**

   Declivitous face of propodeum weakly to strongly concave (Figure 138); head with distinct sculpture..... **6**

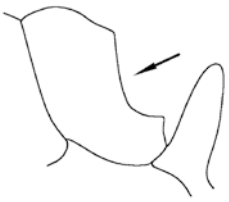

**Figure 137**

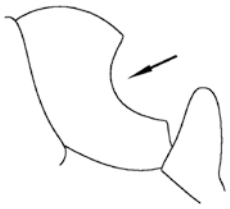

**Figure 138**

6. Pronotal sculpture weakly rugose-punctate, or sculpture largely lacking (Figure 139) ..... **7**

   Pronotal sculpture distinctly foveate-reticulate (Figure 140) ..... **9**

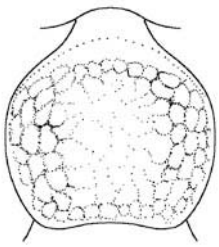

**Figure 139**

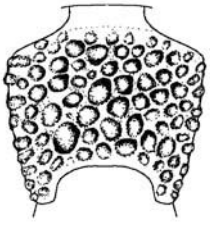

**Figure 140**

7. Standing setae on head, antennal scapes, mesosoma and gaster sparse and short (≤ greatest width of antennal scape), sparse or absent on tibiae; usually pale, depigmented..... ***Dolichoderus*** **sp. JDM 1106**

   Standing setae on head, antennal scapes, mesosoma and gaster abundant and longer (longest setae >> greatest width of antennal scape), present on tibiae; body bicoloured (mesosoma orange to yellowish-brown, gaster and often head brown); ..... **8**

8. Dorsum of propodeum strongly convex, carina separating dorsal and declivitous faces of propodeum not produced as a sharp shelf (Figure 141); without pale markings near lower margin of eyes; sculpture of pronotum almost lacking, pronotum shining..... ..... ***D. clusor*** **Forel**

   Dorsum of propodeum weakly convex, carina separating dorsal and declivitous faces of propodeum produced as sharp shelf (Figure 142); pale markings present near lower margin of eye; sculpture of pronotum weakly rugose-punctate..... ..... ***Dolichoderus*** **sp. JDM 513**

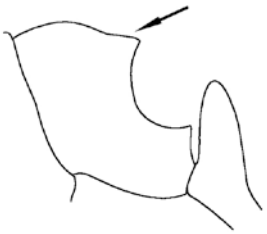

**Figure 141**

**Figure 142**

9. Propodeal dorsum not evenly convex, declivitous face very deeply concave, concavity almost semi-circular (Figure 143).... ***D. reflexus*** **Clark**

   Propodeal dorsum evenly convex, declivitous face less deeply concave, concavity much less than a semi-circle in extent (Figure 144)... ..... **10**

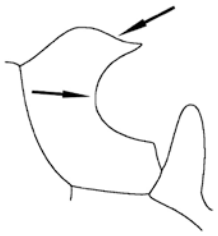

**Figure 143**

**Figure 144**

10. Antenna much darker than head..... ..... ***D. nigricornis*** **Clark**

Antenna the same colour, or slightly lighter in colour than head ..... **11**

11. Mesosoma light to medium reddish-brown; head, gaster, nodes and appendages varying from brown to reddish-orange ..... .....***D. formosus*** **Clark**

Body and appendages blackish..... ..... ***D. occidentalis*** **Clark**

*Dolichoderus* species are recognized by the presence of a flange on the underside of the head, near the base of the mandible. Members of this genus are most attractive ants: in the subgenus *Diceratoclinea*, which is armed with long propodeal spines, the appearance of the head capsule with its foveate hair-pits, when viewed under a dissecting microscope, is reminiscent of a shiny, black golf-ball. In subgenus *Hypoclinea* the propodeum is concave, a feature otherwise seen among Australian Dolichoderinae only in *Ochetellus*. Two other Australian subgenera do not occur in the SWBP. Most species of *Dolichoderus* also have a highly sculptured and well sclerotized exoskeleton, a rarity among dolichoderine ants. Workers of SWBP species are often seen in woodland, where they can be found foraging on tree-trunks, on vegetation, or on the ground. They also tend Hemiptera (Shattuck 1999).

*Dolichoderus* is diverse in the SWBP, and the Province boasts 10 described species (along with two undescribed taxa) compared with a described Australian fauna of 22 species. They are particularly abundant in Banksia woodlands north and south of Perth. Of the *Dolichoderus ypsilon* radiation, the red-legged, black *D. ypsilon* Forel, itself, is the best-known form in the Perth region. In workers of this species, the propodeal spines form a wide 'V' when seen from behind. In the closely related *Dolichoderus angusticornis* Clark, the propodeal spines are more-or-less parallel when seen from behind. This ant is found in drier areas in the eastern and southern wheatbelt. *Dolichoderus ypsilon rufotibialis* Clark, from the south coast, has reddish-brown rather than red legs. The large and handsome *Dolichoderus ypsilon nigra* is all black, unlike the preceding species. Also unlike them, this species has whitish instead of yellowish pubescence on the gaster. This is another species whose main distribution covers the wetter areas of the south-west corner of the State. *Dolichoderus ypsilon nigra* is also found in relictual native woodland in the Perth metropolitan area.

Ants in the subgenus *Hypoclinea* are less numerous than those in *Diceratoclinea*. Several of the described taxa (i.e. *Dolichoderus clusor* Forel, *Dolichoderus formosus* Clark and *Dolichoderus occidentalis* Clark) can be separated only by examining relatively minor differences in sculpture or colour, and may actually be conspecific. *Dolichoderus clusor* Forel is perhaps the commonest of these, and is found mainly in Banksia woodland in the Perth area, but has also been recorded in the western goldfields at Westonia. *Dolichoderus* sp. JDM 513 is a similar species, but with a pronounced propodeal shelf. This ant has a wide range throughout the SWBP. *Dolichoderus nigricornis* Clark is a dark orange-and-black species found in the eastern wheatbelt. The pale *Dolichoderus* sp. JDM 1106 differs from all of the preceding forms in being relatively much less hirsute, standing setae being absent from the tibiae in most workers seen, apart from a few bristly setae near the apex. However, more specimens of this ant, which is known in the SWBP from a small number of workers from Eneabba, are needed. The sombre-coloured *Dolichoderus occidentalis*, Clark, found on and near the south coast, differs mainly in colour from *Dolichoderus formosus* Clark, the typical form of which has a dark brown or blackish head and gaster and a reddish-brown mesosoma. The distinction between these two species may be dubious, as *D. formosus* appears to be colour variable: while the typical form of *D. formosus* has been collected around Perth, elsewhere, especially in drier areas, a *Dolichoderus* occurs that is usually either a concolorous bright orange or brownish-red with a light orange to dark orange-red gaster. Apart from the colour, this ant is identical with *D. formosus* and is here accepted as no more than a variation of the latter species.

*Dolichoderus reflexus* Clark, known to the Curtin Ant Collection from two records from Eneabba, has an exaggerated propodeal concavity. The ant was described from specimens taken at several localities on the Fleurieu Peninsula, SA. In *Dolichoderus glauerti* Wheeler, the propodeum lacks a distinct

concavity and is dorsally rounded. This ant has a sparse distribution through the south-west and into the eastern goldfields.

***Froggattella***

1. Viewed dorsally, propodeal spines thick, laterally convex, not distally digitate (Figure 145); in full-face view, head capsule noticeably longitudinally striate between and around frontal carinae, smooth and shining posteriad .....***F. latispina* Wheeler**

   Viewed dorsally, propodeal spines tending to straight distally, digitate in appearance (Figure 146); in full-face view, head capsule uniformly weakly shining, with superficial micoreticulation evident in some lights ..... .....***F. kirbii* (Lowne)**

**Figure 145**

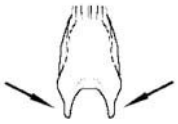

**Figure 146**

The horizontally directed propodeal spines separate this genus from other dolichoderines. The common species found in the SWBP, *Froggattella kirbii* (Lowne), avoids the wetter south-west corner, but is not uncommon in the wheatbelt and in mallee country in the south-east of the SWBP. Workers can be seen trailing on low mallees or on the ground, and evade capture by hiding under bark. This ant has a wide distribution throughout open woodland areas in Australia (Shattuck 1999). A second species has recently been collected in a student project near Lake Warden, close to the Esperance townsite. The two workers taken are very small, reddish-brown, and about half the size of a typical *F. kirbii* worker. Apart from their small size, however, the workers have all the diagnostic characters of *Froggattella latispina* Wheeler, and are tentatively placed in that taxon (type material overseas has not yet been sighted).

***Iridomyrmex***

Keys to the *I. calvus* species-group have been adapted from Shattuck 1993(b), the *I. conifer* species-group from Shattuck and McMillan 1998, and the *I. purpureus* species-group from Shattuck 1993(a).

1. Propodeum large, conical (*I. conifer* species-group) (Figure 147)..... **2**

   Propodeum smaller, not conical (Figure 148)..... **4**

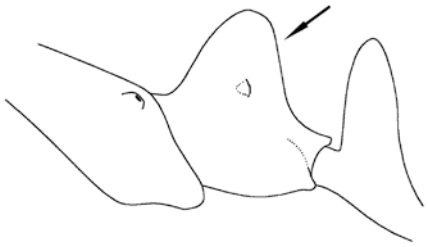

**Figure 147**

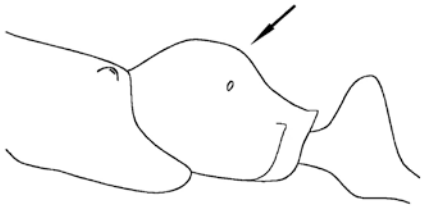

**Figure 148**

2. Erect or suberect setae on pronotum usually lacking, but where present never more than 6. ..... ***I. conifer* Forel**

   More than 8 erect or suberect setae present on pronotum ..... **3**

3. In full-face view, lateral margin of head generally lacking erect setae, but where present posterior setae larger than greatest diameter of scape, and distinctly curved..... .....***I. turbineus* Shattuck and McMillan**

   In full-face view, lateral margin of head always with numerous short, erect setae, these setae always less than maximum scape diameter, and straight or slightly curved ..... ..... ***I. setoconus* Shattuck and McMillan**

4. Large ants (HW > 1.5 mm); erect setae on all surfaces of tibiae and often of scapes; mesonotum with angle or arch between convex anterior sector and flat posterior sector (Figure 149); purple, green or blue iridescence present in SW species ("meat ants" in *I. purpureus* species-group)..... **5**

   Differing in one or more of the above characters (e.g. Figure 150)..... **8**

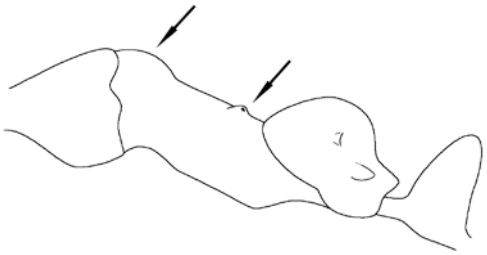

**Figure 149**

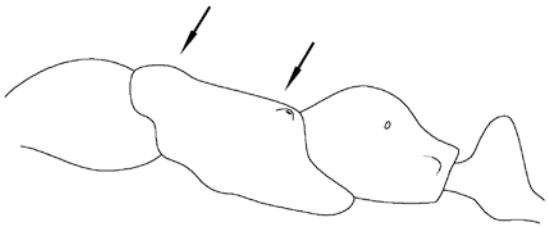

**Figure 150**

5. Lateral and/or dorsal regions of head with weak green iridescence (and often purple iridescence) ..... ***I. viridiaeneus* Viehmeyer**

Lateral and/or dorsal regions of head with purple or blue, but never green iridescence..... **6**

6. In profile, posterior region of pronotum (immediately anterior of the promesonotal suture) rising above the mesonotum in a short, strongly convex arch (Figure 151); sides of head with only very weak purplish iridescence or with no iridescence ..... ..... ***I. reburrus* Shattuck**

In profile, posterior region of pronotum (immediately anterior of the promesonotal suture) rising above the mesonotum in a broad, uniform, weakly convex arch (Figure 152); sides of head usually with well-developed iridescence (commonly purple or blue)..... **7**

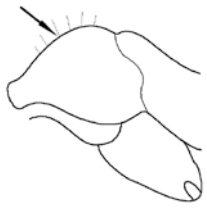

**Figure 151**

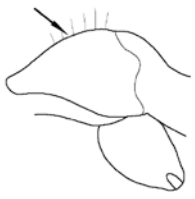

**Figure 152**

7. Head and mesosoma dark reddish-brown to black; head often with strong blue iridescence. ..... ***I. lividus* Shattuck**

Head and mesosoma reddish-brown; head with purple iridescence..... ***I. greensladei* Shattuck**

8. Frontal carinae of head capsule curved throughout their length (*I. calvus* species-group) (Figure 153)..... **9**

Frontal carinae of head capsule sinuate or approximately straight medially (Figure 154) . ..... **13**

**Figure 153**

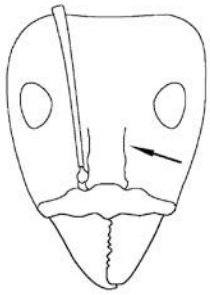

**Figure 154**

9. Propodeum flattened, with propodeal spiracles situated dorsally near propodeal angles; petiolar node very low and broad; body black, with blue iridescence (Figure 155)..... .....***I. calvus group* sp. JDM 1069**

Propodeum more rounded, propodeal spiracle situated laterally; petiolar node more developed, narrow (e.g. Figure 156) ..... **10**

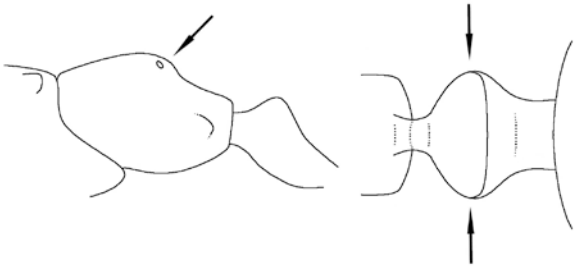

**Figure 155**

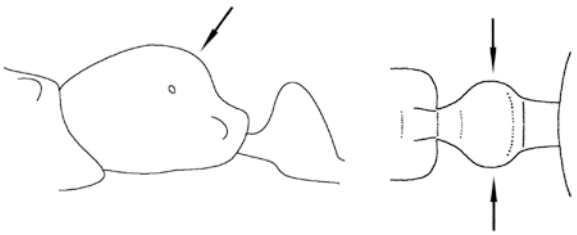

**Figure 156**

10. Tibiae devoid of erect setae ..... **11**

    Tibiae with regularly placed erect setae ..... **12**

11. Mesosoma with numerous short to medium-length (longest setae ≈ width of eye) erect setae ..... ***I. hesperus* Shattuck**

    Mesosoma often lacking erect setae, if present then confined to one or two pairs on pronotum and/or mesonotum, short (width of eye <) ..... ***I. notialis* Shattuck**

12. Erect setae absent from antennal scape; head and mesosoma finely sculptured, the sculpture obscured by appressed pubescence ..... ..... ***I. prismatis* Shattuck**

    Erect setae present on antennal scape; head and mesosoma shining and generally smooth, with only superficial microreticulation evident in some lights, the cuticle not obscured by appressed pubescence ..... ..... ***I. innocens* Shattuck** (including former *I. occiduus* and *I. argutus*).

13. Viewed from front, head capsule very long, up to twice as long as wide, its widest point well above its midpoint (Figure 157); vertex of head capsule often weakly to strongly convex; appendages long, femur and tibia about length of mesosoma (*I. agilis* species-group).... ..... **14**

    Viewed from front, head capsule ≤1.5 times as long as wide, its widest point at about its midpoint (Figure 158); vertex of head capsule straight or concave; appendages shorter, < length of mesosoma..... **16**

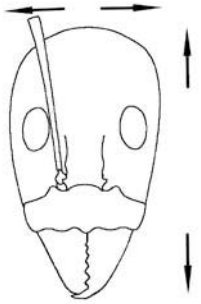

**Figure 157**

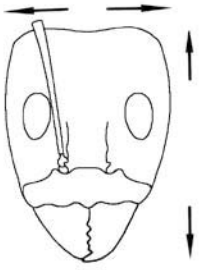

**Figure 158**

14. Larger species (HW > 1 mm); red-and-black ..... ..... ***I. agilis* Forel**

    Smaller species (HW < 1 mm); concolorous black or dark brown..... **15**

15. Pronotum weakly tapered anteriad, attached to head capsule well below level of vertex (Figure 159)..... ***I. bicknelli* Emery**

    Pronotum strongly tapered anteriad, attached to head capsule close to level of vertex (Figure 160) ..... ***I. agilis* group sp. JDM 85**

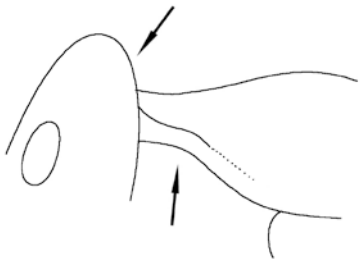

**Figure 159**

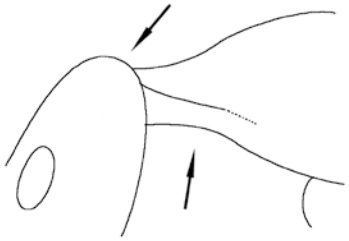

**Figure 160**

16. Eye very large (eye length ≈ 1/3 of HL), strongly asymmetrical, with outer eye margin almost straight, inner margin convex (posterior lobe of eye also distinctly more narrowly convex than anterior lobe in many larger specimens); colour variable, ranging from depigmented yellow through light brown (most commonly) to black (*I. hartmeyeri* species-group) (Figure 161)..... **17**

Eye smaller (eye length < 1/3 of HL), or eyes ovate or weakly asymmetrical; colour rarely pale (often brown or reddish hues, alone or in combination) (Figure 162) ..... **19**

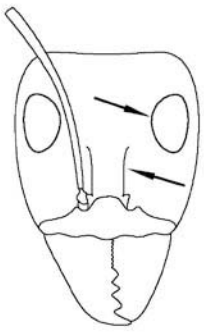

**Figure 161**

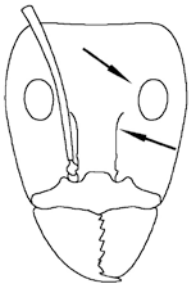

**Figure 162**

17. Dorsum of mesosoma without erect and suberect setae ..... ***I. hartmeyeri*** **Forel**

    Dorsum of mesosoma with erect and suberect setae ..... **18**

18. Viewed from front, sides of head capsule with a few to many short, erect setae; antennal scape often with short, erect setae along its length (Figure 163) ..... .....***I. hartmeyeri*** **group sp. JDM 849**

    Viewed from front, sides of head capsule without short, erect setae; antennal scape without erect setae except at extreme tip..... ***I. dromus*** **Clark (Figure 164)/*I. exsanguis*** **Forel (Figure 165)**

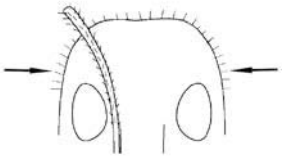

**Figure 163**

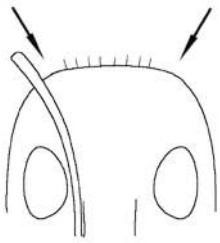

**Figure 164**

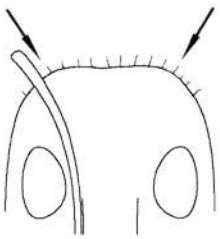

**Figure 165**

19. Antennal scape with erect setae along its length ..... **20**

    Antennal scape with erect setae confined to the extreme tip ..... **23**

20. In full-face view, head shape (excluding the mandibles) variably trapezoidal, the posterior (occipital) angles moderately to much wider apart than the anterior angles (i.e. where mandibles are articulated); size generally larger, HW ≥ 1.5 mm (Figure 166)..... .....***I. discors*** **Forel**

    In full-face view, head shape (excluding the mandibles) rectangular, sides of head capsule convex to almost straight, posterior angles approximately as wide apart as anterior angles (Figure 167); size generally smaller, HW ≤ 1.5 mm..... **21**

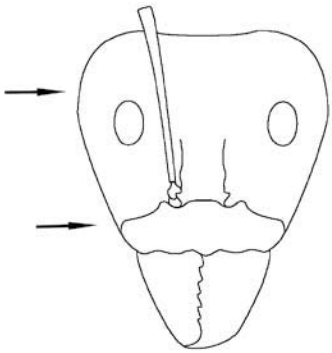

**Figure 166**

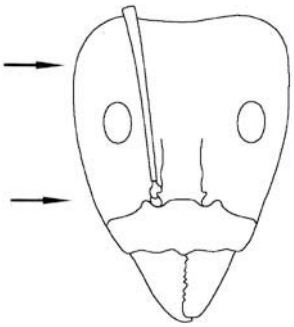

**Figure 167**

21. In profile, mesosoma strongly biconvex, the pronotum rounded and strongly declivitous towards head; propodeum truncate and raised above plane of mesonotum, its dorsal face about as long as its declivitous face (Figure 168) ..... ***I. chasei*** **Forel (pt.)**

    In profile, mesosoma undulant, with pronotum gently convex; propodeum rather long, and on same plane as mesonotum; its dorsal face distinctly longer than its declivitous face (Figure 169)..... **22**

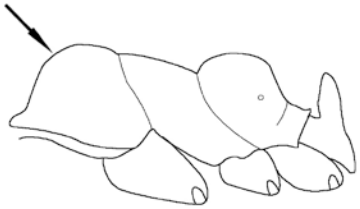

**Figure 168**

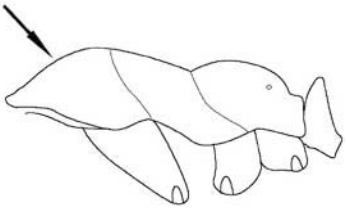

**Figure 169**

22. Erect setae sparse, mostly confined to outer surface of scape (Figure 170) ..... .....***Iridomyrmex* sp. JDM 846**

    Erect setae abundant, and found on all surfaces of scape for most of its length (Figure 171)..... .....***I. gracilis spurcus* Wheeler**

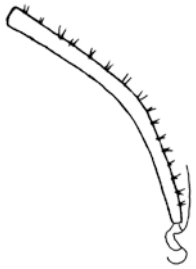

**Figure 170**

**Figure 171**

23. Propodeum longer than high, without a noticeable propodeal angle (generally rather large, gracile ants (Figure 172). (n.b. *Iridomyrmex anceps* (Roger) will also key out here, but is smaller than the two species in couplet 23, i.e. HW 0.8 mm < compared with HW 0.9 mm >)..... **24**

    Propodeum about as long as high with a noticeably protuberant, though blunt propodeal angle (non-gracile ants) (*I. rufoniger* species-group) (e.g. Figure 173)..... **25**

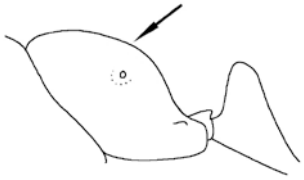

**Figure 172**

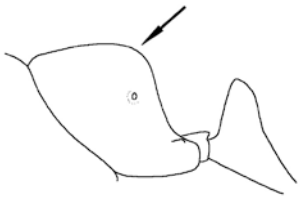

**Figure 173**

24. Head and mesosoma brick-red or reddish orange .....***Iridomyrmex* sp. JDM 133**

    Head brown, mesosoma orange-brown..... .....***I. bicknelli brunneus* Forel**

25. In full-face view, vertex of head weakly to strongly concave; in profile, pronotum strongly rounded, arising abruptly anteriad; > 8 erect setae on its dorsum; propodeum rising above level of metanotum, its dorsum either protuberant or flattened, if the latter then often with a minute indentation..... **26**

    Without the full suite of the above characters (though one or more of these features may be present) (several species in the *mattiroloi* complex) ..... **28**

26. Large, broad-headed species (HW ≥ 0.8 mm, often > 1 mm); gaster with distinct greenish or greenish-blue iridescence..... ..... ***I. rufoniger domesticus* Forel**

    Smaller species (HW ≤ 0.5 mm); gaster with, at most, weak, coppery iridescence (ants in the *I. chasei* complex) ..... **27**

27. Brown species, usually concolorous (mesopleuron may have lighter areas); erect setae on pronotum 12 <; propodeum flattened, often slightly indented medially (Figure 174).. .....***I. chasei concolor* Forel**

    Orange-and-brown species, darker specimens always with some orange areas on mesosoma; erect setae on mesosoma 15 ≥; propodeum usually rounded, occasionally indented medially (Figure 175)..... ***I. chase*i Forel (pt.)/ *I. chasei yalgooensis* Forel**

**Figure 174**

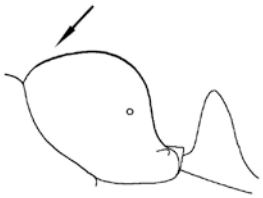

**Figure 175**

28. Worker without erect setae on mesosoma ..... **29**

    Worker with at least a few minute erect setae on mesosoma ..... **30**

29. Eye larger (length 0.25 > × length head capsule); shades of medium to dark brown; drier north and north-east of SWBP ..... ***Iridomyrmex* sp. near *rufoniger suchieri* Forel**

    Eye smaller (length 0.25 < × length head capsule); dark brown to black with bluish-green iridescence; south coast..... .....***I mattiroloi* complex sp. JDM 845**

30. In full-face view, sides of head capsule with 6 > erect setae (Figure 176) ..... ..... ***I. rufoniger suchieri* Forel (population 2)**

    In full-face view, sides of head capsule with 3 ≤ erect setae, setae usually lacking (Figure 177). ..... **31**

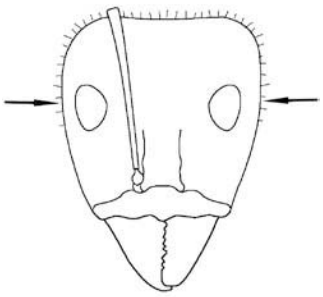

**Figure 176**

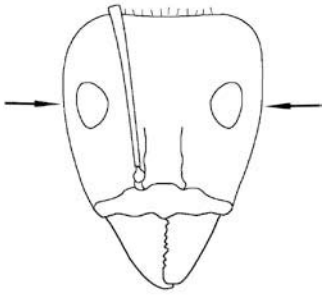

**Figure 177**

31. In profile, anterior pronotum rising more-or-less steeply towards its junction with mesonotum (Figure 178a); in dorsal view, sides of pronotum forming a symmetrical curve (Figure 178b); ant black or greyish-brown (brownish in northern sandplains) with blue to greenish-yellow iridescence; propodeum smoothly rounded (Figure 179); eye smaller (length 0.25 < × length head capsule) ..... .....***I. mattiroloi splendens* Forel**

    In profile, anterior pronotum forming a gradual, even curve towards its junction with mesonotum (Figure 180); in dorsal view, sides of pronotum forming an asymmetrical curve (Figure 181); ant usually a coppery brown, rarely with patches of blue to greenish-yellow iridescence on body; propodeum often not smoothly rounded in profile, its dorsum slightly to moderately flattened posteriad (Figure 182a) or protuberant (Figure 183a); eye larger (length 0.25 > × length head capsule).... ..... **32**

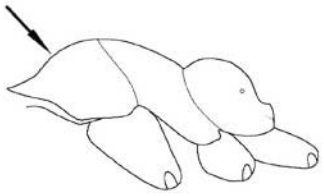

**Figure 178a**

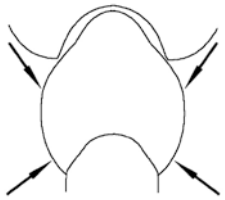

**Figure 178b**

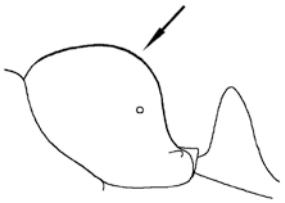

**Figure 179**

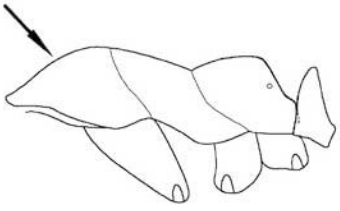

**Figure 180**

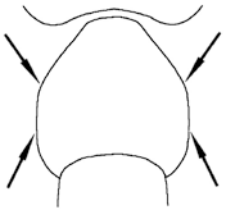

**Figure 181**

32. Dorsum of propodeum sloping, slightly flattened posteriad, propodeal angle indistinct (Figure 182a); scape longer, exceeding vertex of head capsule by more than 0.25 × its length (Figure 182b) .....***I. mattiroloi continentis*** **Forel**

Dorsum of propodeum flat or weakly convex, nearly always connecting with the declivitous face through a distinct, though blunt, angle (Figure 183a); scape shorter, exceeding vertex of head capsule by much less than 0.25 × its length (Figure 183b) ..... ..... ***I. rufoniger suchieri*** **Forel (population 1)**

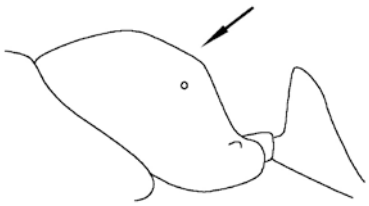

**Figure 182a**

**Figure 182b**

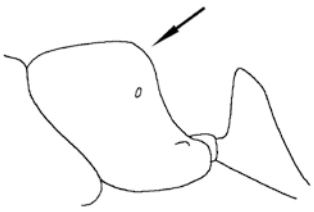

**Figure 183a**

**Figure 183b**

*Iridomyrmex* can be recognized by the head shape and high placement of the compound eyes on the head capsule. Most members of the genus also have a central clypeal projection, but this feature can be very minute and difficult to see in many species. In the SWBP, *Iridomyrmex* is a very large group (32 species), and includes perhaps the best-known ants in this part of Australia, with the possible exception of the bulldog-ants. The genus is very important ecologically, and a summary of the more pertinent aspects of their biology and ecological relationships is given in Shattuck (1999). Many of the species that form large nests are very aggressive, and impact on other ant species around them. Conspecific ants from separate nests are not exempt from that aggression, and it is not uncommon to see a luckless *Iridomyrmex* worker being stretched by others of its own kind. *Iridomyrmex*, however, fare less well against similarly aggressive exotic tramp species such as the Argentine ant and the big-headed ant, and will gradually retreat from areas that are occupied by such taxa. This has happened in large parts of the Perth metropolitan area, where aggressive tramp species now dominate (Heterick *et al.* 2000). However, where tramp ants are controlled (e.g. the big-headed ant through the use of AMDRO ®) members of the *I. rufoniger* species-group are among the first native ants to recolonize treated areas. *Iridomyrmex* species are generalist carnivores and scavengers, and also feed on nectar and the exudates of Hemiptera and lepidopteran caterpillars.

In built-up or highly disturbed areas, members of the *I. rufoniger* species-group dominate. These are mainly small reddish or brown-and-black ants, but also include dark species in what I here call the *I. mattiroloi* complex. The native odorous ant, *Iridomyrmex chasei* Forel, is certainly conspecific with *Iridomyrmex chasei yalgooensis* Forel, and possibly also with taxa described from the eastern states. This species and its relatives also form an easily recognizable unit (here, the *Iridomyrmex chasei* complex) within the *I. rufoniger* species-group. These ants are readily distinguished by their protuberant pronotum and propodeum, and the concave vertex of their head capsule. *Iridomyrmex chasei* is an invariable part of the insect fauna of cities and suburbs in the SWBP, where it forms huge colonies, often on sandy soils. When colonies are at their

peak in the spring and summer months, the amount of sand displaced by their burrowing activities is enormous. *Iridomyrmex chasei* is also common in heathland and other sandy areas. However, it is much less common in timbered and modified rural habitats in the SWBP, where it is largely replaced by a dull brown relative, *Iridomyrmex chasei concolor* Forel. The latter swarms in huge numbers in areas transformed or denuded of their natural cover by human activity. *Iridomyrmex rufoniger domesticus* Forel is a thickset, broad-headed, semi-arid to arid area species (at least, in the SWBP) with a strongly convex pronotum suggestive of *I. chasei*. However, unlike the latter, its gaster possesses bluish-purple iridescence. *Iridomyrmex rufoniger domesticus* is an opportunist, and builds populous colonies in disturbed areas such as mine sites. This ant was described from material collected from near Sydney, NSW, and probably also occurs in other southern Australian states.

The most common member of the I. *mattiroloi* complex, *Iridomyrmex rufoniger suchieri* Forel, is found in much the same habitats as *I. chasei*, and *I. chasei concolor*, but differs from them in the less convex shape of its pronotum and its more compact propodeum. The taxon has several populations in the SWBP that, on closer inspection, may prove to be different species. One of these is a very hairy form with timid behavioural traits that is not uncommon in the Perth area. In the north, on the other hand, is a population that completely lacks erect setae on the mesosoma (*Iridomyrmex* sp. JDM 314). Another form is uniformly dark, with a more rounded propodeum. The latter resembles *Iridomyrmex mattiroloi splendens* Forel, but can be separated through the appearance of the pronotum and its larger eye (see key). Although they are only listed as occurring in the south-west of WA by Taylor and Brown (1985), my perusal of material held in collections, and my personal observations suggest to me that *I. chasei*, *I. chasei concolor* and *I. rufoniger suchieri* occur throughout much of Australia. I suspect a few populations of a very similar species, *Iridomyrmex anceps* (Roger), may also occur in the south-west, and have possibly been confused with *I. rufoniger suchieri* in the past. This species is virtually identical to the latter, but can be distinguished by the slightly longer and less truncate propodeum, the propodeum, in fact, being identical with that of *Iridomyrmex bicknelli bruneus* Forel. *Iridomyrmex anceps* is very common in the more northerly regions of the State.

The *Iridomyrmex mattiroloi* complex in the SWBP comprises at least three other dark brown or black species. *Iridomyrmex mattiroloi splendens* Forel occurs frequently in wetter parts of the south-west, commonly in association with fallen logs and timber debris, but has also been collected in the eastern Pilbara. Nests can be found under logs or stones, as well as in uncovered soil. In the field, this species superficially resembles the more gracile *Iridomyrmex bicknelli* Emery, of the *agilis* species-group, and most populations also possess the same bluish- or greenish-yellow iridescence. This species may well be conspecific with *Iridomyrmex vicinus* Clark from eastern Australia. Populations found in the wheatbelt east of Perth tend to have very small, compact workers with a conspicuously protuberant propodeum. These lack the iridescence found in western populations, but I believe, on the balance of probabilities, that they belong to the same species, which is quite size variable. *Iridomyrmex mattiroloi splendens* closely resembles the dark form of *I. rufoniger suchieri*, but can be distinguished through the features mentioned in the key. *Iridomyrmex mattiroloi* complex sp. JDM 845, which lacks erect setae on the mesosoma, is its counterpart on and near the south coast. In drier areas of the State, *Iridomyrmex mattiroloi continentis* Forel is ubiquitous in most habitats. This species differs from *I. mattiroloi splendens* by virtue of its less convex pronotum, rather flattened propodeum, larger eye and longer antennal scape (the scape in *I. mattiroloi splendens* is short, like that of *I. rufoniger suchieri*).

*Iridomyrmex discors* Forel is a medium-sized red-and-black ant, common on sandy wastes where it appears to be an early pioneer species. At an Eneabba sand-mining lease in 1997, *I. discors* occurred in huge numbers on the most recently rehabilitated sites, but was generally absent in older rehabilitated or undisturbed sites (pers. obs.). In Perth streets, piles of yellow or white sandy soil displaced by this species are a frequent sight on footpaths and verges. *Iridomyrmex discors* occurs throughout Australia, except for the far north and north-west. Elsewhere, the species occupies drier habitats, where it is a generalist predator/scavenger (Shattuck 1996). Details of its morphology and biology suggest that *I. discors* is a close relative of the meat ants[2], four species of which occur in the SWBP. The latter differ chiefly in the nature of the iridescence found on the head and mesosoma (see key). Descriptions of the taxonomy and biology of the group are given in Shattuck (Shattuck 1993a). *Iridomyrmex greensladei* Shattuck is the commonest of the four local species, and is well known to the West Australian public. The large nests of this ant, often covered with small pebbles, may be several metres in diameter, and can be seen anywhere in southern parts of the State outside of the more built up areas. If the mounds are disturbed, angry workers will instantly pour out of the many entrance holes to attack the intruder. *Iridomyrmex viridiaeneus* Viehmeyer has the widest distribution

[2] Andersen (2000) considers that *I. discors* most probably belongs to the *I. purpureus* species-group, but Shattuck (1993a, 1996) keeps the two groups separate.

of all the meat ant species (Shattuck 1993a), and occurs in all of the Australian states. In WA it is absent from the moister south-west and south of the State, and in the SWBP has been found primarily in the eastern wheatbelt and surrounding pastoral country. This is another species that builds large mounds. *Iridomyrmex lividus* Shattuck, by way of contrast, has nests with a single entrance. Specimens collected by the author east of Caiguna, at the edge of the Nullarbor Plain, were a handsome blue-black. This species has been found only in the extreme south-east of the SWBP. A fourth species, *Iridomyrmex reburrus* Shattuck, has been collected (ANIC) from the southeast (Emu Rock and Gora Hill), although its main distribution – and the provenance of the all Curtin specimens – is the north of the state. This species is very similar to I *greensladei*, which also often has short, stiff, erect setae on the sides of the head capsule, but, when seen in profile, can be differentiated from that species by virtue of the shape of the pronotum. *Iridomyrmex bigi* Shattuck, has been collected at Meekatharra in the northern goldfields, and may occur in the far north-east of the SWBP.

Another distinctive species-group is the *I. hartmeyeri* group. The very large, asymmetric eye most readily characterises its members. The taxonomic limits of this group in the SWBP are uncertain, as the taxonomy is difficult. However, *Iridomyrmex hartmeyeri* Forel, itself, is easily recognized as its mesosoma lacks erect or sub-erect setae. This species is found mainly in drier areas of the State, but has also been collected in the North Kimberley. *Iridomyrmex hartmeyeri* group sp. JDM 849 can be identified by the short, erect setae on the sides of the head capsule, and, often, on the antennal scape. This taxon is found in drier areas of the SWBP. I have been unable to satisfactorily separate *Iridomyrmex dromus* Clark and *Iridomyrmex exsanguis* Forel in a key using morphological characters, although each is likely to represent a good species. In general, the short, erect setae on the vertex of the head extend to the corners of the head capsule in *I. exsanguis*, whereas they are confined to the concavity of the vertex in *I. dromus*, but there is a small degree of overlap. *Iridomyrmex exsanguis* workers also tend to be larger than those of *I. dromus*. *Iridomyrmex exsanguis* specimens have been collected on the west coast between Carnarvon and Mandurah, while *I. dromus* was described from SA, and is common throughout WA. The latter exhibits a wide variation in colour: some populations are a depigmented yellow, while a worker collected from Coorow, in the northern wheatbelt, is black! Most workers range from tawny yellow to brown. Both *I. dromus* and *I. exsanguis* are nocturnal foragers.

The *I. calvus* species-group, identified by the uniformly curved frontal carinae (Shattuck 1993b), has five representatives in the SWBP, several of them apparently quite rare. *Iridomyrmex notialis* Shattuck is the most commonly encountered, and its range extends across southern Australia. In the SWBP the ant has been represented in terrestrial collections taken in suburban Perth and several south-western localities. *Iridomyrmex argutus* Shattuck, *Iridomyrmex innocens* Forel and *Iridomyrmex occiduus* Shattuck appear to be the same ant! A queen syntype of *I. innocens*, held at the WAM, clearly belongs to the *I. calvus* species-group, and its non gender-specific features are identical to those of workers identified by Shattuck as *I. occiduus*. Moreover, I here argue that *I. argutus*, described by Shattuck from two specimens, is also *I. innocens*. A worker with the same collection data as the holotype and paratype specimens of *I. argutus*, but with setae on the venter of the head capsule, is housed in the Curtin Ant Collection. A second worker with the same data does not appear to have this feature, (though the setae may be plastered to the head capsule by the alcohol in which the ant had been immersed prior to mounting). This means that a critical distinguishing feature between the two taxa is at least variable, leaving only intensity of head colour (a very feeble character) separating them! In fact, the number of setae under the head in *I. occiduus* varies from two or three to over a dozen in specimens I have inspected. I consider that the three names are synonyms for the same species, the synonym *innocens* having priority. ***Iridomyrmex innocens*** **Forel** is here regarded as the senior synonym of *Iridomyrmex argutus* Shattuck **syn. nov.** and *Iridomyrmex occiduus* Shattuck **syn. nov.** This ant is reasonably common in the Darling Range, and is also found on the south and south-east coasts. The rare *Iridomyrmex hesperus* Shattuck is known from a few specimens taken from near the south coast and from one specimen collected from Queen Victoria Spring Nature Reserve, and *Iridomyrmex prismatis* Shattuck, described on the basis of a few specimens from NSW and Victoria, has recently been collected from near Lake Warden, close to the Esperance townsite.

*Iridomyrmex calvus* group sp. JDM 1069 is an undescribed species known in the Curtin Collection from specimens collected at Eneabba and from near Ravensthorpe, respectively. Additional specimens in the California Academy of Sciences were collected many years ago in Darlington, now one of Perth's eastern suburbs. The ant is here assigned to the *I. calvus* group because of its evenly divergent frontal carinae and the general appearance of its mesosoma and node. However, placement of this species in the *I. calvus* group or even in the genus *Iridomyrmex* is provisional, workers having a completely emarginate anterior clypeal margin without the hint of a central projection, unlike all other *Iridomyrmex*. Also, unlike most other

*Iridomyrmex* species, the gaster is rather flat and elongate, rather than spherical, and the node is broad and very low. The propodeal spiracles are situated dorsally, near the propodeal angles, and erect setae are sparse or lacking on the mesosoma. All in all, this is a most striking little ant that is quite unlike any other *Iridomyrmex* species found in the SWBP, though, based on its morphology, the *I. calvus* group is probably the best fit.

The *I. conifer* species-group is restricted to the SWBP. Members of the group are recognizable immediately by the conical shape of the propodeum. The three constituent species can be separated by differences in the pilosity on the head capsule and mesosoma, and Shattuck and McMillan (1998) have reviewed their taxonomy and biology. The well-known stick-nest ant, *Iridomyrmex conifer* Forel, has the broadest distribution of the group, and occurs in the vicinity of Perth and on the south and south-east coasts. This species has the unusual characteristic of building an underground nest in late Spring and Summer and a surface nest in the colder months. Nests are decorated with suitable plant material, the nature of which depends on the plant community in the area. Workers forage primarily for nectar, but also tend Hemiptera, and scavenge dead animal material (invertebrates and small vertebrates) (Shattuck and McMillan 1998). *Iridomyrmex turbineus* Shattuck and McMillan occurs in the wetter south-west, between the main centres of population of *I. conifer*, while *Iridomyrmex setoconus* Shattuck and McMillan is known from two collections near Esperance (Shattuck and McMillan 1998).

The elongate head capsule and long limbs characterise members of the *I. agilis* species-group. These appear to be thermophilic ants, either active in the heat of the day, or found in areas that are highly insolated (such as sand dunes). *Iridomyrmex agilis* Forel is a fairly large red-and-black ant that has a wide distribution in drier areas of the State. The worker has a habit of scurrying about with its gaster directed vertically. *Iridomyrmex bicknelli* Emery was described from Tasmania, but has a wide Australian distribution (Clark 1938). In WA, this slender, iridescent black ant has been recorded as far north as the Pilbara, but most records are from the south-west and the wheatbelt. Workers of this very common species are often seen on suburban footpaths and on sand dunes near beaches. The species is also common on heathland sand-plains near the west coast and in the interior. In mine sites the ant appears to be an early coloniser of newly rehabilitated plots. *Iridomyrmex agilis* group sp. JDM 85 is very similar in appearance, but differs in the length of the anterior projection of the promesonotum, and the position of its articulation with the head capsule. The ant has been recorded from Perth north to Eneabba. The worker of *Iridomyrmex bicknelli splendidus* Forel collected from Perth, was described (1902) in just two lines. I have not seen a type specimen and am unable at present to identify this taxon among the *Iridomyrmex* material I have seen.

*Iridomyrmex bicknelli brunneus* Forel (conspecific with *Iridomyrmex gracilis minor* Forel, in my opinion), *Iridomyrmex gracilis spurcus* Wheeler, *Iridomyrmex* sp. JDM 133 and *Iridomyrmex* sp. JDM 846 are here identified as probably belonging to the *I. gracilis* species-group. Workers of this group have a rather elongate propodeum and long femora, but the outline of the vertex of the head capsule is straight or slightly concave, rather than convex, as in the *I. agilis* species-group. *Iridomyrmex bicknelli brunneus* is quite common in woodlands in the SWBP, and probably occurs widely throughout Australia, though only listed for WA ('*I. bicknelli brunneus*') and QLD and WA ('*I. gracilis minor*') by Taylor and Brown (1985). This ant is often encountered foraging on the trunks and branches of eucalypts. The closely related *Iridomyrmex* sp. JDM 846 is very similar, but is uniformly brown to dark brown rather than reddish-brown and dark brown, and has erect setae on the outer surface of the antennal scapes. A few erect setae can also be found on the last quarter of the inner surface. This taxon has a wide distribution in drier eastern and northern areas of the SWBP, but is also found in Jarrah forest, and one series has been collected from Mutton-bird Island near Albany and another from Esperance, on the south coast. *Iridomyrmex gracilis spurcus* is a rather small member of the group, and extremely hirsute, with erect seta on all surfaces of the antennal scape. This is a typically eastern and northern form, found at least as far north as the Pilbara. The type material was collected at Moorilyanna in SA. Ground foraging workers of *Iridomyrmex* sp. JDM 133 have been collected in the northern sector of WA, including the north of the SWBP. From its description, I consider that *Iridomyrmex* sp. JDM 133 may be identical with *Iridomyrmex gracilis fusciventris* Forel, but I have not seen type specimens of the latter.

### *Linepithema*

*One species,* Linepithema humile *(Mayr), the Argentine ant.*

*Linepithema* species appear similar to *Iridomyrmex*, but the eyes are placed lower on the head capsule, and the clypeal margin is shallowly concave, without a central protuberance. Only one species, the introduced Argentine Ant (*Linepithema humile* (Mayr), occurs in Australia. The ant can be found in a number of towns in south-west WA, as well as throughout the Perth metropolitan area. This pest species has gained a firmer foothold in suburban

areas of Perth since the cessation of heptachlor spraying in 1988. Fortunately, the ant has thus far not penetrated large, intact tracts of native vegetation in the SWBP, though infestations have been treated in disturbed woodland near Augusta and Margaret River (M. Widmer, Agriculture Department of WA, pers. comm.) However, since *L. humile* prefers humid environments, native riparian plant communities in the south-west of this State remain at risk.

***Nebothriomyrmex***

*One species,* Nebothriomyrmex majeri *Dubovikov.*

*Nebothriomyrmex majeri*, the only species described under this newly erected genus (Dubovikov 2004), has tiny, depigmented workers. Members of this genus can readily be distinguished from *Arnoldius* by their PF of 6,4 and their pronotal protuberance. Although it is not uncommon in the Darling Range, the author has found this ant to be particularly abundant in coastal peppermint (*Agonis flexuosa*) scrubland around Bremer Bay. Here, many clusters of ant colonies can be found in white sand under rotted wood and around tree and shrub roots. Given their close association with roots in these circumstances, they may be tending root aphids or other Hemiptera.

***Ochetellus***

1. Body chocolate to black, appendages dark brown..... ***O. glaber* group sp. JDM 19**

   Head, mesosoma, node and appendages orange or red; legs light brown to brown, gaster dark brown..... ***Ochetellus* sp. JDM 851**

Species of *Ochetellus* resemble small *Dolichoderus* (subgenus *Hypoclinea*) in terms of their concave propodeum, but differ in lacking a flange on the underside of the head capsule near the mandibular insertions. The petiolar node is also very thin and broadly expanded, compared with the thicker, more oblique and narrower node in *Dolichoderus.* The shallowly concave anterior margin of the clypeus found in *Ochetellus* also separates that genus from small *Iridomyrmex* with a flattened propodeum. In the SWBP these ants can mostly be found in association with wood, either in the form of living timber or on timber products and structures (e.g. telegraph poles), where they form thin, trailing columns. Members of this genus can be a nuisance in suburban homes, where they frequent kitchens and other places where sweet foodstuffs can be found.

At least two species can be found in the SWBP. A further two species, including the Spinifex Ant (*Ochetellus flavipes* (Emery)), are found north of the Province. *Ochetellus glaber* group sp. JDM 19 is of uncertain taxonomic status. Variation can include degree of pilosity and sculpturation. Some specimens are rather matt, with thick pubescence on head, mesosoma and gaster, whilst in others the small, appressed setae are sparser and more widely separated, particularly on the head, and they have a smoother, shinier appearance. The latter agree with the form *Ochetellus punctatissimus* (Emery), based on ANIC material. This species or species complex is by far the most common of the two local forms. *Ochetellus* sp. JDM 851, with reddish foreparts, has never been formally described and named, though recognized in manuscript (ANIC material). This form has been collected rarely in the south-eastern wheatbelt, near the south-east coast, and in the mid west.

***Papyrius***

1. Vertex of head capsule, first gastral tergite and node with erect setae; large species (HW 1 mm.>..... ***Papyrius* sp. JDM 666**

   Vertex of head capsule, first gastral tergite and (usually) node lacking erect setae; smaller species (HW ≤ 1 mm) ..... ***P. nitidus* (Mayr)**

*Papyrius* species can be recognized by their short palps (PF 5,3) and truncate propodeum, the latter part often possessing a distinct anterior protuberance or lip. The odour produced by *Papyrius* workers is also distinctive and aromatic in nature. These ants often nest in or at the base of trees, and the carton (plant fibres and/or frass) used to cover their nests and trails may cause their activities to be mistaken for those of termites. Workers will tend the caterpillars of various butterflies (Shattuck 1999). The ants may occasionally be pests in homes: the author has received at least one complaint – a country resident who advised that the ants were infesting timber in his studio.

Two species of *Papyrius* are known from the SWBP. *Papyrius nitidus* (Mayr) is widespread in the SWBP, and also occurs in the Kimberley Region in this State. Other records are from NSW and the NT. *Papyrius* sp. JDM 666 has been recorded from the Darling Range and the eastern and southern wheatbelt.

***Tapinoma***

(n.b. *Tapinoma rottnestense* Wheeler is actually a *Doleromyrma.*)

1. Foreparts dark brown, strongly contrasting with pale gaster and appendages ..... ..... ***T. melanocephalum* (Fabricius)**

   Foreparts, gaster and appendages more-or-less concolorous ..... **2**

2. Eye large, eye length ≈ 1/3 length of head capsule (Figure 184) ... ***Tapinoma* sp. JDM 981**

   Eye smaller, eye length ≤ 1/4 length of head capsule (Figure 185) .....***Tapinoma* sp. JDM 78**

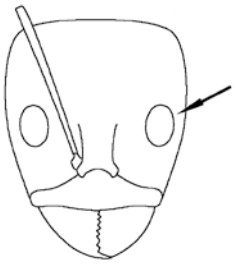

**Figure 184**

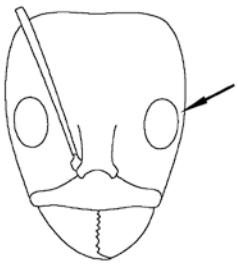

**Figure 185**

Distinguishing workers of *Tapinoma* and *Doleromyrma* can be very difficult (see my comments under the latter). Otherwise, workers of *Tapinoma* will not be confused with those of any other ants. Local species have often been collected in the evening or at night, and are frequently found foraging on trees. In woodlands, nests are most commonly found under stones, in rotting wood or in litter. The ants are general scavengers, but also take honeydew (Shattuck 1999). Shattuck also reports that they tend aphids or coccids.

At least two indigenous species of *Tapinoma* occur in the SWBP. The taxonomy is rendered more difficult by their small size and tendency to shrivel when pointed. However, one species described from material collected on Rottnest Island, i.e. *Tapinoma minutum rottnestense* Wheeler, is a *Doleromyrma* species (see comments under that genus). *Tapinoma* sp. JDM 78 is here separated from the other taxon by its smaller eye. Workers also have a more rounded head capsule. Specimens have been collected from a variety of situations, including pitfall traps, hand collections off tree trunks and from litter, even from a sink inside a house (Broome). The ant has been gathered mainly in coastal localities throughout the State, but one series has been taken near Kalgoorlie. A small-eyed variant, which is more uniformly yellow in colour, may represent a different species. Specimens of this form have been collected from several widely separated localities, including Jurien Bay in the mid north, and Broome, in the Kimberley Region. The large-eyed *Tapinoma* sp. JDM 981 has a more rectangular head capsule, like *Doleromyrma*. Most records are from the arid zone and in the Pilbara, but this ant has occasionally been taken in the Darling Range.

The exotic ghost ant (*Tapinoma melanocephalum* (Fabricius)) may well have become established in the Perth region: recently, two workers were collected in a pitfall trap in rehabilitated vegetation in the Perth suburb of Mosman Park, while a Curtin University project was being undertaken, and the author has also been asked to identify ant material from another Perth suburb that proved to be of this species. This ant, as the common name suggests, has an extremely pale gaster and legs that contrast strongly with the dark brown head and mesosoma, and thus enable it to be distinguished easily from the native taxa.

### *Technomyrmex*

*One species,* Technomyrmex jocosus *Forel.*

On a global scale, *Technomyrmex* species may be confused with *Tapinoma*, but in the SWBP there is a large size difference between the medium-sized *Technomyrmex* workers and those of the local *Tapinoma*, which are minute ants. *Technomyrmex* also has five visible gastral tergites while there are four in *Tapinoma*. Only *Technomyrmex jocosus* Forel occurs in the SWBP, where it is something of a nuisance in some Perth suburbs and, occasionally, in country towns. Outside of houses, workers are most often seen trailing on fence-lines or on tree trunks. Within the central SWBP the species can also be found in disturbed areas such as parkland but does not appear able to penetrate large areas of native vegetation. However, further south, where it may be indigenous, the author has found *T. jocosus* in enormous numbers on karri and tingle trees near Pemberton, and in Banksia woodland west of Albany. This ant is very similar to the better-known exotic *Technomyrmex albipes* (F. Smith), but can readily be differentiated through its shinier, less sculptured head capsule and different arrangement of erect setae on the frons. Barry Bolton is currently revising the world fauna of this genus.

## SUBFAMILY FORMICINAE

Formicinae are readily recognized by the presence of an acidipore on the tip of the gaster. This is the only ant subfamily that produces formic acid. The subfamily includes the well-known sugar ants (*Camponotus*) and several other large genera. Although the subfamily has somewhat fewer genera than the Myrmicinae, in terms of sheer numbers of species this is the largest subfamily in the SWBP. For instance, the genera *Melophorus* and *Stigmacros* have around 30 representatives in the SWBP, while

with *Camponotus* the figure is approximately 75 species. The physical appearance of the different genera is rather more uniform than is the case with the Myrmicinae, but there is more morphological diversity than in the Dolichoderinae. Species range from minute cryptic forms living in litter to relatively huge ants, with major workers in excess of 1.5 cm in length. Most are general scavengers and predators, with some adapted to foraging at the hottest times of the day and others nocturnal. A few genera, e.g. *Acropyga*, have specialized habits.

### *Acropyga*

1. Larger species (HW > 0.6 mm); bright yellow, mesonotum strongly convex, prominent ..... ***Acropyga myops* Forel**

   Smaller species (HW < 0.6 mm); pale, depigmented; mesonotum only weakly convex ..... ***Acropyga pallida* (Donisthorpe)**

These ants cannot be confused with any other formicine because of their combination of short palps (PF 2,3), minute compound eyes and 10–11 segmented antennae (11 segments in the local species). At least some species of these ants are known to have a heavy reliance on Hemiptera, particularly mealybugs. In the case of the northern Australian *Acropyga acutiventris* Roger, the queens carry fertilized mealybugs in their mandibles during their nuptial flight so that the new *Acropyga* colony will be assured of a reliable food supply (Williams 1978, 1985; Williams and Watson 1988).

Two species of *Acropyga* are known from the SWBP. The commonest of these is *Acropyga myops* Forel. Probably on account of its subterranean habits, this ant is rarely encountered. The species was originally described from Mundaring as *Acropyga indistincta* Crawley, but this name has recently been reduced to a synonym (LaPolla 2004). The ant is widespread, especially in coastal parts of the Australian mainland. *Acropyga pallida* (Donisthorpe) is widely distributed in eastern Australia, but there is one confirmed record (ANIC) from Walpole for the SWBP. The Curtin Ant Collection has no specimens of the latter species.

### *Calomyrmex*

1. Pubescence on gaster thick, bright yellow..... ***C. glauerti* Clark**

   Pubescence on gaster sparse, white..... ***Calomyrmex* ANIC sp. 1**

*Calomyrmex* workers are easily mistaken for those of *Camponotus* in the field, and it requires microscopic examination to see that this genus possesses a metapleural gland, a structure that is lacking in all West Australian *Camponotus*. *Calomyrmex* workers are also monomorphic, whereas SWBP *Camponotus* workers are polymorphic. All of the Western Australian species are distinctly hairy, and many have very striking green, blue or purple iridescence on the foreparts with sometimes a contrasting yellow or gold pubescence on the gaster. The underlying body colour, however, is always dark. Foragers can be seen collecting nectar from flowers and extrafloral nectaries, or carrying dead arthropods back to their nests. If workers are handled, they will exude a whitish or orange viscous fluid from the base of their mandibles. The colour varies with the age of the worker, and the fluid acts as an alarm to other workers, or operates as a defensive mechanism (Shattuck 1999)

*Calomyrmex* ANIC sp. 1 has a wide distribution through central and northern SWBP, while *Calomyrmex glauerti* Clark was described from material collected from beside the Murchison River, and occurs in the far north of the Province. The latter is easily distinguished by the thick, yellow or orange pubescence on its gaster, *Calomyrmex* ANIC sp. 1 having only sparse, whitish pubescence. *Calomyrmex* ANIC sp. 1 appears to be absent from the wetter south-west corner of the State, and to commence its range north and east of Perth. In workers of *Calomyrmex* ANIC sp. 1 collected from southern parts of its range cuticular iridescence is reduced or absent, and the general appearance of the ant in the field is a dull greyish-black. Workers from further north, however, often have a dark green to olive-green iridescence on their foreparts. This tends to change to purple in older, pinned specimens, or those that have been damaged through handling. This species can be quite pugnacious if its nest is disturbed, and it is a conspicuous component of the ant fauna on middle-aged and older rehabilitated mineral sand sites at Eneabba.

### *Camponotus*

The key to major and minor workers in the *C. consobrinus* species-group is taken from McArthur and Adams (1996; modified).

#### *Major workers*

(n.b. This key provides couplets to known major workers: major workers for a number of species are as yet unknown, as this subcaste tends to leave the nest less frequently than the minor and media worker castes.)

1. Inner surfaces of middle and hind tibiae lacking elongate setae (Figure 186a); anterior two thirds of clypeus and surrounding genae abruptly truncate (used by the ant to plug the nest entry hole in wood) (Figure 186b) (C. macrocephalus species-group) ..... ***C. gasseri* Forel**

Inner surfaces of middle and hind tibiae with double row of stout spines (Figure 187); clypeus and adjoining sectors of head capsule not as above ..... **2**

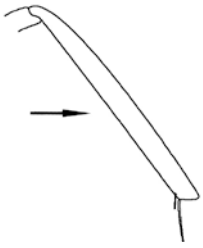

**Figure 186a**

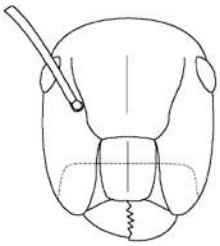

**Figure 186b**

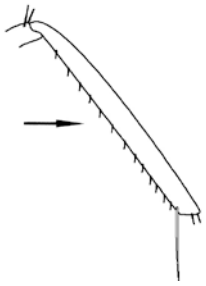

**Figure 187**

2. Mentum with elongate, J-shaped setae near its posterior margin (*C. wiederkehri* species-group) (Figure 188)..... **3**

Without elongate J-shaped setae on posterior margin of mentum (Figure 189)..... **9**

**Figure 188**

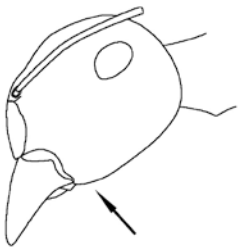

**Figure 189**

3. Antennal scape and tibiae with many erect, bristly setae ..... **4**

Antennal scape and tibiae lacking erect, bristly setae ..... **5**

4. Dorsum of petiolar node bluntly rounded, node thick (Figure 190a); pubescence on gaster abundant, individual setae overlapping (Figure 190b) ..... ***C. gouldianus*** **Forel**

Dorsum of petiolar node acuminate in profile, node thin, scale-like (Figure 191a); pubescence on gaster less abundant, individual setae usually not overlapping (Figure 191b) ..... .....***C. terebrans*** **(Lowne)**

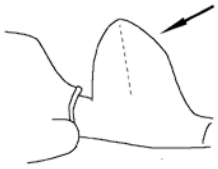

**Figure 190a**

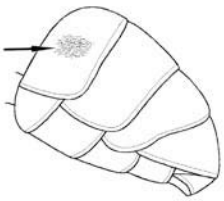

**Figure 190b**

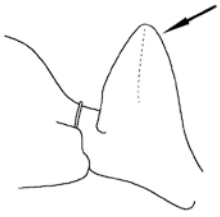

**Figure 191a**

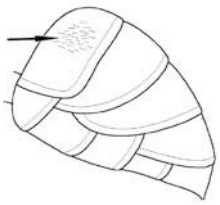

**Figure 191b**

5. In profile, posterior angle of vertex acute, relatively sharp; outline of mesosoma almost circular in outline (Figure 192)..... ..... ***C. postcornutus*** **Clark**

In profile, posterior angle of vertex obtuse, smoothly rounded; outline of mesosoma not as above (pronotum is convex, mesonotum and dorsal surface of propodeum form a straight line, except for impression of metanotal groove) (Figure 193) ..... **6**

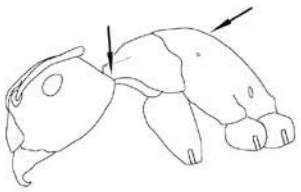

**Figure 192**

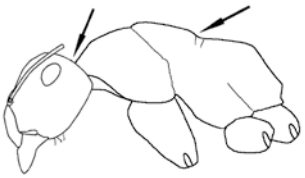

**Figure 193**

6. In profile, vertex of petiolar node broadly rounded; metanotal groove distinctly impressed (Figure 194)..... ***C. versicolor*** **Clark**

   In profile, vertex of petiolar node tapering to a sharp or blunt point; metanotal groove feebly impressed (Figure 195)..... **7**

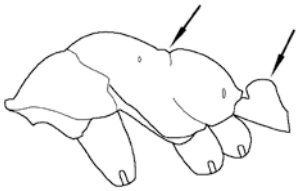

**Figure 194**

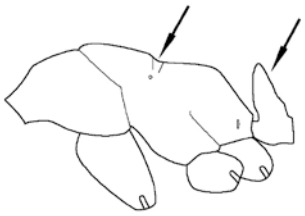

**Figure 195**

7. Clypeus projecting as a rectangular disc with sharp angles (Figure 196)..... .....***C. wiederkehri*** **Forel**

   Anterior clypeal margin broadly convex across its width (Figure 197)..... **8**

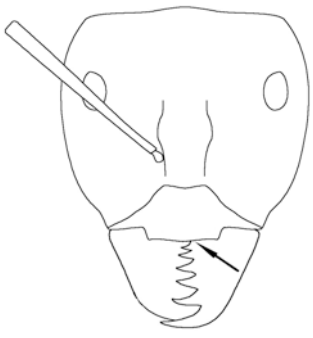

**Figure 196**

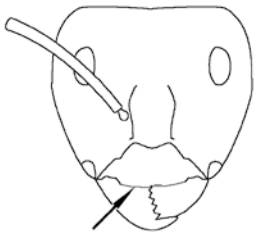

**Figure 197**

8. Profile of mesosoma weakly predominantly convex; dorsum of propodeum weakly convex, anterior face of petiolar node only slightly shorter than its posterior face (Figure 198) ..... ***C. prosseri*** **Shattuck and McArthur**

   Profile of mesosoma strongly sinuate; dorsum of propodeum almost straight, anterior face of petiolar node much shorter than posterior face, node inclined forward (Figure 199)..... .....***C. johnclarki*** **Taylor**

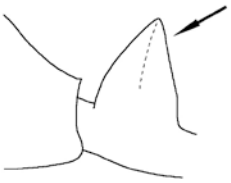

**Figure 198**

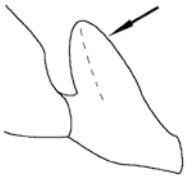

**Figure 199**

9. Clypeus with anteromedial notch; clypeus projecting beyond genae, clypeal angles acute (*C. nigriceps* species-group) (Figure 200)..... **10**

   Conformation of clypeus not as above..... **14**

10. Setae on venter of head capsule absent (Figure 201)....***C. longideclivis*** **McArthur and Adams**

    Setae on venter of head capsule present (Figure 202) ..... **11**

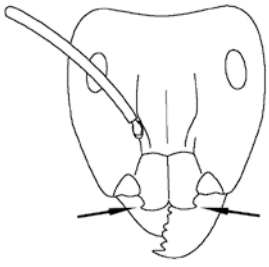

**Figure 200**

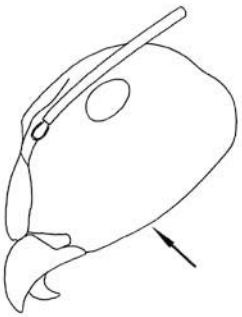

**Figure 201**

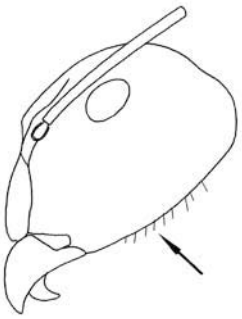

**Figure 202**

11. Dorsum of propodeum with 10 > erect setae, setae distributed over propodeum (Figure 203) ..... **12**

    Dorsum of propodeum with 10 < erect setae at or near propodeal angle (Figure 204)..... **13**

**Figure 203**

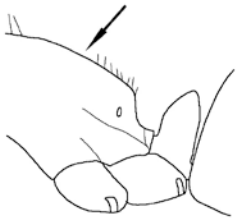

**Figure 204**

12. Head, mesosoma, node and most of gaster uniformly honey coloured..... ***C. clarior*** **Forel**

    Head black or brown, mesosoma yellow or red-brown..... ***C. nigriceps*** **(F. Smith)**

13. Erect setae on venter of head capsule 20 >, or setae covering more than 1/2 venter area; typically, head dark brown or black, mesosoma yellowish to dark red and gaster brown or black, with or without yellowish colouration anteriad (Figure 205) ..... .....***C. dryandrae*** **McArthur and Adams**

    Erect setae on venter of head capsule 20 <, or setae covering less than 1/2 venter area; typically, head, mesosoma and gaster concolorous dark brown or black (Figure 206) .....***C. prostans*** **Forel**

14. Body and appendages covered with dense, whitish, erect setae; head deeply concave; anterior margin of clypeus simple, not bilobate or bidentate (*C. intrepidus* species-complex) (Figure 207) .....***C. molossus*** **Forel**

    Body and appendages not covered with dense, whitish, erect setae (*C. whitei* has dense, yellow, bristly setae) or anterior margin of clypeus emarginate ..... **15**

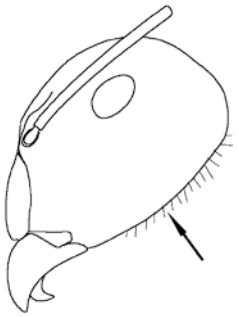

**Figure 205**

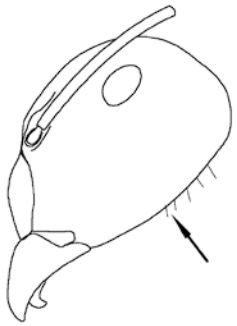

**Figure 206**

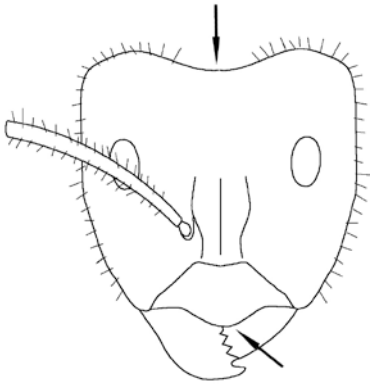

**Figure 207**

15. Sculpture densely punctate; in profile, mesosoma with mesonotum abruptly descending to propodeum, the latter compact and rounded in outline (dorsal surfaces of body with many yellow, bristly setae) (Figure 208) ..... ..... ***C. whitei*** **Wheeler**

Sculpture not densely punctate; mesonotum not abruptly descending to propodeum (e.g. Figure 209)..... **16**

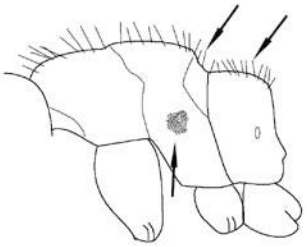

**Figure 208**

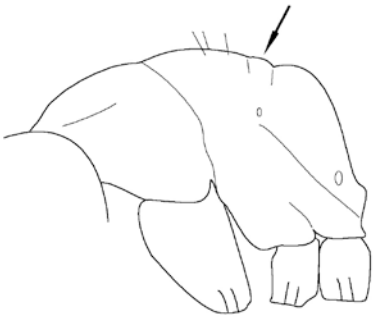

**Figure 209**

16. In full-face view, head with posterior angles of vertex rounded in shape of small lobes, the outline of the head between them straight; antennal scape not reaching vertex; sides of head usually parallel; anteromedial margin of clypeus protruding, bidentate; mandible strongly sculptured, with six teeth and denticles; outline of mandible strongly rounded (*C. ephippium* species-complex) (Figure 210)..... **17**

In full-face view, head capsule differing in one or more of the above characters; mandible may have more or fewer teeth (e.g. Figure 211) ..... **25**

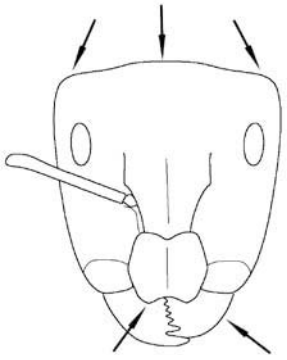

**Figure 210**

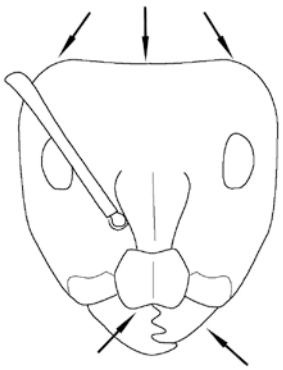

**Figure 211**

17. Scapes with whorls of erect setae (Figure 212)..... ..... ***C. pawseyi*** **McArthur**

Scape without erect setae except for one or two at the end (Figure 213)..... **18**

**Figure 212**

**Figure 213**

18. At least anterior half of frons and sides of head capsule with short, erect and sub-erect setae (Figure 214)..... **19**

Frons and sides of head capsule totally lacking erect and sub-erect setae (Figure 215)..... **21**

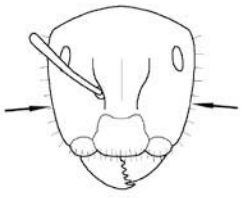

**Figure 214**

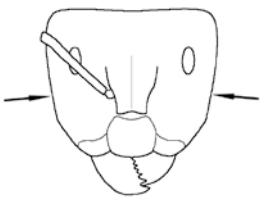

**Figure 215**

19. Head less massive; in dorsal view, posterior angles of vertex weakly lobate, lobes not reaching humeral angles of pronotum (Figure 216)..... ***C. cinereus notterae*** **Forel**

    Head more massive; in dorsal view, posterior angles of vertex strongly lobate, lobes reaching humeral angles of pronotum (Figure 217) ... **20**

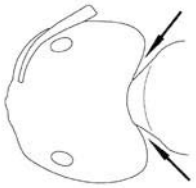

**Figure 216**

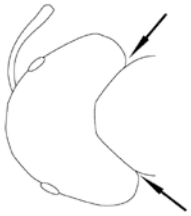

**Figure 217**

20. Punctation on upper half of frons much fainter than that of lower half; head capsule uniformly red ..... ***Camponotus*** **sp. near** ***ephippium*** **(F. Smith) sp. JDM 431**

    Punctation on upper half of frons almost as strong as that on lower half; head capsule predominantly black with a few dark red patches..... ***C. ephippium*** **(F. Smith)**

21. Smaller; HW < 2 mm ..... **22**

    Larger, HW > 2.5 mm ..... **23**

22. Median sector of clypeus narrow, its outline weakly convex, and from about the midpoint carinate and raised above the lateral sectors of the clypeus (Figure 218) ..... ..... ***C. longifacies*** **McArthur**

    Median sector of clypeus broad, its outline strongly convex, not raised but confluent with the lateral sectors of the clypeus (Figure 219).. ..... ***C. sponsorum*** **Forel**

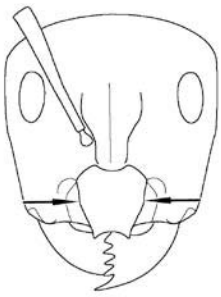

**Figure 218**

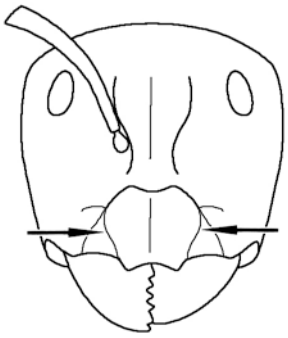

**Figure 219**

23. Relatively less hirsute, erect setae on mesosoma 30<; setae on venter of head capsule 20<..... ..... ***C. capito ebenithorax*** **Forel**

    Relatively more hirsute, erect setae on mesosoma 30>; setae on venter of head capsule 20>..... **24**

24. Pubescence largely absent from lower mesopleuron and propodeum; legs brown..... ....***C. capito ebenithorax*** **Forel ('black soma')**

    Pubescence present and conspicuous on lower mesopleuron and propodeum; legs orange..... .....***C. dromas*** **Santschi**

25. In profile, propodeum dorsally concave, forming a "saddle" (Figure 220); pronotum and mesonotum black, propodeum and posterior metapleuron bright crimson ..... ..... ***C. chalceus*** **Crawley**

In profile, propodeum not dorsally concave (e.g. Figure 221); colour of mesosoma not as above ..... **26**

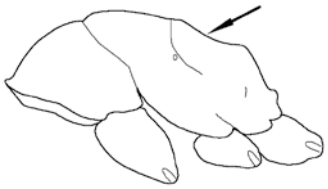

**Figure 220**

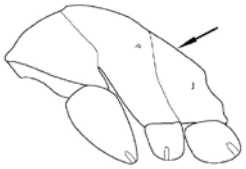

**Figure 221**

26. Mandibles very large in proportion to head capsule, outer surface of mandible almost circular; number of developed mandibular teeth 7 ≥; in full-face view vertex of head capsule usually straight (Figure 222) ..... **27**

Mandibles of normal proportions, usually triangular, number of developed mandibular teeth 5 or 6; in full-face view vertex of head capsule weakly to moderately concave (Figure 223) ..... **29**

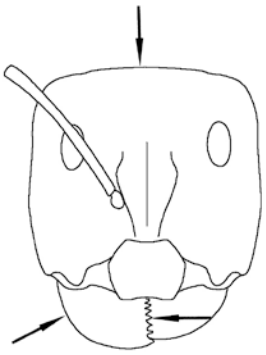

**Figure 222**

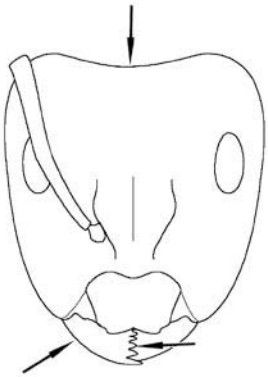

**Figure 223**

27. Propodeum with transverse notch about midpoint of its dorsal face (Figure 224) ..... .....***Camponotus* sp. JDM 26**

Propodeum without transverse notch (*C. subnitidus* species-group) (Figure 225) ..... **28**

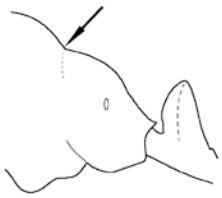

**Figure 224**

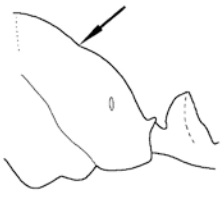

**Figure 225**

28. One pair of setae present on venter of head capsule, or setae absent ..... ***C. rufus* Crawley**

Many setae present on venter of head capsule .... ..... ***C. tricoloratus* Clark**

29. In profile, node thicker, not scale-like, its dorsum flat or only weakly descending towards its anterior face; (Figures 226, 227); ratio of length of propodeum to its declivitous face 1:1–2:1 (Figure 228) ..... **30**

In profile, node thin, scale-like, its dorsum culminating in a sharp point, its anterior face descending vertically or at least at a very acute angle to the vertex (Figures 229, 230); ratio of length of propodeum to its declivitous face usually much less than 1:1 (often 1:2 or 1:3) (Figure 231)..... **31**

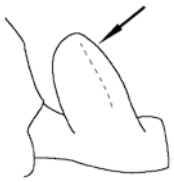

**Figure 226**

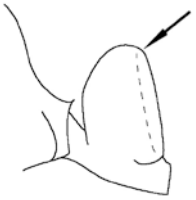

**Figure 227**

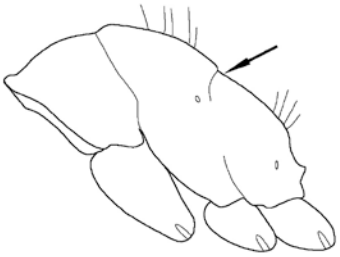

**Figure 228**

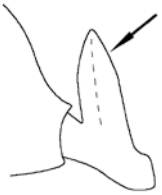

**Figure 229**

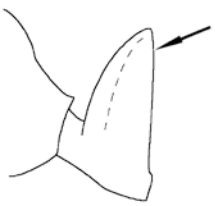

**Figure 230**

**Figure 231**

30. Decumbent and appressed setae on propodeum fine, forming pubescence on at least posterior sector, same setae on gaster minute, mostly separated from one another by more than twice their length; foreparts red, gaster black or ant concolorous black ..... ***C. cinereus amperei*** **Forel/*C. pitjantjatarae*** **Forel**

Decumbent and appressed setae on propodeum coarser and obviously curled, not forming pubescence, same setae on gaster of similar appearance, mostly separated from one another by less than their length; typically, head dark reddish-brown to black, mesosoma and legs orange to light brown, gaster dark brown..... ***C. scotti*** **McArthur**

31. With combination of strongly concave head capsule, many erect setae on sides and front of head capsule and propodeum steeply declivitous..... ..... ***C. discors*** **complex. sp. JDM 1104**

Without this combination of characters..... **32**

32. In full-face view, sides of head with erect setae along much of their length; sides of head more-or-less straight (*C. claripes* species-complex) (Figure 232) ..... **33**

In full-face view, sides of head without erect setae or with erect setae restricted to lower frons and genae; sides of head often convex (e.g. Figure 233)..... **37**

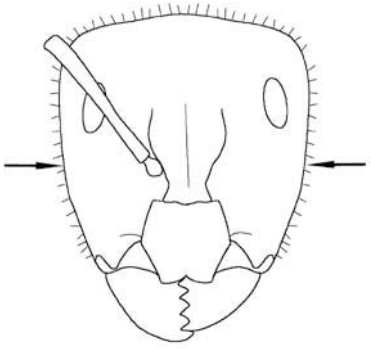

**Figure 232**

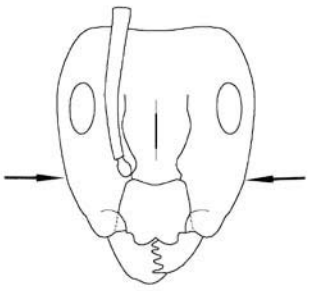

**Figure 233**

33. In profile, dorsum of propodeum straight, ratio of length of dorsum of propodeum to its declivitous face slightly more than 1:1 (Figure 234); mesosoma reddish contrasting with black head and gaster..... ..... ***C. claripes*** **complex sp. JDM 430**

In profile, dorsum of propodeum convex, ratio of length of dorsum of propodeum to its declivitous face less than 1:1 (Figure 235); mesosoma not coloured as above..... **34**

**Figure 234**

**Figure 235**

34. In dorsal view, gaster bicoloured, first tergite orange, remaining tergites dark brown to black..... ***C. marcens*** **Forel**

In dorsal view, gaster concolorous dark brown to black..... **35**

35. Tibiae and much of femora same colour as mesosoma ..... ..... ***C. claripes*** **complex sp. JDM 779**

Tibiae and femora much lighter than mesosoma ..... **36**

36. Propodeum with few (10 ≤) erect setae clustered around propodeal angle; genae often with lighter-coloured regions (two or more species may well be represented here)..... ..... ***C. claripes*** **Mayr**

Propodeum with many (10>) erect setae descending up its dorsal face; genae without lighter-coloured regions ..... ***C. claripes* complex sp. JDM 767**

37. Dorsum of mesosoma completely without erect setae ..... ***C. oetkeri* Forel**

Dorsum of mesosoma with a few to many pairs of erect setae ..... **38**

38. Ant completely black; cuticle dull in appearance ..... ***C. tristis* Clark**

Ant not completely black, appendages, at least, coloured; cuticle usually shining in appearance ..... **39**

39. Bright, glossy orange; five mandibular teeth; sculpture a fine microreticulation..... ***Camponotus* sp. JDM 1038**

Colour not bright, glossy orange; other features vary with species ..... **40**

40. Head and gaster black; mesosoma and legs brick-red ..... ***C. armstrongi* Wheeler**

Not distinctly bicoloured as above (head and mesosoma yellow to black, with or without mottling, legs rarely red) ..... **41**

41. Sides of head below eyes and lower genae with sparse to moderately abundant erect setae (Figure 236) ..... **42**

Sides of head below eyes and lower genae lacking erect setae (Figure 237)..... **46**

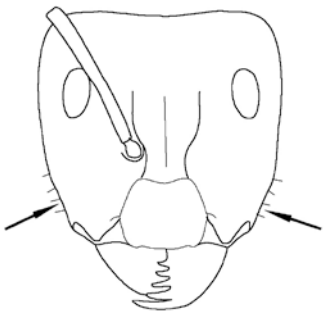

**Figure 236**

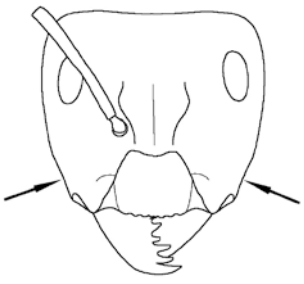

**Figure 237**

42. Very small species (HW ≤ 1.5 mm)..... ..... ***C. scratius* Forel**

Species larger (HW ≥ 2 mm)..... **43**

43. Clypeus with distinct anteromedial notch (glossy, black ants) (Figure 238) ..... **44**

Clypeus without distinct anteromedial notch (either ants not black, or appearance matt) (Figure 239) ..... **45**

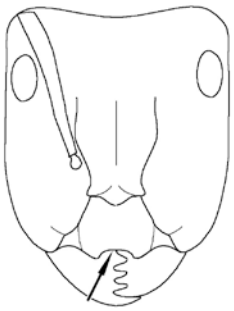

**Figure 238**

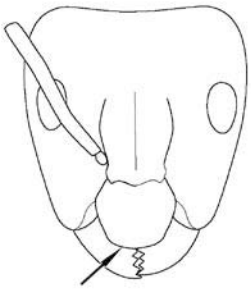

**Figure 239**

44. Sides of head parallel (Figure 240)..... ..... ***C. lownei* Forel**

Sides of head convex (Figure 241) ..... ..... ***C. evae zeuxis* Forel**

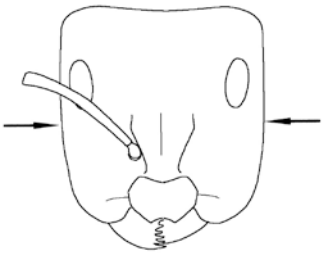

**Figure 240**

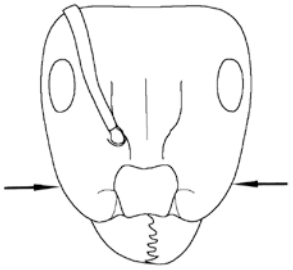

**Figure 241**

45. In full-face view, appearance of head of ant micropunctate, matt, black in colour ..... .....***C. oetkeri voltai*** **Forel**

    In full-face view, appearance of head of ant more-or-less smooth, glossy, brown in colour. .....***C. cowlei*** **Froggatt**

46. Clypeus rugose, matt, with strong pitting on its surface and on surrounding genae, clypeus flattened in profile (Figure 242) ..... ..... ***C. claripes*** **group sp. JDM 288**

    Clypeus smooth, shining, at most with only minor pitting on its surface and on surrounding genae, clypeus usually slightly protuberant in profile (Figure 243)..... ..... **47**

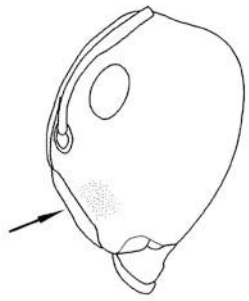

**Figure 242**

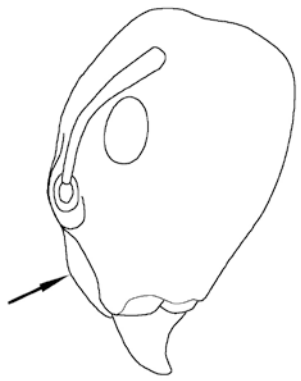

**Figure 243**

47. Bicoloured or pale species with ochre highlights on mesosoma, at least..... **48**

    More-or-less uniformly black or blackish-brown species with pale legs..... **51**

48. Head much darker than mesosoma; anteromedial clypeal margin with a weak notch; vertex of head capsule weakly concave ..... .....***C. claripes nudimalis*** **Forel**

    Either head the same colour as mesosoma, or only slightly darker, or anteromedial clypeal margin straight or crenulate, without notch, or vertex of head capsule markedly concave... ..... **49**

49. Anteromedial margin of clypeus with notch; head ochre, contrasting with dark brown mesosoma and gaster..... .....***C. claripes minimus*** **Crawley (pt.)**

    Anteromedial margin of clypeus without notch, though may be crenulate; head not lighter than mesosoma ..... **50**

50. In full-face view, lateral sectors of clypeus strongly indented with central clypeal sector prominent, standing out in relief; external margin of mandible more-or-less uniformly rounded (minor workers with 8≥ mandibular teeth) (Figure 244) ..... ..... ***C. claripes*** **group sp. JDM 63**

    In full-face view, lateral sectors of clypeus only weakly indented, the central clypeal sector not prominent or standing out in relief; mandible triangular, its external margin oblique, only rounded in its apical quarter (minor workers with 6 mandibular teeth) (Figure 245) ..... ***C. discors*** **Forel/*C. gibbinotus*** **Forel**

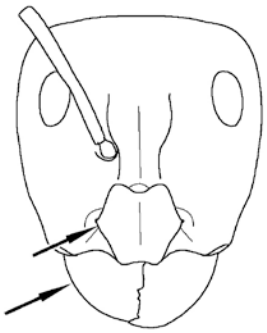

**Figure 244**

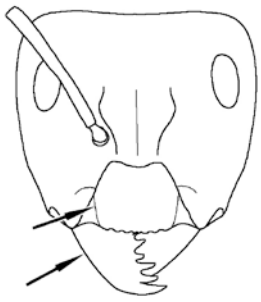

**Figure 245**

51. Larger species (HW ≈ 4 mm); in profile, metanotal groove a distinct notch (Figure 246) ..... ..... ***C. michaelseni*** **Forel/*C. tumidus*** **Crawley**

    Smaller species (HW ≤ 3 mm); in profile metanotal groove indistinct or a small dimple (Figure 247) ..... **52**

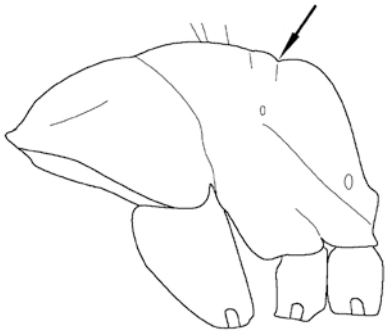

**Figure 246**

**Figure 247**

52. Setae on venter of head capsule present ..... .....***C. walkeri*** **Forel**

    Setae on venter of head capsule absent..... **53**

53. In full-face view, anteromedial clypeal margin with a weak notch, head triangular, expanded towards angles of vertex..... .....***C. claripes minimus*** **Crawley (pt.)**

    In full-face view, anteromedial clypeal margin either without notch, or head not triangular... ..... **54**

54. In full-face view, mandibles short, compact, with five teeth (Figure 248)..... .....***C. simpsoni*** **McArthur**

    In full-face view, mandibles of normal appearance, with six teeth or five strong teeth and additional denticle (Figure 249) ..... .....***C. darlingtoni*** **Wheeler**

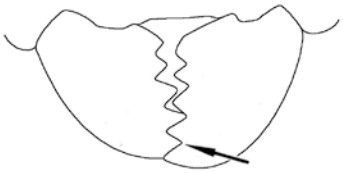

**Figure 248**

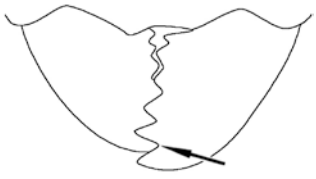

**Figure 249**

*Minor workers*

1. Inner surfaces of middle and hind tibiae lacking elongate setae (Figure 186a); frontal carinae width usually > 1/2 HW (slightly less than 1/2 HW in *C. macrocephalus* group sp. JDM 927) (Figure 250); (*macrocephalus* species-group).... **2**

   Inner surfaces of middle and hind tibiae with double row of stout bristles (Figure 187a); frontal carinae width <1/2 HW (Figure 251);... ..... **3**

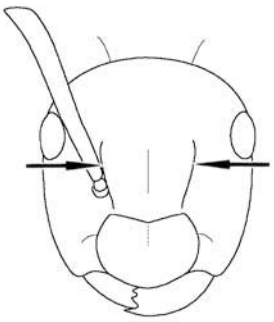

**Figure 250**

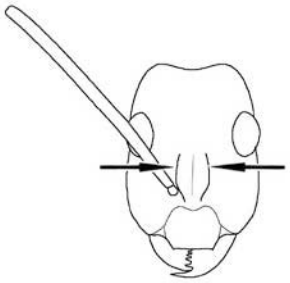

**Figure 251**

2. Mesosoma and node without erect setae or pubescence; venter of head capsule without erect setae; in profile, protuberances on dorsum of mesosoma smoothly rounded; propodeal spiracle near midpoint of propodeum (Figure 252) ..... ***C. gasseri*** **(Forel)**

   Mesosoma and node pubescent, erect setae on all body surface; a few erect setae on venter of head capsule; protuberances on dorsum of mesosoma rather angulate in outline; propodeal spiracle near declivitous face of propodeum (Figure 253) ..... ***Camponotus macrocephalus*** **group sp. JDM 927**

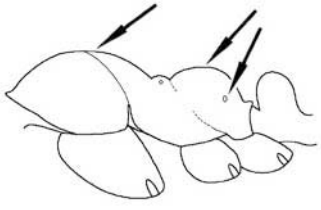

**Figure 252**

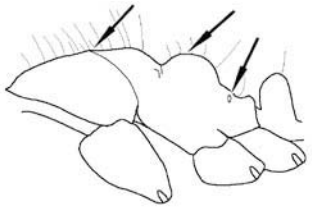

**Figure 253**

3. Mentum with elongate, J-shaped setae near its posterior margin (Figure 188) (*C. wiederkehri* species-group) ..... **4**

   Without elongate J-shaped setae on posterior margin of mentum (Figure 189)..... **15**

4. Head capsule strongly tapered posteriad, with fluted edges around foramen (Figure 254)..... .....***C. johnclarki*** **Taylor**

   Head capsule rounded in normal way posteriorly (Figure 255) ..... **5**

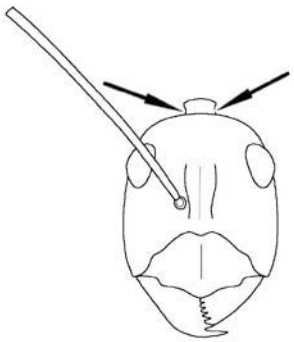

**Figure 254**

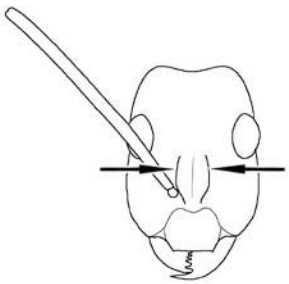

**Figure 255**

5. Surfaces of tibiae and antennal scape with many erect, bristly setae (Figure 256a, b) ..... **6**

   Surfaces of tibiae and antennal scape lacking erect, bristly setae (Figure 257a, b)..... **7**

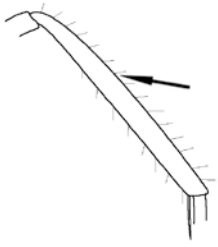

**Figure 256a**

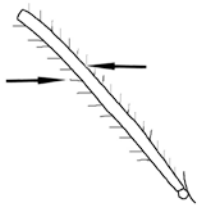

**Figure 256b**

**Figure 257a**

**Figure 257b**

6. In profile, petiolar node thick, about as high as wide, pubescence on head and gaster abundant, individual setae overlapping (Figure 190b) ..... ***C. gouldianus*** **Forel**

   In profile, petiolar node thinner, about twice as high as wide; pubescence on gaster less abundant, individual setae usually not overlapping (Figure 191b) ..... .....***C. terebrans*** **(Lowne)**

7. Metanotal groove strongly impressed, rising abruptly at commencement of propodeum (Figure 258a); petiolar node elongate, flattened, with anterior face much shorter than posterior face (Figure 258b) ..... ***C. versicolor*** **Clark**

   Metanotal groove, at most, only weakly to moderately impressed (e.g. Figures 259a, 260, 261), in such cases not rising abruptly with commencement of propodeum; petiolar node variable but not normally elongate and vertex often distinctly convex, its anterior face only slighter shorter than its posterior face (Figure 259b) ..... **8**

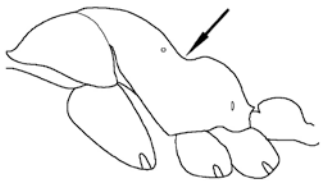

**Figure 258a**

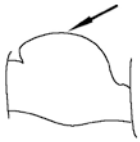

**Figure 258b**

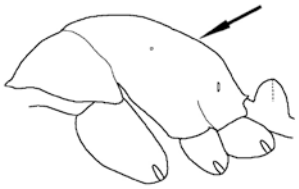

**Figure 259a**

**Figure 259b**

8. Angles of vertex acute; ant with 'hump-backed' appearance (Figure 192) ..... ***C. postcornutus* Clark**

   Angles of vertex rounded; dorsum of mesosoma gently to moderately sinuate (e.g. Figure 193).. ..... **9**

9. Metanotal groove visibly impressed, propodeum distinctly convex (Figure 260); first gastral tergite may be lighter in colour than remaining tergites..... **10**

   Metanotal groove vestigial or absent, propodeal dorsum straight or barely convex (Figure 261); first gastral tergite concolorous with remaining tergites..... **11**

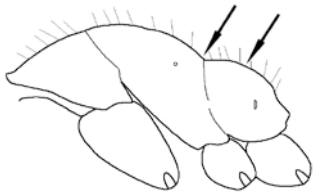

**Figure 260**

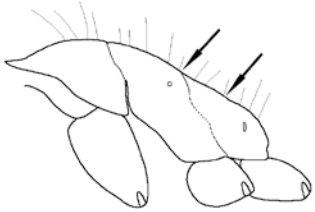

**Figure 261**

10. In full-face view, setae on the lower sides of head capsule lacking; head and mesosoma red (Figure 262) ..... ***C. wiederkehri* group sp. JDM 924**

    In full-face view, head capsule with many erect setae around its perimeter; head and mesosoma orange (Figure 263) ..... ***C. wiederkehri* group sp. JDM 925**

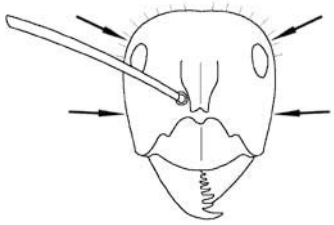

**Figure 262**

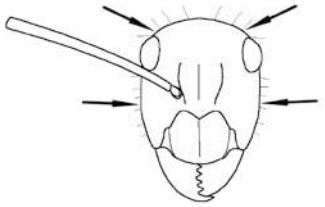

**Figure 263**

11. Eye larger, eye length about 1/4 length of head capsule (Figure 264)..... ***C. wiederkehri* Forel**

    Eye smaller (eye length 1/5 ≤ head length) (Figure 265) (ants in *C. ceriseipes* complex) ... **12**

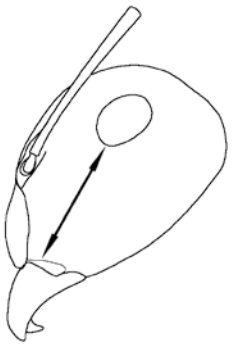

**Figure 264**

**Figure 265**

12. Viewed from behind, appressed setulae on one side of gaster gradually converging towards centre of gaster, without clear central line of demarcation (Figure 266) ..... ***C. ceriseipes* complex sp. JDM 105**

Viewed from behind, appressed setulae on one half of gaster the mirror image of appressed setulae on the other half, the two sides meeting in a clear line of demarcation (most noticeable on tergites 2–4) (Figure 267)..... **13**

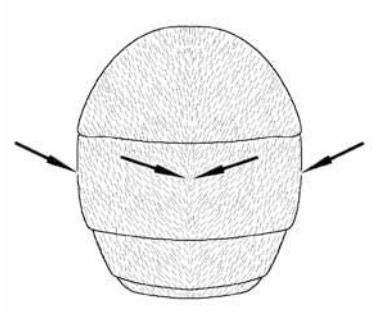

**Figure 266**

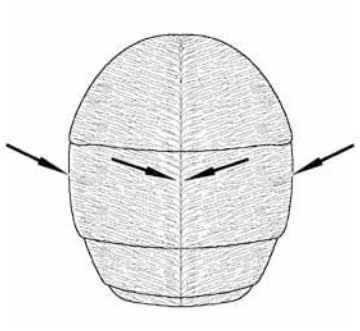

**Figure 267**

13. Erect setae sparse on mesosoma, on propodeum 4 ≤, clustered on or near propodeal angle..... ..... ***C. donnellani*** **Shattuck and McArthur**

Erect setae abundant on mesosoma, on propodeum 4 >, arranged along length of sclerite..... **14**

14. Scapes relatively shorter (SI < 150); petiolar node often tending to rectangular in profile, rounded above and inclined anteriad ..... .....***C. ceriseipes*** **Clark**

Scapes relatively longer (SI > 150); petiolar node often tending to tumular in profile, rounded above and inclined anteriad..... ..... ***C. prosseri*** **Shattuck and McArthur**

15. Clypeus concave or with anteromedial notch; clypeus projecting beyond genae, clypeal angles acute or right-angled (*C. nigriceps* species-group) (Figure 200) ..... **16**

Conformation of clypeus not as above..... **20**

16. Setae on venter of head capsule absent (Figure 201)....***C. longideclivis*** **McArthur and Adams**

Setae on venter of head capsule present (Figure 202) ..... **17**

17. Dorsum of propodeum with 10 > erect setae, setae distributed over propodeum (Figure 203) ..... **18**

Dorsum of propodeum with 10 < erect setae at or near propodeal angle (Figure 204)..... **19**

18. Head, mesosoma, node and most of gaster uniformly honey coloured..... ***C. clarior*** **Forel**

Head black or brown, mesosoma yellow or red-brown..... ***C. nigriceps*** **(F. Smith)**

19. Erect setae on venter of head capsule 20 >, or setae covering more than 1/2 venter area (Figure 205); typically, head dark brown or black, mesosoma yellowish to dark red and gaster brown or black, with or without yellowish colouration anteriad ..... .....***C. dryandrae*** **McArthur and Adams**

Erect setae on venter of head capsule 20 <, or setae covering less than 1/2 venter area (Figure 206); typically, head, mesosoma and gaster concolorous dark brown or black ..... .....***C. prostans*** **Forel**

20. Head capsule behind eyes strongly attenuated, the edges of the foramen fluted or flanged (Figure 268a, b); number of mandibular teeth usually 7 or more (*C. subnitidus* species-complex) ..... **21**

Head capsule behind eyes not strongly attenuated, the edges of the foramen normal (Figure 269a, b); number of mandibular teeth often 5 or 6. ..... **22**

**Figure 268a**

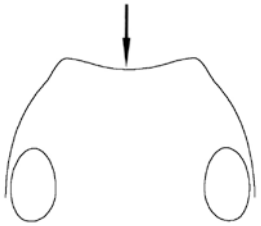

**Figure 268b**

**Figure 269a**

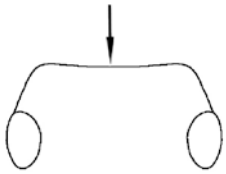

**Figure 269b**

21. Setae on venter of head capsule absent; number of mandibular teeth 9, mesosoma reddish-brown..... ***C. rufus*** **Crawley**

    Setae on venter of head capsule present; number of mandibular teeth 7 or 8, mesosoma ochre to brown ..... ***C. tricoloratus*** **Clark**

22. Body and appendages covered with short, white, erect setae; pubescence lacking on head, gaster and most of mesosoma; number of mandibular teeth 7; clypeus projecting, its anterior margin straight, without central notch or depression .....***C. molossus*** **Forel**

    Body and appendages rarely covered with short, white, erect setae; if many white, erect setae present, then differing in one or more of the other characters..... **23**

23. Metanotal groove deeply impressed, the propodeum quadrate (Figure 270); sculpture of head and mesosoma densely microreticulate-foveate..... ***C. whitei*** **Wheeler**

    Metanotal groove weakly impressed or obsolete, propodeum not quadrate..... **24**

24. Combination of 9 or 10 mandibular teeth, gracile body and elongate head capsule that is moderately attenuated behind large compound eyes (Figure 271)..... ..... ***C. claripes*** **group sp. JDM 63**

    Number of mandibular teeth usually 8 ≤; if 7 or more, then head capsule not as above, usually square, often with vertex broad and somewhat flattened..... **25**

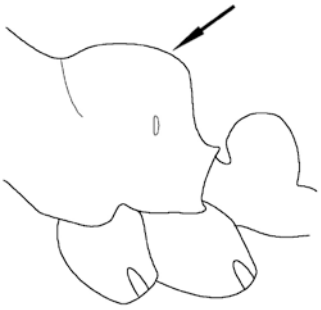

**Figure 270**

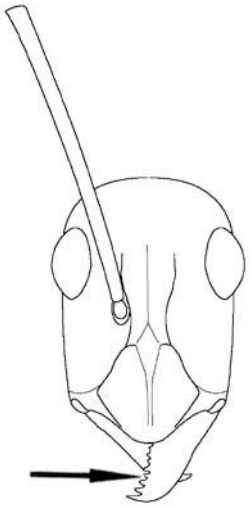

**Figure 271**

25. Propodeum with a transverse notch about midpoint of its dorsal face (Figure 272) ..... .....***Camponotus*** **sp. JDM 26**

    Propodeum without transverse notch (Figure 273) ..... **26**

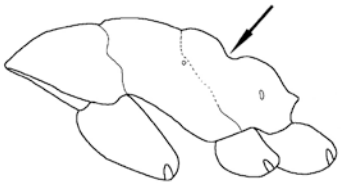

**Figure 272**

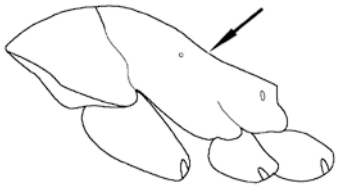

**Figure 273**

26. Number of mandibular teeth nearly always 7 or 8, very rarely 6 or 9 teeth on one or both mandibles (in which case mesosoma is distinctly concave in profile), mesosoma with concavity or angle at metanotal groove, or propodeum concave; head often square with eyes set at or near angles of vertex (Figures 274); body often densely hairy or with thick

pubescence (*C. ephippium* species-complex) (Figure 275) ..... **27**

Number of mandibular teeth 5 or 6; in profile, dorsum of mesosoma often strongly convex, dorsum of propodeum may have a distinct concavity or 'saddle' in a few species, but usually convex or straight in outline; vertex of head capsule often strongly convex with eyes set well below vertex (taxa with flattened vertex or with angle between vertex and sides of head capsule usually have 5 teeth and a strongly convex propodeal dorsum in profile); body rarely with thick pubescence ..... **38**

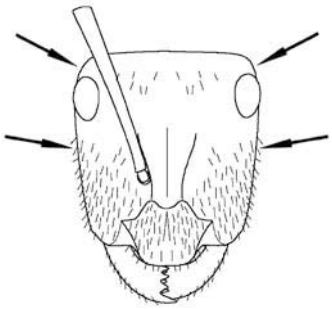

**Figure 274**

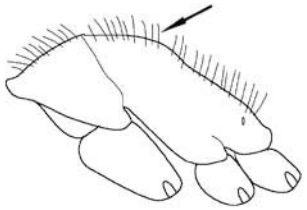

**Figure 275**

27. In profile, vertex of head capsule tapered to a blunt angle; body with pinkish iridescence (appearance that of a meat ant (*Iridomyrmex purpureus* group)) (Figure 276)..... .....***C. perjurus*** **Shattuck and McArthur**

In profile, vertex of head capsule not tapered to a blunt angle, pinkish iridescence lacking, appearance not meat-ant like ..... **28**

28. Small species (HW ≤ 1 mm)..... **29**

Species larger (HW ≥ 1.5 mm) ..... **30**

29. Non-gracile species; in full-face view, head capsule almost as wide as long; clypeus projecting forward, its anteromedial clypeal margin straight (Figure 277) ..... ..... ***C. sponsorum*** **Forel**

Gracile species; in full-face view head capsule less than two thirds as wide as long; anterior margin of clypeus strongly and evenly convex (Figure 278) .....***C. longifacies*** **McArthur**

**Figure 276**

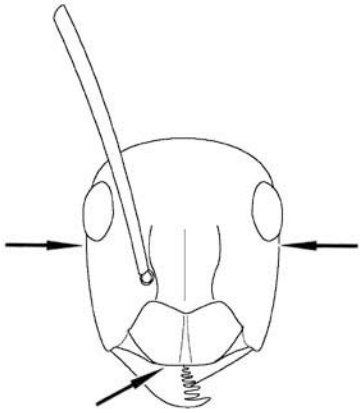

**Figure 277**

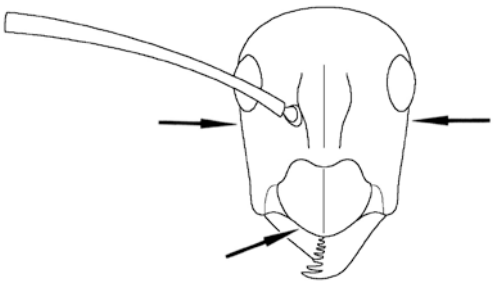

**Figure 278**

30. Vertex convex, without distinct separation between vertex and sides of head capsule; eyes placed somewhat below level of dorsum of vertex (Figure 279)..... **31**

Vertex flat or nearly so, vertex and sides of head capsule may be separated by angle; eyes placed at or near dorsum of vertex (Figure 280) ..... **33**

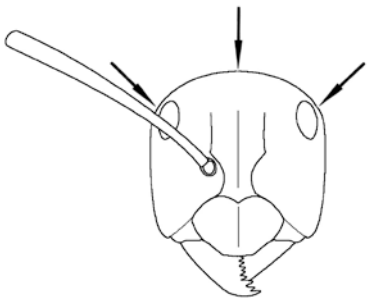

**Figure 279**

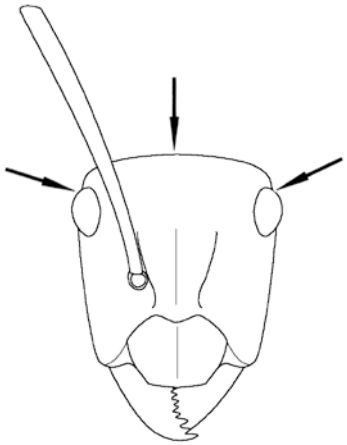

**Figure 280**

31. Tibiae (Figure 281a) and antennal scape (Figure 281b) (and rest of body) covered with many long, erect, white setae ..... ***C. pawseyi*** **McArthur**

    Tibiae (Figure 282) and antennal scape (Figure 283), at least, lacking long, erect, white setae ..... **32**

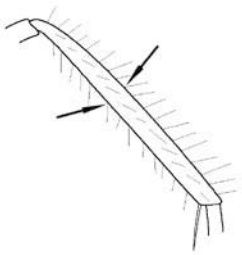

**Figure 281a**

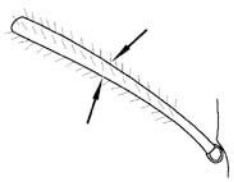

**Figure 281b**

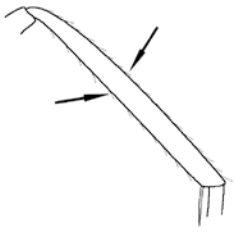

**Figure 282**

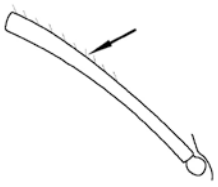

**Figure 283**

32. Tibial setae raised to angle of about 20° (Figure 284); in full-face view sides of head with very many erect, white setae; antennal scape often with several semi-erect setae ..... ***C. cinereus notterae*** **Forel (pt.)**

    Tibial setae appressed or barely raised (Figure 285); in full-face view, sides of head with fewer (usually 12≤), erect, white setae; antennal scape lacking semi-erect setae ..... ***C. ephippium complex*** **sp. JDM 775**

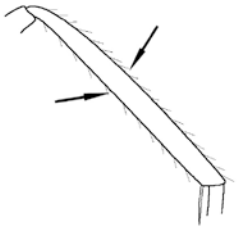

**Figure 284**

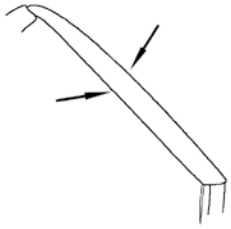

**Figure 285**

33. Tibial setae raised to angle of 20°, giving leg of ant a shaggy appearance (Figure 284) ..... **34**

    Tibial setae appressed or barely raised (Figure 285) ..... **36**

34. With combination of vertex of head completely flattened, with blunt angle distinctly separating dorsum of head from its sides (Figure 280) and antennal scape with several longer, erect or semi-erect setae..... ***Camponotus*** **near** ***ephippium*** **(F. Smith) sp. JDM 431**

    Either vertex of head not so flattened, without distinct separation of dorsum and sides (Figure 279), or antennal scape lacking several longer, erect or semi-erect setae except at the end..... **35**

35. In full-face view, vertex of head behind eyes slightly convex, narrowed towards occiput, eyes set just below posterior angles of vertex (Figure 286); sides of head with many erect setae; ant black or black-and-red in colour with orange mid and hind femora, femora black distally..... ***C. cinereus notterae*** **Forel (pt.)**

In full-face view, vertex of head behind eyes flattened, truncated, not narrowed towards occiput, eyes set at posterior angles of vertex (Figure 287); sides of head usually with few erect setae; colour various but legs not as above.....*C. ephippium* **(F. Smith)**

**Figure 286**

**Figure 287**

36. Individual minute setulae comprising pubescence linked together in rows, giving feathery appearance to each cluster, thick and overlapping on clypeus (Figure 288)..... .....*C. dromas* **Santschi**

Individual setulae comprising pubescence distinct, less abundant and non-overlapping on clypeus (Figure 289) ..... **37**

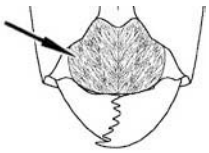

**Figure 288**

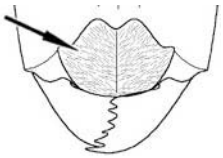

**Figure 289**

37. Appressed setae on body minute, sparse; those on gaster well-separated; nearly always black with red head (very rarely, head and mesosoma reddish-orange, gaster black, or ant entirely black)..... ..*C. capito ebenithorax* **Forel ("black soma")**

Appressed setae on body longer, more abundant; those on anterior of gastral tergites overlapping, forming whitish pubescence; colour variable, often red, or red and dark red, but not distinctly bicoloured as above..... ..... *C. capito ebenithorax* **Forel**

38. Very small (HW ≤ 1 mm); body very compact, in profile, pronotum slightly convex anteriorly, otherwise dorsum of mesosoma almost straight; in profile, propodeal angle produced as a broad, bluntly rounded shelf overhanging the node, declivitous face of the propodeum deeply concave (Figure 290); sculpture densely foveate; body and appendages orange to dark reddish-orange .....*Camponotus* **sp. JDM 695**

If appearance generally as above, in profile, propodeal angle not produced to form a blunt shelf overhanging a deeply impressed declivitous propodeal face..... **39**

39. Gaster black with yellowish-green sheen, finely microreticulate, the cells even and impressed; cuticular membrane at apex of each tergite yellowish; head and mesosoma finely sculptured, black or black-and-red with faint white or yellowish sheen; propodeum long, barely to moderately concave (in latter case forming a 'saddle'); in rear view, sides of mesopleuron and propodeum not or barely compressed; legs red to dark reddish-brown (*C. nigroaeneus* complex, pt.) ..... **40**

Appearance of gaster not as above; otherwise often differing in one or more characters .... **43**

40. Pronotum and mesonotum black, propodeum and posterior of metapleuron bright crimson. ..... *C. chalceus* **Crawley**

Colour combination of mesosoma not as above.. ..... **41**

41. In profile, dorsum of propodeum moderately concave, the propodeal angle raised, forming a small hump..... .....*C. nigroaeneus* **complex sp. JDM 1031**

In profile, dorsum of propodeum not or barely concave, the propodeal angle not raised ..... **42**

42. In full-face view, vertex of head slightly concave, sides of head moderately convex (Figure 291) . ..... *C. hartogi* **Forel**

In full-face view, vertex of head moderately convex, sides of head more-or-less straight (Figure 292) .....*C. innexus* **Forel**

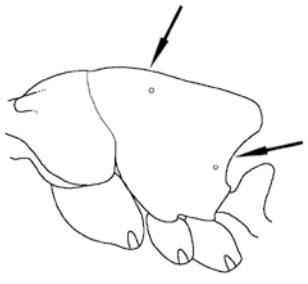

**Figure 290**

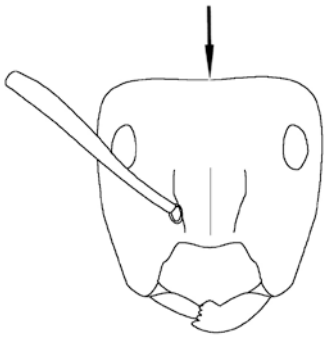

**Figure 291**

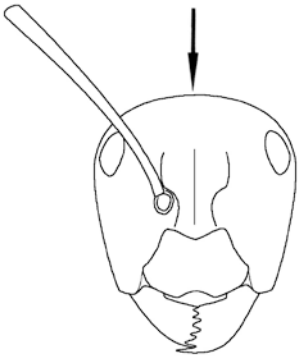

**Figure 292**

43. Declivitous face of propodeum steep, long (ratio between length of dorsum of propodeum and its declivitous face much less than 1:1, often 1:2–1:3) (Figure 293); viewed from rear, sides of propodeum strongly laterally compressed and tapering to a blunt to sharp edge posteriad (Figure 294); sculpture of mesopleuron and propodeum consisting of evenly impressed microreticulation; body concolorous black or dark brown, legs often light in colour; number of mandibular teeth usually six, rarely five (e.g. in some specimens of *C. tristis*) ..... **44**

    If declivitous face of propodeum steep and long, then propodeal sides not tapering to blunt or sharp edge or body colour not concolorous black (members of *C. lownei* complex, which are similar, always have five mandibular teeth, the propodeal flanks are less compressed; the mesopleural and propodeal microsculpture is superficial without uniform, impressed microreticulation, and the colour may be brown, reddish or bicoloured shades of brown or red-and-black) ..... **48**

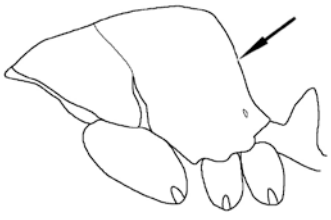

**Figure 293**

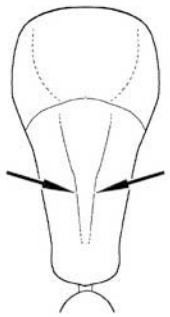

**Figure 294**

44. Erect setae completely absent from dorsum of mesosoma ..... ***C. oetkeri*** **Forel**

    At least two pairs of erect setae present on mesosoma ..... **45**

45. Ant completely black, dull in appearance; propodeal angle not distinct ..... ***C. tristis*** **Clark**

    Ant with femora, at least, normally lighter coloured than the body (usually yellow or reddish), if femora dark, then ant with relatively sharp propodeal angle (rare *C. michaelseni* workers); usually shining in appearance ..... **46**

46. Dorsum of mesosoma with more than three pairs of erect setae (usually many); pronotum and mesonotum distinctly shagreenate in appearance ..... ***C. evae voltai*** **Forel**

    Dorsum of mesosoma with 2 or 3 pairs of erect setae; sculpture on pronotum and mesonotum very weak, these sclerites shiny in appearance ..... **47**

47. Femora yellowish (rarely dark brown), tibiae brown; propodeal angle distinct (Figure 295) ..... ***C. michaelseni*** **Forel**/***C. tumidus*** **Crawley**

    Legs uniformly light brown to yellowish; propodeal angle indistinct (Figure 296) ..... ***C. walkeri*** **Forel**

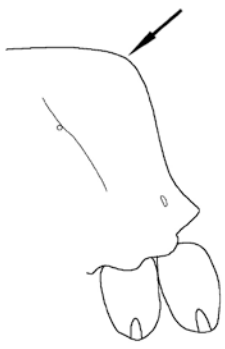

**Figure 295**

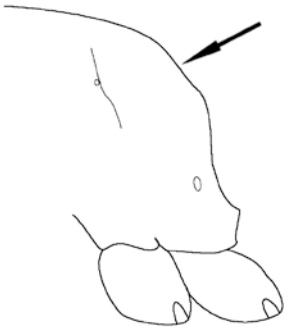

**Figure 296**

48. Five mandibular teeth (basal (sixth) tooth may be represented by minute denticle or angle); in profile, pronotum flat, metanotal groove obsolete; propodeum usually steeply declivitous (Figure 297)..... **49**

Six distinct mandibular teeth; profile usually different (e.g. Figure 298) ..... **58**

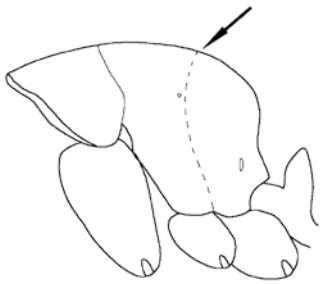

**Figure 297**

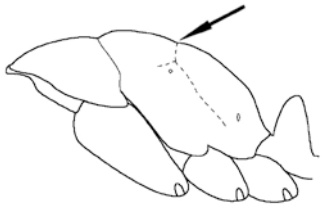

**Figure 298**

49. Head and at least pronotum and mesonotum of mesosoma densely foveate-punctate; matt in appearance, colour of body and appendages orange ..... **50**

Head and mesosoma usually shining, either smooth or with microsculpture; if matt in appearance and reddish, then sculpture finely shagreenate; most commonly black or dark brown with lighter appendages (*C. lownei* complex) or mottled or concolorous ochre (some populations of *C. gibbinotus*) ..... **51**

50. Head and mesosoma densely foveate-punctate (Figure 299); very many erect setae on body, femora and antennal scape; matt in appearance ..... ***Camponotus* sp. JDM 771**

Sculpture and appearance generally as above, but dorsum and sides of propodeum with fine, parallel striolae rather than fovea or punctures (Figure 300); femora and antennal scape lacking erect setae, except at the ends ... ..... ***Camponotus* sp. JDM 1038**

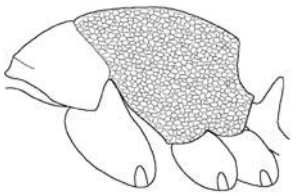

**Figure 299**

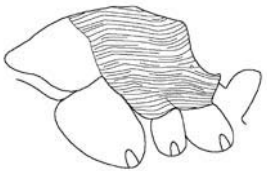

**Figure 300**

51. Propodeal angle absent or very weak, dorsum of propodeum rounding smoothly into declivitous surface of propodeum (Figure 301) ..... **52**

Propodeal angle present, dorsum and declivitous face of propodeum distinctly separate (Figure 302) ..... **54**

**Figure 301**

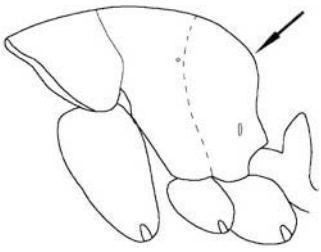

**Figure 302**

52. Uniformly pale ochraceous; basal (sixth tooth) may be represented by a minute half denticle or angle; seen from rear propodeum strongly laterally compressed with distinct edge..... .....***C. gibbinotus* Forel (pt)**

Head much darker than mesosoma when ant viewed dorsally, or ant uniformly dark brownish or black; five mandibular teeth; seen from rear propodeum only moderately laterally compressed without distinct edge..... ..... **53**

When viewed full-face, head capsule rectangular, eyes placed well below vertex (Figure 303)..... .....***C. discors* complex sp. JDM 772**

When viewed full-face, head capsule square, eyes placed near vertex (Figure 304)..... ..... ***C. lownei* complex sp. JDM 616**

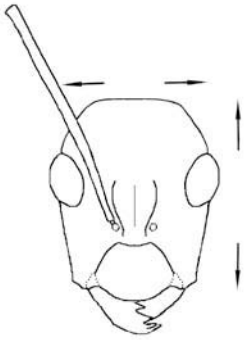

**Figure 303**

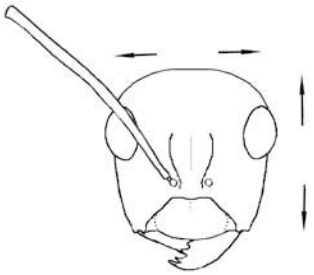

**Figure 304**

54. Head and gaster black, mesosoma, node and legs bright reddish-brown..... ..... ***C. armstrongi* McAreavey**

Head and body either concolorous reddish-or-orange-brown or blackish-brown to black... **55**

55. Underside of head with several erect setae ..... **56**

Underside of head lacking erect setae..... **57**

56. Mandible concolorous reddish-brown; appendages ochre to rich reddish-brown; in full-face view, margin of vertex of head capsule flat to slightly concave in many specimens..... ***C. lownei* Forel**

Mandible dark brown to black with transverse lighter band of colour near masticatory margin; appendages dark brown to brownish-black; in full-face view, margin of vertex of head capsule tending to slightly convex (n.b. Caution: the distinctions between *C. lownei* and *C. evae zeuxis* minor workers given here may not be true for all populations. Major workers are required for a definitive diagnosis) ..... ***C. evae zeuxis* Forel**

57. Vertex of head capsule with erect and semi-erect setae scattered over dorsum; abundant semi-erect setae present on legs and antennae, these setae set at ≈ 20° to horizontal plane (Figure 305a,b) ..... ***C. simpsoni* McArthur**

Erect setae on dorsum of vertex of head capsule confined to a paired row that straddle the midline of the head capsule; setae on antenna and legs appressed or nearly so (Figure 306a,b) ..... ***C. lownei* complex sp. JDM 761**

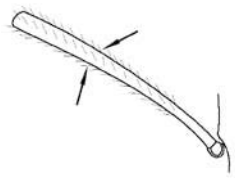

**Figure 305a**

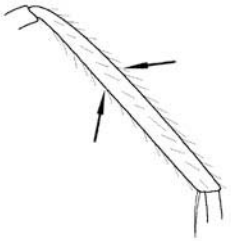

**Figure 305b**

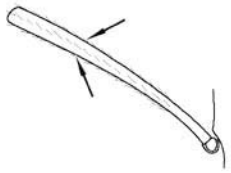

**Figure 306a**

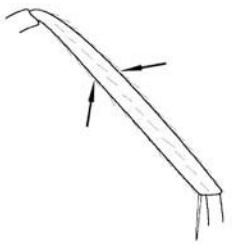

**Figure 306b**

58. In profile, mesosoma forming an arc, mesonotum and propodeum, at least, strongly convex (Figure 307a); in dorsal view, mesonotum and propodeum broad, not laterally compressed (Figure 307b); Vertex of head capsule flat, with distinct angle between eye and posterior margin of head capsule (Figure 307c) ..... .....***C. arcuatus* complex sp. JDM 694**

In profile, mesosoma not forming an arc, either pronotum and mesonotum flattened, propodeum sharply declivitous towards its junction with the petiole, or mesosoma weakly convex, the propodeum weakly

convex or straight; in dorsal view, propodeum often distinctly laterally compressed (Figure 308); head capsule usually without distinct angle between eye and posterior margin of head capsule (Figure 309) ..... **59**

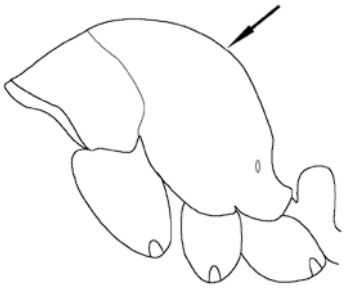

**Figure 307a**

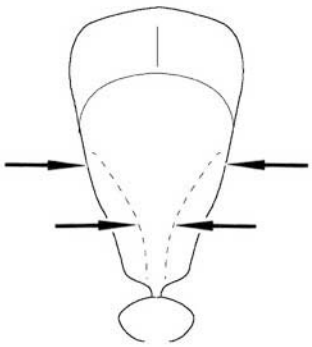

**Figure 307b**

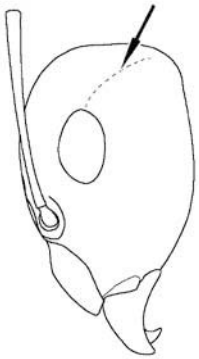

**Figure 307c**

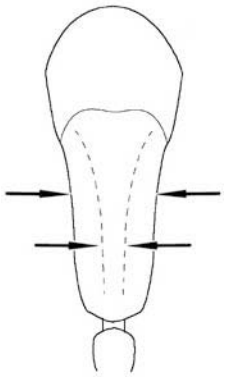

**Figure 308**

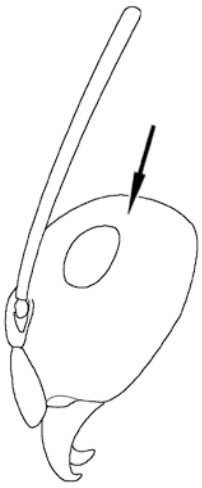

**Figure 309**

59. In full-face view, setae on sides of head extending above level of eyes; antennal scape with short erect and sub-erect setae (Figure 310)..... **60**

In full-face view, setae on sides of head not extending above level of eyes, either absent or restricted to a few about articulation of mandibles (except for *C. cowlei*); antennal scape often lacking erect setae, where present these confined to one or two (Figure 311) .... **61**

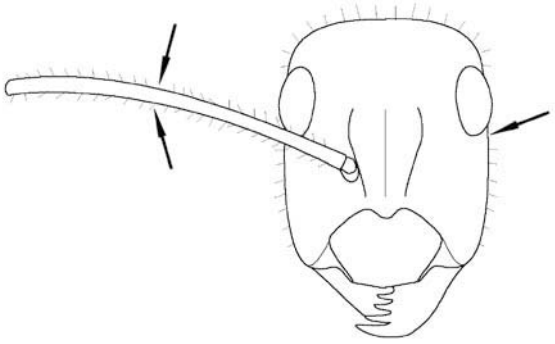

**Figure 310**

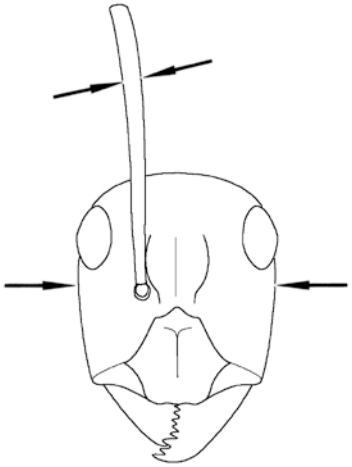

**Figure 311**

60. Head black, contrasting with tawny-orange mesosoma; in full-face view, anteromedial clypeal margin straight without small protuberance at midpoint (Figure 312) ..... ***C. claripes* complex sp. JDM 767**

Head concolorous or only slightly darker than tawny-orange mesosoma; in full-face view, anteromedial clypeal margin slightly convex, with small protuberance at midpoint (Figure 313).....***C. discors* complex sp. JDM 1104**

**Figure 312**

**Figure 313**

61. Erect pronotal setae consisting of one pair placed near the promesonotal suture (rarely, additional shorter erect setae may be found in some *C. darlingtoni* individuals) (Figure 314) ... ..... **62**

Erect pronotal setae consisting of one pair placed at about midpoint of sclerite or of more than three setae without a pair placed near promesonotal suture (Figure 315)..... **64**

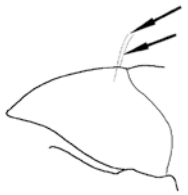

**Figure 314**

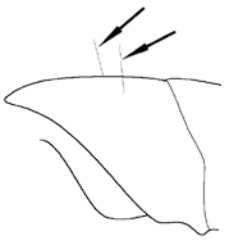

**Figure 315**

62. In profile, dorsal propodeal face straight, ratio of dorsal to declivitous propodeal face ≈ 2:1 (Figure 316)..... ***C. darlingtoni* Wheeler**

In profile, dorsal propodeal face convex, ratio of dorsal to declivitous propodeal face 1:1–1:2 (Figure 317) ..... **63**

**Figure 316**

**Figure 317**

63. Setae on venter of head capsule present (mainly SW coastal plain, also found on inland sand-plains) ..... ***C scratius* Forel**

Setae on venter of head capsule absent (widespread) .... ***C. claripes minimus* Crawley**

64. Body and appendages bright yellow-orange, last two tergites of gaster blackish..... .....***C. claripes marcens* Forel**

Colour variable, but never as above..... **65**

65. In profile, dorsum of propodeum straight; in rear view, sides of propodeum not compressed or very weakly so (Figure 318)..... **66**

In profile, dorsum of propodeum weakly to strongly convex, arcing down to propodeal angle; in rear view sides of propodeum strongly compressed (Figure 319)..... **69**

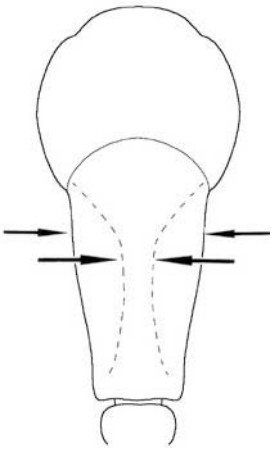

**Figure 318**

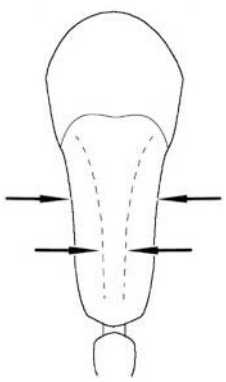

**Figure 319**

66. Setae present on venter of head capsule ..... ..... ***C. claripes*** **complex sp. JDM 430**

Setae absent from venter of head capsule..... **67**

67. Appressed setae relatively long, glistening and sometimes curled, forming close, irregular rows on head, mesosoma and gaster (Figure 320) ..... ***C. scotti*** **McArthur**

Appressed setae minute, well-separated on gaster (Figure 321), forming fine pubescence on lower mesopleuron, propodeum and node ..... **68**

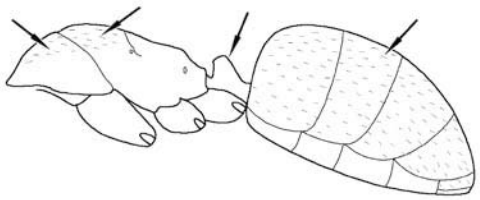

**Figure 320**

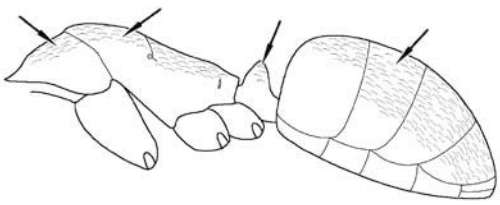

**Figure 321**

68. In full-face view, sides of head straight, parallel (Figure 322); mesosoma matt, shagreenate with milky sheen ... ***C. cinereus amperei*** **Forel**

In full-face view, sides of head tapering, converging anteriad (Figure 323); mesosoma more shiny in appearance ..... ..... ***C. pitjantjatarae*** **McArthur**

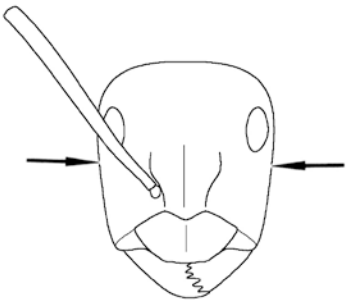

**Figure 322**

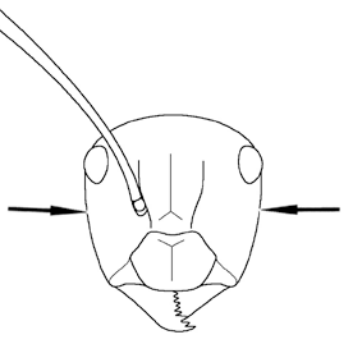

**Figure 323**

69. Appearance matt, dull, with fine, micropunctate sculpture; colour usually uniformly dingy, dark, greyish-brown, more rarely reddish-orange with greyish-brown gaster..... ..... ***C. claripes*** **complex sp. JDM 779**

Appearance glossy, with only very superficial microsculpture; colour variable, but usually paler with at least some yellowish sectors ... **70**

70. In full-face view, genae and lower sides of head capsule with several to many erect and sub-erect setae (Figure 324)..... ***C. cowlei*** **Froggatt**

Genae without erect setae, usually also lacking from lower sides of head capsule (one or two very small erect setae may be present near mandibular insertion) (Figure 325)..... **71**

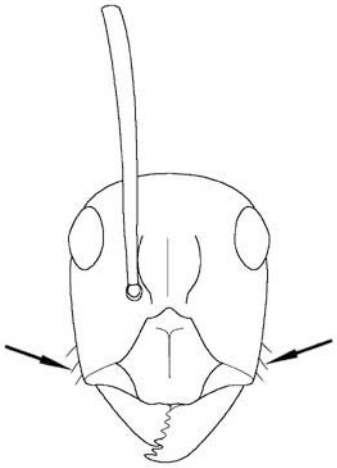

**Figure 324**

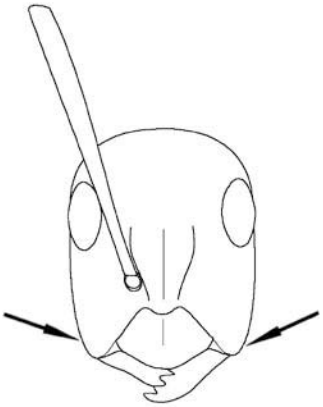

**Figure 325**

71. Anteromedial margin of clypeus straight or slightly emarginate (Figure 326); in profile, petiolar node usually thicker, its dorsum rounded, with tapering edge (if present) directed posteriad; ratio of length of dorsum of propodeum to its declivitous face 1:2≥..... **72**

    Anteromedial margin of clypeus weakly convex, often with small protuberance at its midpoint (Figure 327); in profile, petiolar node rather high and thin, usually tapering to a sharp point apically; ratio of length of dorsum of propodeum to its declivitous face 1:1–1:2 ..... **74**

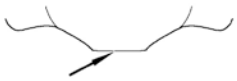

**Figure 326**

**Figure 327**

72. Head and body concolorous ochre to pale brown, legs uniform pale yellow; erect setae absent from venter of head capsule..... ..... ***C. claripes*** **group sp. JDM 288**

    Head conspicuously darker than mesosoma and/or legs with patches of grey infuscation or uniformly dark in colour; one to several erect setae nearly always visible on venter of head capsule ..... **73**

73. Head broader (CI 75≥)..... .....***C. claripes nudimalis*** **Forel**

    Head narrower (CI 70 <)(possibly a complex of at least two species represented here)..... .....***C. claripes*** **Mayr**

74. Sides of head diverging anteriad, greatest head width near articulation of mandibles (Figure 328) ..... ***C. claripes*** **group sp. JDM 1073**

    Sides of head more-or-less parallel (Figure 329).. ..... **75**

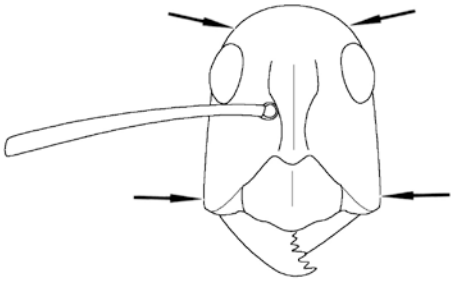

**Figure 328**

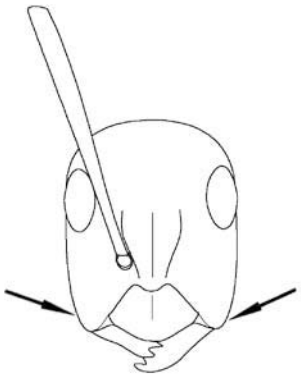

**Figure 329**

75. Setae on venter of head capsule (if present: absent in SWBP specimens, see Figure 330) confined to depression near foramen; yellowish, pale ants, head not darker than mesosoma ..... ***C. gibbinotus*** **Forel (pt.)**

    Setae on venter of head capsule covering a larger area (McArthur, pers. comm. – confined to foramen in SWBP specimens, see Figure 331); tawny-orange to brownish ants, head may be darker than mesosoma.....***C discors*** **Forel**

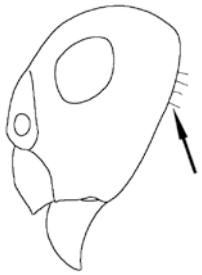

**Figure 330**

**Figure 331**

The lack of a metapleural gland will distinguish West Australian *Camponotus* from all other formicines, except for *Oecophylla* and *Polyrhachis*. *Oecophylla*, represented in Australia only by the famous green tree or weaver ant, *Oecophylla smaragdina* (Fabricius), does not occur in the SWBP, and in *Polyrhachis* spines or sharp angles are always present on the petiolar node (and usually the propodeum), and the first gastral tergite represents slightly less than half to more than half the total length of the gaster. In Australian *Camponotus* spines or sharp angles are lacking on the petiolar node, and the propodeum never carries spines. Moreover, the first gastral tergite represents much less than half the total length of the gaster. *Camponotus* workers are polymorphic, while those of *Polyrhachis* are monomorphic.

The genus *Camponotus* is ubiquitous in Australian environments. One conspicuous group of arboreal taxa, the *C. macrocephalus* species-group, exhibits morphological adaptations to living in twigs and tree-trunks, but most taxa are terrestrial. Nests of some of the latter species can be recognized by the presence of large mounds, while those of others are represented by inconspicuous holes in the ground. Many Western Australian *Camponotus* live under rocks or logs. If these are lifted from the nest, elongate galleries, full of ants frantically removing their brood, are revealed. Many *Camponotus* are general scavengers and foragers; they also collect nectar and other plant secretions and tend Hemiptera. Some *Camponotus* are associated mutualistically with butterflies, particularly those in the family Lycaenidae (McArthur and Adams 1996; Field 1997). Within the SWBP, nocturnal species can often be recognised by their pale bodies and large eyes. However, members of the crepuscular and nocturnal *C. lownei* complex are among those that retain a dark coloration. While the eastern states *Camponotus consobrinus* (Erichson) is sometimes a minor domestic pest, most of the species in the SWBP do not come under notice by the general public. *Camponotus claripes nudimalis* Forel will occasionally enter houses at night, searching for food scraps or carrion (i.e. dead Indian crickets, etc.).

The SWBP *Camponotus* fauna is extraordinarily rich. At the present time 74 morphospecies can be recognized – more than twice the number for any other formicine genus – though perhaps not all of these represent good species. In the SWBP, *Camponotus* are most strongly represented by the *C. claripes* and *C. nigriceps* species-groups in wetter areas, and by the *C. ephippium* complex and the *C. wiederkehri* species-group in drier areas. The composition of most *Camponotus* species-groups is a work in progress at the present moment. However, two of the groups mentioned above have been recently revised and are strongly supported by morphological characters, these being the *C. nigriceps* (McArthur and Adams 1996), and *C. wiederkehri* (Shattuck and McArthur 2002) species-groups. The *C. macrocephalus* species-group has also been revised (McArthur and Shattuck 2001), and is even more highly distinctive morphologically. Currently, McArthur and his associates are engaged in the revision of the entire Australian *Camponotus* fauna. Two papers have thus far been produced (McArthur 2003, 2007). Information provided here on *Camponotus* distributions outside of WA is largely based on specimens housed in the South Australia Museum and Curtin ant Collection as well as the already published data listed above.

The largely tropical *C. macrocephalus* group has just two representatives in the SWBP. *Camponotus gasseri* (Forel) is typical of those members of this group formerly placed in the subgenus *Colobopsis*. The head of the major worker is truncate and heavily sclerotized and used as a type of living bung to the nest entrance, which is usually found in a tree-trunk or tree limb. Fellow workers antennate the head of the major in order to gain entrance to the nest. *Camponotus gasseri* occurs in all Australian states except the NT. *Camponotus macrocephalus* group sp. JDM 927 is an undescribed species known only from a short series of minor workers collected at Yanchep National Park, north of Perth, in 1989, and, more recently, from a few workers collected in a pitfall trap near Eneabba.

Workers of the *C. nigriceps* species-group are all very large ants, and include some of the largest formicines in the SWBP. Members of the group are easily recognized by the projecting clypeus, which has either a deep median notch in the anterior border or is concave. The projecting edges of the clypeus are always acute. Despite the distinctive appearance of members of the group, however, individual species are morphologically very similar and difficult to identify. Of the nine recognized species, five occur in the SWBP. All can only be identified accurately by examination of the distribution of erect and sub-erect setae on certain parts of the body. *Camponotus longideclivis* McArthur and Adams is the only one of the four taxa that lacks setae on the venter of the head capsule. The distribution of this ant embraces the south-eastern portion of the SWBP, in and around the Esperance region.

*Camponotus nigriceps* (F. Smith) and *Camponotus dryandrae* McArthur and Adams are two very large and widespread species. Both are very common in the Darling Range, where they are sympatric. The distribution of erect and sub-erect setae on the propodeum distinguishes each species; these setae being continuous along the propodeal dorsum in *C. nigriceps*, and concentrated near the propodeal

angle in *C. dryandrae*. The nests of these ants in the Darling Range are often found in compacted laterite clay around the boles of trees, but are also made directly into soil. The range of *C. nigriceps* probably includes all Australian states, although McArthur and Adams (1996) did not record it for the NT, while *C. dryandrae* is found in the south-west and goldfields in this State. *Camponotus prostans* Forel and *C. dryandrae* are very difficult to separate on morphological characters alone. The only reliable feature is the reduced number of setae found on the venter of the head capsule in *C. prostans*, a feature that requires examination through a microscope. However, in the field their rich reddish- or yellowish-brown-and-black colouration separates most workers of *C. dryandrae* from the more sober, uniformly blackish or brown-and-black *C. prostans*. The latter is mainly confined to the south-west and southern portions of the SWBP, but has been recorded as far afield as the Gibson Nature Reserve, well to the NE of the SWBP. *Camponotus clarior* Forel is a principally eastern, eremaean species that is known in the SWBP from a single collection taken by McArthur from just south of the Billabong Roadhouse, near Shark Bay. The ants were collected from a nest in a hollow branch overhanging a conical mound of excavated soil directly under the nest (A. McArthur, pers. comm.). This species strongly resembles *C. nigriceps*, but workers have a pale coloured head, concolorous with the mesosoma and node. Elsewhere in WA, workers of this species have been collected from the Queen Victoria Spring Nature Reserve, north-east of Kalgoorlie.

The head of the minor worker of *Camponotus perjurus* Shattuck and McArthur has a unique vertex, and this ant cannot be mistaken for any other *Camponotus* species. Shattuck and McArthur (2002) placed this species in its own species-group. The range of this ostensible meat ant mimic is extensive throughout SA and WA, but collections have been very rare. Single foragers have been collected in association with the meat ant *Iridomyrmex spodipilus* Shattuck and also a *Camponotus* species (*Camponotus prosseri* Shattuck and McArthur) (Shattuck and McArthur 2002). Despite its aberrant head capsule, *C. perjurus* seems to me to be otherwise a representative member of the *C. ephippium* species complex, which is widespread and diverse in arid and semi-arid parts of this State. The dentition and character of the mandible, the shape of the mesosoma and petiolar node, and the pilosity pattern all suggest to me that it should be placed in this complex, probably somewhere near *Camponotus ephippium* (F. Smith). The finding of the major subcaste should settle this question, as *C. ephippium* complex major workers are distinctive.

Members of the *Camponotus wiederkehri* species-group have curved setae on the base of the mentum. Many, if not all members of this species-group also possess a rather elongate spiracle. These features are shared with *Melophorus* species, but members of the *C. wiederkehri* species-group can be distinguished from *Melophorus* by the placement of the antennal insertions well above the posterior margin of the clypeus, and by the absence of a metapleural gland.

Ten described species and two or three undescribed members of the group can be found in the SWBP, and this number may increase with further collecting, as several additional species have known distributions that include localities just outside of the SWBP. *Camponotus terebrans* (Lowne) is the most common of these species in the wetter parts of the SWBP, and has a wide range throughout southern Australia. Workers of this species and *Camponotus gouldianus* Forel can be distinguished from the rest of the group by their hirsute antennal scapes and tibiae. Workers of *C. terebrans* are unusually aggressive for *Camponotus* and will readily swarm over and nip anyone who disturbs their nests. This species occasionally enters buildings in outer suburbs of the Perth metropolitan area, and is also known to have a mutualistic association with *Ogyris* spp. (Lycaenidae) (Braby 2000). *Camponotus wiederkehri* group sp. JDM 924 and *Camponotus wiederkehri* group sp. JDM 925 are known in the SWBP only from rehabilitated mineral sand mines in the Eneabba district (*Camponotus wiederkehri* group sp. JDM 924 has also been collected from the Kennedy Ra., inland from Carnarvon). These two colourful red species – or, possibly, a single variable species – are common diurnal foragers on the mine sites. They may be expected to occur on other areas of the Kwongan sand-plain, north of Perth. They can be distinguished from each other by the presence or absence of erect setae on the lower side of the head capsule (seen when the worker is in full-face view).

Workers of the closely related *Camponotus ceriseipes* Clark, *Camponotus prosseri* Shattuck and McArthur and *Camponotus ceriseipes* complex sp. JDM 105 are rather difficult to differentiate (see species-level key for a few useful characters). Some of the worker variation includes attractive orange-and-black or red-and-black ants with shiny gold to off-white pubescence on the gaster. *Camponotus ceriseipes* and *C. prosseri* form a closely related unit. *Camponotus ceriseipes* has been recorded from widely separated localities in the NT, SA and WA, but is confined to the south coast in the SWBP, while *C. prosseri*, separable from the former only by the length of the antennal scape in larger minor workers (and, I think, its colour), occurs in NSW, SA and the southern sector of WA. *Camponotus ceriseipes* complex sp. JDM 105 is thus far only known from Kingsley, a northern Perth suburb, and Chingarrup,

Nornalup and Torbay on the south coast.

*Camponotus wiederkehri* Forel is a very common large-eyed *Camponotus* of central and northern Australia, but is also found in drier, inland areas of the SWBP. Colour and pilosity vary considerably in this ant. A superficially similar species, but one with a smaller eye and different mesosoma profile, *C. donnellani* Shattuck and McArthur, is known from a single minor worker collected 50 km east of Hyden in sand-plain heathland. Elsewhere this arid zone species has been recorded from the Pilbara and from scattered locations in NT and SA.

In WA, *Camponotus postcornutus* Clark has a known distribution mainly confined to in and around the SWBP, although it is also found in SA. This striking red-and-black ant is a diurnal forager, and both major and minor workers can be seen scurrying quickly over the ground in mallee country. The black-and-gold *Camponotus versicolor* Clark is found in the drier regions of southern and south-eastern WA. This species can be distinguished from the more common and widespread *Camponotus aurocinctus* (Smith), which probably does not occur in the SWBP, by its darker coloration. *Camponotus gouldianus* is another large, arid area species, whose range just overlaps the far south-east of the SWBP. This species is particularly common in SA (Greenslade 1979; Shattuck and McArthur 2002), though it is probably found in all mainland Australian states.

*Camponotus johnclarki* Taylor has J-shaped setae on the mentum and an elongate propodeal spiracle, and probably should be placed in this group. The minor worker has an odd appearance, its posteriorly attenuated head capsule suggesting an affinity with members of the *C. subnitidus* species-complex. The *C. johnclarki* major worker, however, is quite unlike major workers of the latter group. *Camponotus johnclarki* was originally placed in the genus *Notostigma*, but that is a rainforest genus, whose Australian representatives are confined to tropical and temperate rainforests on the east coast. Taylor (1992), who removed *C. johnclarki* from *Notostigma*, provides distribution details for this species, which also occurs in SA. Workers are rarely encountered, but on several instances I have seen them foraging on *Banksia* trunks in woodland north of Perth.

The remaining *Camponotus* species are not as readily assigned to natural groupings. These taxa may represent radiations related to the well-known *Camponotus claripes* Mayr. The *C. ephippium* species-complex is the most easily defined of these radiations, and major workers in this group can readily be distinguished by their head shape, which has evolved for a similar purpose to that of majors in the *C. gasseri* group. Ants in the *C. ephippium* complex, however, are soil nesters rather than wood nesters, so the head shape in the major workers has not reached quite the same extremes found in majors of the *C. gasseri* species-group. The minor workers in the *C. ephippium* complex are less distinctive than the major workers, but can generally be distinguished from other groupings by a combination of mandibular, head and mesosoma characters (see key). The body of the minor worker is often densely hairy or has thick pubescence.

The *C. ephippium* complex has at least ten representatives in the SWBP, most of these occurring in the drier Wandoo woodland and mallee areas, rather than in the wetter *Banksia* or Jarrah-Marri woodlands or the karri forests of the south coast. Major workers cannot yet be associated with all of the following *ephippium* complex taxa, and I have separated those of which I am aware mainly on the basis of subtle differences in the sculpture of the head capsule. Added to this is the fact that majors are rarely found foraging. Consequently, discussion of the morphology of this group focuses on the minor workers. Several taxa can be grouped phenetically on the basis of the pilosity of their hind tibiae.

*Camponotus sponsorum* Forel and *Camponotus longifacies* McArthur are two very small *Camponotus*, and in the field minor workers resemble small *Iridomyrmex* species such as *I. chasei* and *I. bicknelli*. In the SWBP these *Camponotus* are typically found in the eastern Darling Range and wheatbelt regions, but occur widely throughout Western Australia, penetrating at least the Pilbara region. *Camponotus sponsorum* is also found in the NT, while the minute *C. longifacies* was described recently from Narrandera, NSW, and occurs in all mainland states. Of the larger ants in which minor workers have a rounded vertex, *Camponotus pawseyi* McArthur, a wheatbelt ant with hairy tibiae and antennae, is easily split from *Camponotus ephippium* complex sp. JDM 775 McArthur, in which these parts lack erect setae. *Camponotus cinereus* Mayr was described from Qld, and may occur in the far north of the SWBP. However, I have not seen reliably identified material belonging to this species, and, based on the appearance of the major worker in images, have some doubts as to whether it belongs to the *C. ephippium* complex. A morphospecies that may prove actually prove to be *C. cinereus*, *Camponotus* sp. JDM 1108, is discussed below.

The other members of the *C. ephippium* complex include minor workers with a rather flattened vertex, one species having a distinct angle between the vertex and sides of the head capsule. In full-face view, the eyes are situated at or near the vertex. These ants are typical members of the *Camponotus* fauna in arid and semi-arid areas of Western Australia. The minor workers of three taxa can be distinguished by lacking erect or semi-erect setae on the hind tibiae. Minor workers

of *Camponotus capito ebenithorax* Forel ('black soma' – McArthur, pers. comm.) are nearly always black with a distinctive red head – though one minor worker from Fitzgerald River NP also has a reddish-orange mesosoma, and ants from near Westonia are all black and lack pubescence on the gaster. Minor workers of *C. capito ebenithorax* have thick pubescence on the gaster, and, while colour variable, are never black with a red head. The two taxa probably represent different species. Both can be separated from *Camponotus dromas* Santschi through inspection of pilosity patterns of the smaller appressed setulae on the head and mesosoma surfaces. While these are mainly separated from one another in the former two taxa, they are linked together in irregular rows in the latter.

The remaining three species in the *ephippium* species-complex have rather shaggier hind tibiae, with semi-erect setae as well as shorter appressed setae. *Camponotus* near *ephippium* (F. Smith) sp. JDM 431 is very similar to the other two taxa, but minor workers have a distinct angle between the eye and the posterior margin of the head capsule that is lacking in either of the latter. Minor workers are very hairy, and usually possess a black-and-red mesosoma. *Camponotus* near *ephippium* (F. Smith) sp. JDM 431 has a known distribution in the states of SA and WA. *Camponotus cinereus notterae* Forel, despite its name, is probably not close to *C. cinereus* and is certainly not closely related to *Camponotus cinereus amperei* Forel. This ant, in which minors are typically hairy and black with orange legs, appears to have its main distribution in the Darling Range near Perth, and in adjacent areas in the south-west wheatbelt, but can be found at least as far east as the Kalgoorlie region. The species may be conspecific with the much more wide-spread *Camponotus ephippium* (Smith), which has a distribution throughout Australian mainland states, but what appear to be small but consistent differences in the minor workers of the two taxa (major workers are less well characterised) are provided in the key.

*Camponotus whitei* Wheeler and *Camponotus molossus* Forel appear to have affinities with the *Camponotus intrepidus* species-group (or complex), most of whose members are found on Australia's east coast. *Camponotus whitei* has distinctive major and minor workers, with a deeply impressed metanotal groove. In the major worker the mesonotum abruptly descends to the propodeum, a feature not found in any other *Camponotus* major worker in the SWBP. Both sub-castes have a densely punctate sculpture, with stiff, erect, yellow setae. *Camponotus whitei* probably occurs in all the mainland states, though it is most common in the Bassian region. Major and minor workers of *C. molossus* are covered with thick, bristly, erect, setae that are white in this case. *Camponotus molossus* is a very large, black species that appears to have a localized distribution on the Swan Coastal Plain and western Darling Range. The head capsule of the major worker is probably broader than that of any other *Camponotus* species found in the SWBP.

The members of the *Camponotus subnitidus* complex superficially resemble very large *Camponotus claripes* complex workers, but they do possess important differences in the major and minor castes, and probably form a separate taxonomic unit to ants related to *Camponotus claripes* Mayr. Major workers can be fairly easily recognized by their huge, well-armed mandibles (seven or more teeth present), the peculiar, almost circular outer surface of the mandible, and the usually flat vertex of the head capsule. Minor workers may be confused with some minor workers of the *C. claripes* complex with posteriorly attenuated head capsules. However, in the case of *C. subnitidus* complex minors, the edges of the foramen are fluted or flanged, a condition not found in workers of the *C. claripes* complex. *Camponotus johnclarki* also has a flask-shaped border around the foramen, but this species has the J-shaped setae on the mentum characteristic of the *C. wiederkehri* species-group. Two species indubitably in the *C. subnitidus* complex (*Camponotus rufus* Crawley and *Camponotus tricoloratus* Clark) are found in the SWBP. Major and minor workers of *C. tricoloratus* have many setae under the head capsule, but these are lacking or restricted to a single pair in *C. rufus*. Both ants have distinct habitat preferences in western Australia, but also occur in other states. In WA, *C. rufus* is restricted to the more mesic south- and mid-west, while *C. tricoloratus* is also found in the semi-arid and arid areas of this State.

The remaining 40 *Camponotus* taxa here recognized as occurring in the SWBP (along with several I am treating as likely synonyms) are much more homogeneous in appearance. The appearance of the mesosoma, especially in major workers, however, suggests two separate evolutionary radiations, one of which embraces taxa with a long mesosoma and a low propodeum, and the other those with a short mesosoma and a high, sometimes concave propodeum. Major and minor workers of all species, with just one exception, have five or six mandibular teeth.

Of those species in which major workers have long mesosomas, *Camponotus chalceus* Crawley, *Camponotus hartogi* Forel, *Camponotus innexus* Forel and *Camponotus nigroaeneus* complex sp. JDM 1031 are probably very closely related, all being finely sculptured black or red-and-black ants with rather square heads and a concave propodeum. The gaster is matt and minutely punctate-reticulate, and the posterior margin of the tergites is light in colour,

giving these ants a gold-banded appearance in the field. *Camponotus chalceus* is quite common in southern SA and WA, and its WA range includes the more wooded Perth suburbs. This ant nests in trees, including *Banksia*. *Camponotus hartogi* also has a southern distribution, being found in SA, Vic and WA. In the SWBP this species appears to be confined to the south coast. *Camponotus innexus* Forel, otherwise known from the east coast of Australia, is represented in the Curtin Ant Collection by two minor workers from Nerren Nerren Station, on the northern outskirts of the SWBP. This species is currently separated from *C. hartogi* by the appearance of the head capsule in full-face view. *Camponotus nigroaeneus* complex sp. JDM 1031 is known only from two minor workers taken in an intercept trap off a Jarrah (*Eucalyptus marginata* Donn ex Sm.) trunk at Dryandra State Forest, in the southern wheatbelt.

Rather similar to the above four species but lacking the minutely punctate gaster are three other taxa in which the major also has a long, low mesosoma. Minor workers of the reddish *Camponotus scotti* McArthur superficially appear to have more affinity with those of the *C. ephippium* species-complex, but the major worker lacks the posterior lobes to the vertex found in the latter group, and minor workers have six mandibular teeth. Minor workers also have glistening white setae that may be appressed or curled over. This species is not uncommon in the Darling Range, but was described from Jupiter Creek near Adelaide. *Camponotus cinereus amperei* Forel, despite its name, is not closely related to *C. cinereus notterae* but may be close to *C. cinereus*. This species is a common sight in arid and semi-arid woodlands in southern Australia, where workers scurry swiftly across the ground with their gasters vertically raised. The colour of the workers ranges from black (most commonly) to a rich red. This ant was described from Victoria.

*Camponotus pitjantjatarae* McArthur is very similar to C. *cinereus amperei*, but supposedly differs in the broader, more tapering head and shinier mesosoma of the minor workers (A. McArthur, pers comm.). However, the West Australian material I have available appears to overlap the published boundaries between the two taxa, and I am uncertain as to whether the two are to be thus separated. On the other hand, there appear to be differences in the appressed pronotal setae in minor workers of the two taxa: in *C. pitjantjatarae* these setae are short and well separated, whereas in *C. cinereus amperei* the setae are close together and form a fine pilose covering to the pronotal sclerite.

*Camponotus* sp. JDM 26 is an ant of uncertain affinities. Both major and minor workers have an odd, transverse notch midway along the propodeum. The immediate impression on seeing a specimen, if one is unfamiliar with the species, is that the animal was damaged during the pupal stage or has a deformity. This species is occasionally collected in the Swan Coastal Plain and Darling Range and has also been collected in the western goldfields, the Esperance sandplains and east of the SWBP. The minor worker has a similar appearance to *C. scotti* and possesses the same glistening white appressed setae, but the major workers of the two species are very different. A possible placement in the *C. ephippium* complex is suggested by the appearance of the head capsule in the major worker and the appearance and dentition of the mandible in both worker subcastes.

The minor workers of *Camponotus claripes minimus* Crawley, *Camponotus darlingtoni* Wheeler and *Camponotus scratius* Forel all have the principal, paired, erect, pronotal setae placed near the mesonotal suture, a synapomorphy not shared with any other *Camponotus* in the SWBP. This closely allies the three taxa, despite the fact that the *C. darlingtoni* major worker has a relatively long, low mesosoma while the major worker of the other two species has a shorter, high mesosoma. (A few *C. darlingtoni* individuals may have additional shorter setae placed in a line with the stout pair, and one specimen from Eneabba also has a tiny erect seta in the centre of the pronotum.) Somewhat incomprehensibly, the name of *C. darlingtoni* was sunk under *C. terebrans*, a species to which it is only distantly related, by Brown (1956), before it was revived from synonymy by McArthur *et al*. (1997). This is an ant of the south-west corner of WA, where it can be found in woodland around Perth and on Rottnest Island.

*Camponotus scratius* Forel and *Camponotus claripes minimus* Crawley are very small forms, minor workers of *C. scratius* being among the smallest *Camponotus* in Australia. They are both common, and, being very similar in appearance, are easily confused. Both major and minor workers, however, can be distinguished by the presence (*C. scratius*) or absence (*C. claripes minimus*) of setae on the venter of the head capsule. The two species appear to have a wide range in coastal WA, but whereas, in the lower south-west, *C. claripes minimus* is found in both coastal and inland regions, *C. scratius* is rarely found more than a few kilometres from the coast. However, the latter can also be found in inland sand-plain country, east of Kalgoorlie. Minor workers of *C. claripes minimus* vary considerably in appearance from tiny, yellowish forms from the Kwongan sand-plain north of Perth, to rather more robust brown ants in southern districts. Some workers from the goldfields have an orange mesosoma, contrasting with a dark head, petiolar node and gaster. *Camponotus scratius* minors, on

the contrary, vary little in appearance. Forel (1907) described *Camponotus scratius nuntius* from material from Dirk Hartog Island, in the extreme north of the SWBP, but the holotype is lost, probably destroyed, and I am unable to positively identify material answering to the brief description of this ant.

*Camponotus* with a high propodeum include many SWBP species. In the *Camponotus arcuatus* complex, the mesonotum and propodeum of the minor worker are broad and not laterally compressed in dorsal view. The *Camponotus arcuatus* complex is probably not closely related to the other taxa mentioned below. Only the minor worker is known for *Camponotus arcuatus* complex sp. JDM 694. The appearance of this ant agrees closely with that described for *Camponotus arcuatus aesopus* Forel, but unfortunately the holotype of *C. arcuatus aesopus* has probably been destroyed. This is a shiny black ant of the goldfields, although a closely related species from the north-east coast of Queensland, *Camponotus esau* Forel, is matt in appearance.

The *Camponotus lownei* complex includes *Camponotus* species that characteristically have a dark coloured head and mesosoma, though some have a reddish body. The minor workers are small and compact and have five mandibular teeth. These ants are ubiquitous and common in almost all non-urban environments. Six species are recognized here, each distinguished by consistent differences in head shape, pilosity patterns and colour. In the field the workers are timid, and, if disturbed, readily seek refuge in litter. Based on my collecting experience, most species are probably nocturnal or crepuscular. *Camponotus lownei* Forel, itself, occurs in at least NSW, SA and WA. *Camponotus evae zeuxis* Forel can only properly be distinguished from *C. lownei* by inspection of the major worker (*C. evae zeuxis* having a parallel-sided head, and *C. lownei* a head whose sides converge anteriad). The minor worker of this widespread ant usually has darker appendages than that of *C. lownei*, which characteristically has rich, reddish-brown appendages. The attractive red-and-black *Camponotus armstrongi* McAreavey also belongs to the complex, and the major worker has the same head shape as *C. lownei*. This species mainly occurs outside of the SWBP, but material seen by the author in the California Academy of Sciences was collected near Merredin.

*Camponotus simpsoni* McArthur is one of several *Camponotus* recently described by McArthur (2003) from South Australian material. *Camponotus lownei* complex sp. JDM 616 is known from the far eastern wheatbelt. The remaining species, *Camponotus lownei* complex sp. JDM 761, is known only from minor workers collected in the Darling Range.

Similar to the *C. lownei* complex in appearance, is what is here called the *C. michaelseni* complex. Like most members of the *C. lownei* complex, those in the *C. michaelseni* complex have a black mesosoma and a high propodeum whose declivitous face is steep and often concave. The members of the latter complex, however, have a minutely punctate propodeum and lower mesopleuron, as compared with a superficially microreticulate or striolate propodeum and mesopleuron in the former. The other major difference is that in the minor worker the sides of the propodeum have a pinched-in appearance, and the declivitous propodeal face viewed from the rear is virtually an edge that may be sharp or blunt, depending on the species. The same body parts in members of the *C. lownei* complex are much less compressed, and the declivitous propodeal face does not have the appearance of an edge in most specimens. Members of the *C. lownei* complex also have a maximum of five mandibular teeth, whereas the number is six in the *C. michaelseni* complex (with the exception of some workers of *Camponotus tristis* Clark, which have five).

The all-black *C. tristis* Clark is widespread in the SWBP, and in semi-arid areas is commonly found foraging on vegetation. The ant is normally matt in appearance. However, a smoother, shinier version has been collected in the Merredin and Westonia districts and more specimens of the latter are needed to find out if the variation in sculpture is continuous. Western Australian material referrable to *Camponotus oetkeri* Forel, *Camponotus michaelseni* Forel and *Camponotus walkeri* Forel, is very similar in appearance, all ants being black with yellow legs or orange legs with dark joints (rarely the entire femora may be black in *C. michaelseni*). *Camponotus oetkeri*, found throughout WA and in the NT, differs from the other two taxa in lacking erect setae on the mesosoma in both worker subcastes. *Camponotus michaelseni*, which may well be synonymous with *Camponotus tumidus* Crawley and *Camponotus walkeri bardus* Forel, judging from descriptions and photographs of the type material, is mostly confined to the south-west. Within this area it is most common in the laterite soil of the Darling Range where its nests under stones are readily found. *Camponotus walkeri* was described from a major worker from East Wallabi Island in the Abrolhos, and the colour is given as 'brownish-black' (Forel 1893). Specimens from NSW believed to be *C. walkeri* are held in SAMA, and these have lighter brown bodies. All specimens I have seen from WA, however, are black with light yellow legs. This species is not uncommon in some Perth coastal parklands where native vegetation persists, and has also been collected as far east as Coolgardie, and as far north as Shark Bay. The taxon here identified as *Camponotus oetkeri voltai* Forel differs slightly in colour from the syntype material from Tasmania, but I believe the two are conspecific. The species is recognised among similar ants by its shagreenate

appearance (minor worker) and plentiful erect setae on the mesosoma and under the head capsule (both major and minor sub-castes). In the SWBP *C. oetkeri voltai* is confined to wetter and better-vegetated areas of the south-west. The recently described *Camponotus rudis* McArthur appears to be a synonym of this species.

Three very small orange *Camponotus* with a high propodeum complete the group with a high, concave propodeum. These do not appear to be closely related to the other taxa, but share with the *C. lownei* group a similar mandible with a compliment of five teeth. *Camponotus* sp. JDM 695, known from minor workers only, has a deeply concave propodeum and densely foveate sculpture. *Camponotus* sp. JDM 771 has a less concave propodeum and foveate-punctate sculpture. In WA, both species are known from a handful of specimens collected in the eastern wheatbelt and adjacent goldfields. Also from the goldfields is *Camponotus* sp. JDM 1038, which is quite similar to the other two species, but has fine, parallel striolae on the mesopleuron and propodeum. The major worker is a bright, glossy orange with a bulbous head and five mandibular teeth.

Major workers here referred to the *C. claripes* complex are easily recognized by the presence of short erect and sub-erect setae on the genae and sides of the head capsule and the punctate, rugose or otherwise sculptured cuticle on and around the clypeus, but minor workers are much more nondescript when compared with related species. Members of this complex are very common in all ecosystems in the SWBP, and, if disturbed, minor workers have the interesting defence mechanism of drawing their limbs close to their bodies and feigning death (thanatosis). This ruse is particularly effective if they are on tree-trunks, when they will free-fall to the ground if touched. Lying immobile among vegetation, twigs and leaf litter, these small-medium ants are then almost impossible to find.

*Camponotus claripes* Mayr needs much research in order to delimit the taxon successfully: what is here defined as '*C. claripes*' is almost certainly a species cluster. The major workers in the *C. claripes* group are often represented as having a bilobate anterior clypeal margin (e.g. Greenslade 1979). This is also true for *C. claripes* Mayr minor workers. However, minor workers in the SWBP that appear to belong to *C. claripes* invariably lack this feature, the anteromedial clypeal margin being straight in most populations, and faintly convex in the remainder. *Camponotus claripes* was described from material collected in NE Queensland, but three subspecies were described from material collected in the SWBP. These are, in fact, distinct and recognizable species. *Camponotus claripes minimus*, which does not actually belong to the *C. claripes* complex, has already been mentioned, and *Camponotus claripes nudimalis* Forel is discussed below: major workers do not have a hirsute head capsule in this species. *Camponotus claripes marcens* Forel, however, is a member of the *C. claripes* complex with unique behaviour for the group. The brightly-coloured minor workers with a yellow-and-black gaster are most commonly encountered, often as they are running rapidly up and down Jarrah and Marri trunks. These ants will seek to evade detection by keeping to the opposite side of the tree to the side where the observer is standing. *Camponotus claripes marcens* has a more limited range than many of its close relatives, and seems to be confined to the Darling Range and southern wheatbelt. The form of *C. claripes* ***sensu stricto*** most commonly seen in the south-west agrees very closely with an eastern states subspecies, *Camponotus claripes inverellensis* Forel and has the same bicoloured head, but the major workers of the local ant have a reddish brown rather than a pale yellow mesosoma. Another light-coloured, eastern states form, *Camponotus claripes piperatus* Wheeler, which is very similar to the above sub-species, may also be present in the south-west of WA. In the wetter jarrah forests is another form with a dark head that is not pale coloured anteriorly (unlike the head of the two forms mentioned above) and heavily infuscated legs.

Three probably undescribed members of the *C. claripes* complex that appear to represent good species are here designated as *Camponotus claripes* complex sp. JDM 430, *Camponotus claripes* complex sp. JDM 767 and *Camponotus claripes* complex sp. JDM 779, respectively. *Camponotus claripes* complex sp. JDM 767 is the largest member of the group, and minor workers are rather hairy, with many long setae on the head, body and venter of the head capsule. This ant has much the same range as *C. claripes marcens*. The minor workers of *Camponotus claripes* complex sp. JDM 430 and *Camponotus claripes* complex sp. JDM 779 are very similar, both being dark brown ants with a shagreenate exoskeleton. The former, though, has a narrow mesosoma reminiscent of the *C. maculatus* complex, none of whose members appear to occur in the SWBP, and the pilosity bears some resemblance to that of *C. scotti*. The major workers are also quite distinct (see key). Both species occupy habitats on the east slopes of the Darling Range and in the adjacent wheatbelt. *Camponotus claripes* group sp. JDM 288 has a distinctive major worker that has a pitted clypeus but lacks erect setae on the side of the head. However, minor workers of this species are very difficult to distinguish from those of both *Camponotus claripes* and *Camponotus claripes nudimalis*. This ant appears to have its stronghold on the drier eastern flanks of the Darling Range, where nests can be found under stones.

Six medium-sized orange or orange-and-brown species have a similar *facies* to the foregoing species, but the major workers have a smooth clypeus and the propodeum in the minor workers is somewhat higher in relation to its dorsal surface. Minor workers also tend to have a high, narrow petiolar node (usually thicker and bluntly rounded in minor workers from the *C. claripes* complex). These ants are among the most common *Camponotus* in the SWBP. *Camponotus gibbinotus* Forel is a nocturnal ant often seen in drier areas. The minor workers are frequently found standing stationary on twigs or grass stems, with only their antennae moving. Major workers have a flat or faintly carinate clypeus with a slightly projecting, rectangular anterior margin. The margin is crenulate. The taxonomic position of the very closely related *Camponotus discors* Forel is at present unclear. The only officially recognized difference between the two nominal taxa is the distribution of the erect setae on the underside of the head capsule (A. McArthur pers. comm.). Molecular methods will be needed to ascertain whether the two taxa represent distinct species or are only morphs of a single species. (In fact, *C. gibbinotus* itself may be a species complex, there being rather large differences between the minor workers, both in terms of size, the number and appearance of the mandibular teeth and the slope of the propodeum). These ants are widely distributed throughout mainland Australia. The major and minor workers of *Camponotus cowlei* Froggatt differ from *C. gibbinotus* and *C. discors* only in that a few to many erect and suberect setae can be found on the lower sides of the head capsule and on the genae.

Minor workers of *Camponotus discors* complex sp. JDM 772 are dark reddish-brown to blackish, gracile ants with light yellow legs. This species shares with some populations of *C. gibbinotus* minor workers a dentition of five mandibular teeth or four teeth and a bifurcated basal tooth. The major worker of *Camponotus discors* complex sp. JDM 772 is not known. This species occurs sparsely on sandplains, mainly in coastal parts of the SWBP, but has also been collected in the Pilbara. A single, dark, minor worker specimen from Eneabba shows some similarities with this taxon, but cannot be placed with confidence at the moment. *Camponotus discors* complex sp. JDM 1104 is a shaggy species, close to *C. cowlei*, known in the SWBP from one collection in the Shark Bay region and a single major worker from Westonia in the western goldfields. A very similar species has been collected in the Pilbara.

*Camponotus claripes nudimalis* Forel is a dark-headed form apparently confined to the south-west. This is one of the very few *Camponotus* species that will forage inside Perth houses. Major workers can be distinguished from those of *C. cowlei*, *C. discors* and *C. gibbinotus* by their bilobate clypeus. At least some colonies of this ant make their nest in living trees. A well-grown *Eucalyptus ficifolia* F. Muell on the author's property contains a nest of *C. claripes nudimalis*, with tunnels under the outer bark. Copious amounts of sawdust within bark crevices, and on the ground around the tree indicate that these ants have been actively engaged in excavating wood from the living tree, even though the colony may have been established in pre-existing cavities made by another arthropod.

*Camponotus discors angustinodus* Emery, first described as an infrasubspecific form by Forel in 1907 (Forel 1907), is one of several *Camponotus* ***species inquirenda*** collected in the SWBP likely to belong to the *C. claripes* group. Forel examined specimens from localities as widely separated as Denham, Day Dawn and Mundaring Weir, so the ant is in all probability a common and widespread species. He also compares the worker appearance with that of *C. gibbinotus*. However, the description of the worker is short, and omits important information about colour, pilosity and appearance of the head capsule. Although non-type material in the MCZ carrying the name '*Camponotus discors angustinodus*' is identical to *C. claripes nudimalis*, the former workers came from Augusta, on the south coast. For the time being therefore, the identity of *C. discors angustinodus* must be regarded as problematic, although *Camponotus claripes nudimalis* remains a strong candidate. Another problematic taxon that belongs in this general vicinity is *Camponotus insipidus* Forel. I have also seen non-type material in MCZ labelled '*Camponotus insipidus*': the workers are very like the pale yellow *C. claripes minimus* found in the Kwongan sand-plain in the Eneabba district, but the major worker has a swollen head that has granular sculpture around the clypeus and lower genae – not unlike *Camponotus claripes* group sp. JDM 288 major workers. What can be said with a fair degree of certainty is that these ants are typical members of the *C. claripes* species-group. *Camponotus insipidus* was described from East Wallabi Island, in the Abrolhos.

The remaining two species in the *C. claripes* species-group have a *facies* similar to that of members of the *C. subnitidus* species complex, with long, low mesosomas and a low, bluntly acuminate petiolar node. However, the major worker (known only for *Camponotus claripes* group sp. JDM 63) does not have the features of the head and mandible found in *C. subnitidus* group majors, and minor workers of both species lack fluted edges around the foramen. Minor workers of *Camponotus claripes* group sp. JDM 63 are unique among their relatives in that their mandibles each have eight to ten teeth. The major worker, however, has the regulation six

teeth. This insect is confined to wetter parts of the south-west, and is occasionally collected in Perth urban bushland. *Camponotus claripes* group sp. JDM 1073 is known from one specimen, a minor worker, collected in a bark trap on Wandoo at Dryandra.

### *Melophorus*

Although this genus is polymorphic, there is generally relatively less difference, apart from the broad head capsule in the major, between the major and other worker castes than there is in genera like *Pheidole* and *Camponotus*. The characteristics of all worker castes of *Melophorus*, therefore, are included in this key. The major workers for some species, however, are unknown.

1. Propodeum in major and minor workers armed with stout denticles, directed vertically; head, mesosoma and nodes strongly shagreenate; matt in appearance; minor worker with elongate head capsule, in full-face view, about three times as long as wide (very rare, sandplain E of Albany and Eneabba region) (Figure 332) ..... ***M. majeri* Agosti**

   Propodeum unarmed in all worker castes; appearance otherwise not as above ..... **2**

2. In profile, head (at least of minor and media workers) extremely flattened (Figure 333); outline of dorsum of mesosoma almost straight (characteristics of major worker unknown)..... ***Melophorus* sp. JDM 787**

   In profile, head not extremely flattened; outline of dorsum of mesosoma usually sinuate, with pronotum and/or propodeum elevated above plane of mesonotum..... **3**

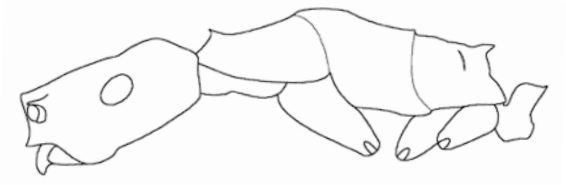

**Figure 332**

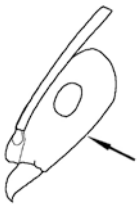

**Figure 333**

3. In profile, propodeum elongate, often descending obliquely towards its junction with petiole (mainly *M. iridescens* species-group) (e.g. Figure 334)..... **4**

   In profile, propodeum compact, smoothly rounded or truncate with distinct dorsal and declivitous faces (e.g. Figure 335) ..... **6**

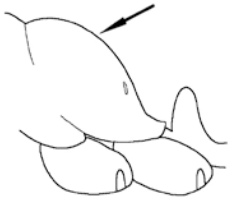

**Figure 334**

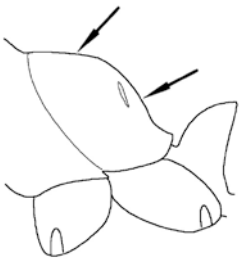

**Figure 335**

In profile, pronotum very weakly convex; propodeum weakly convex with long dorsal face (gracile, uniformly orange ants; arid to semi-arid environments)..... ..... ***Melophorus* sp. JDM 199**

In profile, pronotum distinctly rounded; propodeum describing oblique arc (Figure 334) ..... **5**

5. Larger (major workers TL ≈ 7–9 mm, media and minor workers TL ≈ 4–6 mm); metanotal groove in all workers usually more deeply impressed, so metathoracic spiracles are more-or-less dorsally situated (Figure 335); minor workers most commonly with red or reddish-brown foreparts (drier areas of SWBP) ..... ***Melophorus* sp. near aeneovirens (JDM 545)**

   Smaller (major workers TL ≈ 5–6 mm, media and minor workers TL ≈ 3–4 mm); metanotal groove in all workers usually more shallowly impressed, so metathoracic spiracles are more-or-less laterally situated (Figure 337); minor workers most commonly with ochre to dark brown foreparts and brown to black gasters, never red, and usually not reddish-brown (widespread, but most abundant in wetter, forested areas of the south-west)..... ..... ***M. insularis* Wheeler**

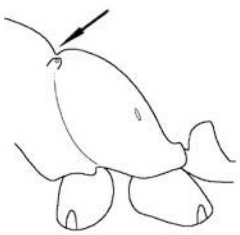

**Figure 336**

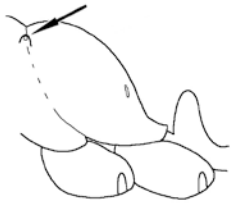

**Figure 337**

6. Minor worker with many short, peg-like bristles covering the body (Figure 338); cuticle finely microreticulate with a yellowish sheen (major worker unknown) ... ***Melophorus* sp. JDM 613**

   Minor worker without peg-like bristles; appearance of cuticle not as above ..... **7**

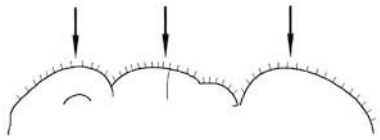

**Figure 338**

7. Mandible very large (2/3–3/4 length of head capsule), hatchet-shaped (Figure 339) ..... ..... ***M. potteri* gp. sp. JDM 1032**

   Mandible of normal proportions, triangular or strap-like in shape (e.g. Figures 340, 341) ..... **8**

**Figure 339**

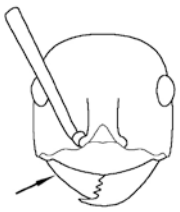

**Figure 340**

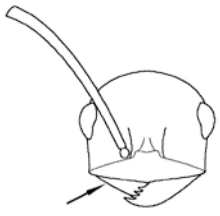

**Figure 341**

8. Propodeal spiracle very large and conspicuous, about 2/3 x length of declivitous face of propodeum; spiracle placed slightly nearer declivitous face of propodeum than metanotal groove (Figure 342) ..... **9**

   Propodeal spiracle smaller and/or placed much closer to declivitous face of propodeum (often on edge of its surface) (Figures 343, 344) ..... **10**

**Figure 342**

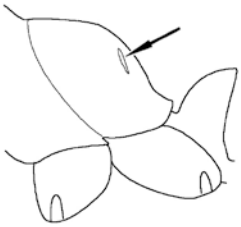

**Figure 343**

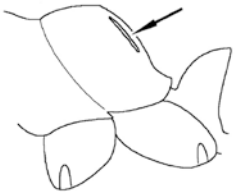

**Figure 344**

9. In profile, anterior margin of clypeus protruding (Figure 345); in full-face view, frons unsculptured, smooth and glossy ..... ..... ***M. potteri* McAreavey**

   In profile, anterior margin of clypeus curved inwards (Figure 346); in full-face view, sculpture of frons finely microreticulate, matt or with a dull sheen ..... ..... ***M. potteri* gp. sp. JDM 1082**

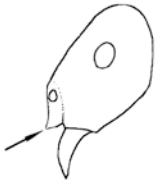

**Figure 345**

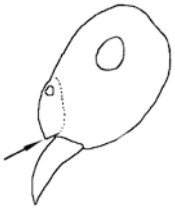

**Figure 346**

10. Posterior of mesonotum extended as a lobe, overhanging the propodeum; dorsal face of propodeum very narrow, almost wedge-shaped in profile; metathoracic spiracle facing laterad, in one species situated well before junction of mesonotum and propodeum (Figure 347) ..... **11**

    Mesonotum less developed, not overhanging propodeum; dorsal face of propodeum longer; metathoracic spiracle usually facing dorsad (e.g. Figure 348)..... **12**

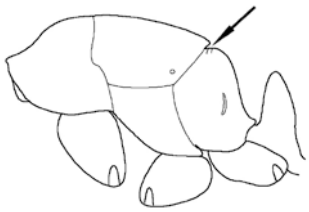

**Figure 347**

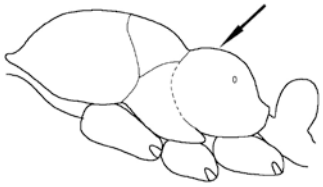

**Figure 348**

11. Major and minor workers with scattered, short, erect setae on mesosoma; appressed setae longer (length ≈ greatest width of antennal scape) almost adjoining on mesosoma and gaster; metathoracic spiracle situated near junction of mesonotum and propodeum ..... .....***Melophorus* sp. JDM 230**

    Minor worker lacking erect setae on mesosoma; appressed setae shorter (length < greatest width of antennal scape) well separated on mesosoma and gaster; metathoracic spiracle situated well before junction of mesonotum and propodeum ....***Melophorus* sp. JDM 1063**

12. Dorsal surfaces of body with short, modified, spatulate setae (Figure 349); body covered with fine, whitish-yellow pubescence (more distinct in minor workers)..... .....***Melophorus* sp. JDM 784**

    Either modified setae absent, or, if present, then confined to pronotum and body not pubescent as above ..... **13**

13. Body, legs and antenna of minor covered in long, erect and downy, appressed setae; body slender, gracile (*Iridomyrmex*-like); in profile eye very large (eye length >1/3 length of head capsule) (Figure 350); cuticle matt, finely microreticulate; clypeus protruding (major worker unknown) ...***Melophorus* sp. JDM 788**

    Body often smooth and shining with few erect setae; if hairy, then either body not gracile and *Iridomyrmex*–like, or eye smaller or clypeus not protruding..... **14**

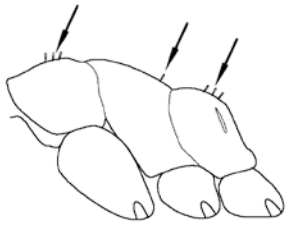

**Figure 349**

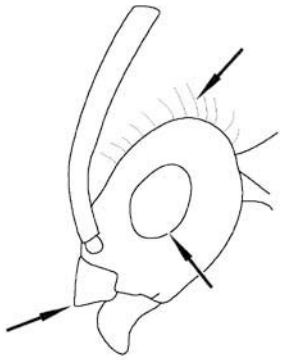

**Figure 350**

14. Major and minor worker with fine pubescence, silvery in minor worker, mesosoma with many short, erect setae; in profile pronotum and mesonotum of minor worker gently convex to almost straight....***M. mjobergi* Forel**

    If major worker also with fine pubescence (usually lacking), then pronotum and mesonotum of minor worker more convex, often protuberant..... **15**

15. Major and minor workers with abundant fine pubescence on frons of head capsule (relatively large, reddish northern species)..... .....***Melophorus* sp. JDM 1105**

    Major and minor workers without abundant fine pubescence on frons of head capsule..... **16**

16. Mesonotum bulbous, translucent or even transparent, ground colour distinctly paler than surrounding mesosoma (small species, TL of minors ≈ 2 mm)..... .....***Melophorus* sp. JDM 500**

    Mesonotum, if protuberant, not translucent, usually the same colour as rest of mesosoma but may be slightly paler ..... **17**

17. Large size discrepancy between smallest minors (HW ≤ 0.5 mm) and largest major workers (HW ≥ 2mm); pale orange to depigmented yellow ants, with colour of frons often gradually darkening towards vertex; declivitous face of propodeum strongly oblique when seen in profile (e.g. as in Figure 343); minor workers without erect setae on dorsum of mesosoma .... ***M. ludius sulla*** **Forel**

    Size more uniform among subcastes (see couplet 18 below); if very pale, then without above combination of features (propodeum of small yellow or yellowish workers often with weakly oblique or abruptly vertical declivitous face (e.g. as in Figure 353 below) ... ..... **18**

18. Small species (major worker HW ≤ 1 mm, minor worker HW ≤ 0.5 mm) ..... **19**

    Species larger (major worker HW ≥ 2mm, minor worker HW ≥ 0.8 mm) ..... **26**

19. Major and minor workers with erect, usually long setae on mesosoma ..... **20**

    Minor workers, at least, glabrous or pubescent, without longer, erect setae on mesosoma .... **24**

20. In minor worker (major worker unknown) sculpture of head and mesosoma completely microreticulate, appearance of cuticle uniformly matt, dull; pilosity consisting of two or three very short, bristle-like setae, arranged transversely across central sector of pronotum ..... ***Melophorus*** **sp. JDM 1180**

    Sculpture of minor worker not as above, sculpture reduced or absent on pronotum and mesonotum particularly, these parts more-or-less shining in appearance; pilosity more extensive, usually consisting of long, fine erect, curved setae ..... **21**

21. In minor worker, pronotum globose (Figure 351); propodeum truncate or sharply rounded in profile; erect setae on pronotum and mesonotum relatively long (> diameter of eye); eye moderate (eye length 1/5 x length of head capsule); viewed dorsally, pronotum and mesonotum smooth and shiny in appearance in minor worker (Major worker similar in appearance to *Melophorus* sp. JDM 176 – see couplet 22 – but with scattered erect setae on entire mesosoma) .... ***Melophorus*** **sp. JDM 470**

    In minor worker, pronotum either not noticeably globose (Figure 352); or erect setae on pronotum and mesonotum relatively short (≤ diameter of eye) (single worker of Melophorus sp. JDM 176); eye larger (eye length ≈ 1/3 length of head capsule) in remaining spp.... **22**

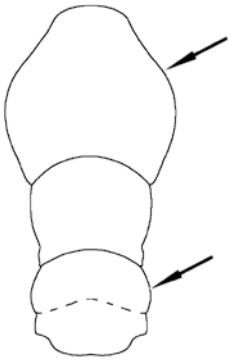

**Figure 351**

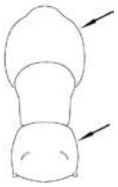

**Figure 352**

22. Eye moderate, eye length 1/5 x length of head capsule; in profile, propodeum of minor worker truncate (Figure 353), its dorsal face < half length of its declivitous face; erect setae on mesosoma short bristles, their length ≈ greatest width of antennal scapes ..... ..... ***Melophorus*** **sp. JDM 176 (pt.) (a single minor worker)**

    Eye large, eye length ≈ 1/3 length of head capsule; in profile, propodeum of minor worker usually distinctly rounded, though may be narrowly so (Figure 354); erect setae on mesosoma fine, not bristle-like, length usually > greatest width of antennal scapes ... ..... **23**

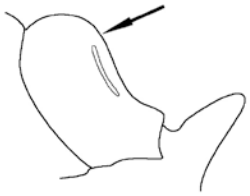

**Figure 353**

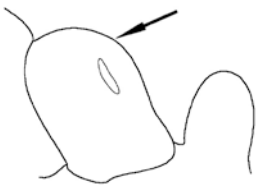

**Figure 354**

23. Inner edge of antennal scape in major and minor worker with many erect setae arising at angle of 90° (Figure 355); mesosoma clothed in fine, curved erect setae .....
.....***Melophorus* sp. JDM 1070**

Antennal scape lacking erect setae (Figure 356); mesosoma with moderate to sparse erect pilosity .....***Melophorus* sp. JDM 786**

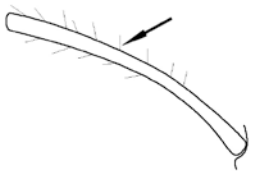

**Figure 355**

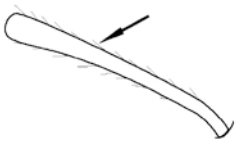

**Figure 356**

24. In full-face view, head of minor worker narrow, longer than wide with a strongly convex vertex (Figure 357a); in profile, propodeum rising above level of mesonotum, which is straight; hind femur gradually decreasing in diameter to about its midpoint, thereafter femur of same diameter up to its articulation with the tibia (Figure 357b) (possible major worker known but not confirmed) .....
.....***Melophorus* JDM 1102**

In full-face view, head of minor worker more-or-less square, about as long as wide; vertex straight or weakly convex (Figure 358); in profile, propodeum below level of mesonotum which is gently to strongly convex; hind femur gradually decreasing in diameter virtually throughout its entire length (Figure 359) ..... **25**

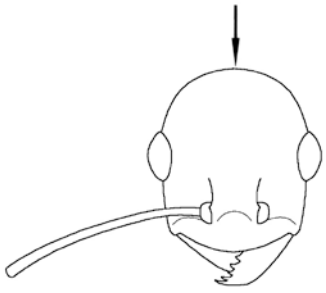

**Figure 357a**

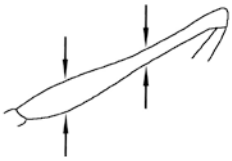

**Figure 357b**

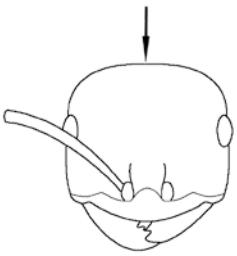

**Figure 358**

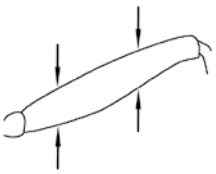

**Figure 359**

25. Major worker with scattered, longer (i.e. eye width >), thin, erect setae on dorsum of pronotum, mesonotum and propodeum; cuticle of minor worker almost completely smooth and shining; mostly light, depigmented yellow with greyish or black gaster, head may be light orange-red (n.b. widespread, dark minor workers, presently unassociated with majors, may belong to another species) .....
.....***Melophorus* ANIC sp. 3**

Major worker with a few shorter (i.e. eye width <), stout, erect setae on dorsum of pronotum and sometimes mesonotum; cuticle of minor worker finely shagreenate or with superficial microreticulation, colour variable, often concolorous brown or reddish-brown or with foreparts orange, legs brown, gaster black .....
***Melophorus* sp. JDM 176 (pt.)(most workers)**

26. In profile, head capsule of major and media workers massive and broad, eye placed well in front of midline of head capsule (Figure 360a), length of head capsule and mandible in major and media workers approximately length of mesosoma; basal margin of mandible in media workers may have a tusk-like tooth (Figure 360b) (*M. wheeleri* complex).
..... **27**

In profile, head capsule of major and media workers less massive and broad, eye placed slightly in front of midline of head capsule (Figure 361), length of head capsule in major and media workers less than length of mesosoma; basal margin of mandible in media workers without tusk-like tooth..... **29**

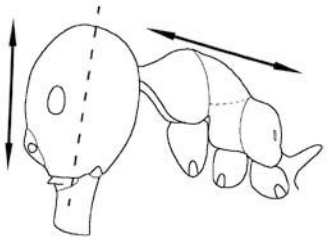

**Figure 360a**

**Figure 360b**

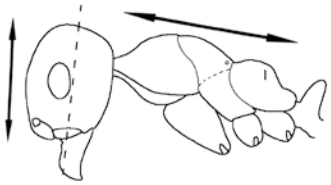

**Figure 361**

27. Mandible of minor worker with 7 or more denticles; frons of head capsule of major and minor worker dull and finely sculptured ..... .....***M. wheeleri*** **Forel**

    Mandible of minor worker with 5 or 6 denticles; frons of head capsule of major and minor worker with vestigial or no sculpture, shining in appearance ..... **28**

28. Head orange to chocolate, mesosoma orange to dark reddish brown, gaster black; media worker with tooth in middle of basal margin of mandible (Figure 360b); masticatory margin of mandible in minor worker weakly oblique, basal tooth strongly offset (Figure 362) ..... .....***M. wheeleri*** **complex sp. JDM 783**

    Mesosoma and gaster shining black, head slightly lighter; media worker without tooth in middle of basal margin of mandible (NE fringe of SWBP); masticatory margin of mandible in minor worker weakly offset (Figure 363) ..... .....***M. wheeleri*** **complex sp. JDM 1077**

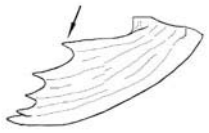

**Figure 362**

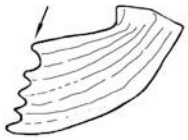

**Figure 363**

29. In minor worker, mesosoma rarely with a few erect setae, these lacking in most specimens; sculpture of head and mesosoma reduced or absent, appearance shining ..... **30**

    In minor worker, mesosoma with many erect, usually long setae; head and mesosoma usually dull, shagreenate, less often shining... ..... **31**

30. In profile, mesonotum of major and minor worker moderately convex (Figure 364); major worker without setae or with 6 < erect setae, mainly on pronotum; propodeum tending to truncate in outline ..... ..... ***M. turneri perthensis*** **Wheeler**

    In profile, mesonotum of major and minor worker straight or nearly so (Figure 365); major worker with 6 > erect setae on pronotum; propodeum generally more rounded in outline..... ***M. turneri*** **Forel (pt.)**

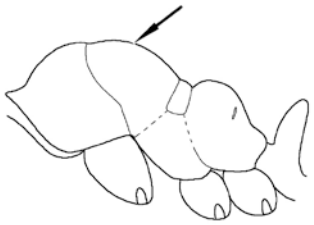

**Figure 364**

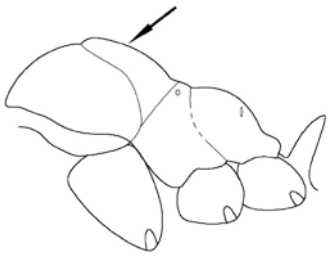

**Figure 365**

31. Femora with whorls of long, erect, straight setae (Figure 366), head, mesosoma and gaster with very many long, fine, erect setae ..... .....***M. turneri*** **complex sp. JDM 791**

    Femora lacking whorls of long, erect, straight setae, setae mainly appressed or decumbent (Figure 367); setae on head, mesosoma and gaster shorter, often giving a shaggy appearance to the ant ..... **32**

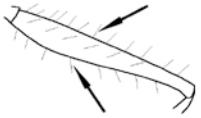

**Figure 366**

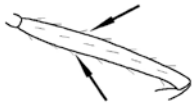

**Figure 367**

32. In profile, anterior margin of minor worker clypeus projecting, so mandibles close well underneath it (Figure 368) (putative major worker cannot be distinguished from *M. bruneus* McAreavey majors)..... .....***M. mjobergi*** **complex sp. JDM 1121**

    In profile, anterior margin of minor worker clypeus curved inward, so mandibles just below it and on the same plane (Figure 369) ... .....**33**

**Figure 368**

**Figure 369**

33. Eye large and protuberant (eye length 1/3 head length <) (370a); hind tibia without erect and semi-erect setae (Figure 370b) (major worker unknown)..... .....***M. bruneus*** **complex sp. JDM 600**

    Either eye smaller, less protuberant (eye length ≈ ¼ head capsule) (Figure 371), or hind tibia with semi-erect setae.....**34**

**Figure 370a**

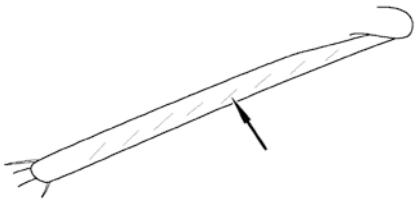

**Figure 370b**

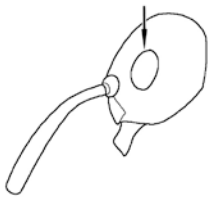

**Figure 371**

34. Antennal scape finely sculptured, with many erect setae on all surfaces (Figure 372); sculpture in minor and media workers shagreenate; setae on body rather short and erect (≤ greatest antennal width)..... .....***M. bruneus*** **complex sp. JDM 520**

    Antennal scape smooth, setae predominantly appressed, erect setae nearly always more sparse than in *M. bruneus* complex sp. JDM 520, normally present on outer surface only and may be completely absent (Figure 373); sculpture in minor and media workers reduced, so cuticle is usually shining; setae on body longer (except in coastal populations) (longest setae ≥ greater than greatest antennal width, and curved, giving ant a shaggy appearance).....***M. turneri*** **Forel (pt.)**

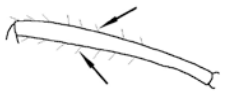

**Figure 372**

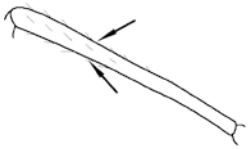

**Figure 373**

Some 32 species and subspecies of this exclusively Australian genus have been described, but this is only a fraction of its true diversity. Many *Melophorus* species have their main centres of distribution in remote desert regions, and the genus as a whole is not strongly represented in the wetter, coastal areas that have been well-collected by taxonomists and their assistants. Nonetheless, 33 morphospecies of *Melophorus* have been identified in the SWBP to this point of time, though reliable names can be assigned to less than one quarter of these.

Historically, at least some of the desert-dwelling species have been called honeypot ants, but perhaps Andersen's (2002) suggested common name of 'furnace ants' for the genus is preferable, since it avoids confusion with similar 'honeypot' ants in unrelated overseas genera (e.g. *Myrmecocystus*) as well as a few desert-dwelling *Camponotus* species, and accurately describes the thermophilic nature of most *Melophorus*.

The genus *Melophorus* is characterised by a combination of a slit-like propodeal spiracle, the presence of a metapleural gland and antennal insertions that abut the posterior margin of the clypeus. Workers are polymorphic. All known species are terrestrial, nesting directly into soil. For the most part, workers forage on the ground, but in the SWBP at least two species, including one that possesses a peculiarly flattened head, have been collected on tree-trunks. *Melophorus* are summer active and are rarely seen in the cooler seasons of the year. Workers are typically very fast moving and extremely timid. If they are disturbed at their nest hole, even by so much as the shadow of an observer, they may not return above ground for several minutes. From observations, local species appear to include a lot of plant material, particularly seeds of grasses, in their diet.

The bulk of the *Melophorus* fauna in the SWBP appears to belong to what is here termed the *M. turneri* species-group (Wheeler, describing the Rottnest Island ant fauna in 1934, refers to the '*turneri* Formenkreis' in WA). Minor workers of the *M. turneri* group possess a short, rounded or truncate propodeum and a distinctive, striated mandible. The mandibular teeth typically include two stout apical teeth, a smaller third tooth, and two stout, basal teeth, but additional teeth can be present in some taxa. Several smaller complexes are easily identified within this group, which may be related to the northern *M. fieldi* species-group (the latter *sensu* Andersen 2000). The *M. aeneovirens* species-group includes two common and widespread species in which the minor has a long, oblique propodeum. In addition to these major groupings, the residue of species contains several that appear to lack close relatives. Their workers, in some instances, exhibit a bizarre morphology, the reason(s) for the evolution of which one can only guess at.

In terms of abundance, the *M. turneri* species-group dominates in the SWBP, and its representatives can be found in most habitats. The reddish-brown *Melophorus turneri perthensis* Wheeler is familiar to many Perth city dwellers, even those without an entomological interest. This species is the *Melophorus* most commonly seen in and around the city in summer, when it is active on sandy verges, urban dune systems and backyards. The amount of sand displaced by this ant is considerable. Workers can often be seen taking grass seeds, other plant material and occasionally small carrion back to their nests. Under a microscope, workers of this species can be identified by their bulbous mesonotum. In the very similar *Melophorus turneri* Forel, on the other hand, the mesonotum does not protrude. The latter is the *Melophorus* most commonly seen in country areas, where it is ubiquitous in almost all habitats away from the wettest areas. Even paddocks that carry only a very depauperate ant fauna will usually support colonies of this species. Both ants have a broad distribution in WA, though they have most often been collected in the south-west of the State. *Melophorus turneri*, at least, also occurs in QLD and probably other mainland states. *Melophorus turneri*, as here defined, is a very variable species in terms of pilosity and appearance of the cuticle: commonly the more hirsute workers have a matt, shagreenate cuticle while those that are more-or-less glabrous are smooth and shiny. However, this is not invariably the case. Colour of the cuticle ranges from pale yellowish-brown or red to almost black. Most workers, whatever their colour, tend to have a coppery iridescence. Dark brown to black populations close to the coast have smaller eyes, especially among the minor and media workers. These populations may be worth closer investigation when the group is revised. In the meantime, they are being treated as part of the natural variation within the species.

*Melophorus ludius sulla* Forel is a pale version of *M. turneri*. This species occurs in drier areas of the State, away from the wetter south-west corner and south coast. *Melophorus ludius sulla* was described from the NT, but may also be expected to occur in inland NSW and SA and possibly other parts of the mainland. The northern *Melophorus turneri* complex sp. JDM 791 is more hirsute than even quite hairy *M. turneri*, with long, straight, erect setae on the antennae and tibiae.

The *Melophorus wheeleri* complex has at least three representatives in the SWBP. Major workers have massive heads in which are housed the muscles needed to move their powerful, grinding mandibles. These are specialist seed harvesters (Andersen 2000), and are generally confined to arid and semi-arid regions. *Melophorus wheeleri* complex sp. JDM 783, however, can be found as far south as Perth. Media and major workers of this species are unmistakeable because of the tusk-like tooth in the middle of the basal margin of the mandible. However, minor workers belonging to the complex, including those of *Melophorus wheeleri* complex sp. JDM 783, as a group are difficult to differentiate from those of *M. turneri* and its close relatives. *Melophorus wheeleri* complex sp. JDM 783 is quite

common in Perth gardens. *Melophorus wheeleri* Forel is found from the Pilbara down to the gold fields, and into the wheatbelt at least as far west as Kellerberrin. Workers from Jiggalong Station have been collected in the process of carrying seeds of *Lepidium phlebopetalum* (Brassicaceae). Two minor workers collected near Yalgoo, just outside of the SWBP, are aberrant in that they have scattered erect setae on the dorsum of the mesosoma (otherwise lacking in minor workers of *M. wheeleri* I have seen), and one has six teeth on one of the mandibles, rather than the customary seven or more. These may represent another species in the *M. wheeleri* complex, as other *M. wheeleri* minor workers in the Curtin Ant Collection are very uniform in appearance. *Melophorus wheeleri* complex sp. JDM 1077 is known from the far east and north-east of the SWBP. The main stronghold of this species appears to be the Eremaean zone.

The *Melophorus bruneus* complex falls within the *turneri* group, and shares a common mandibular conformation. As with many *M. turneri* populations, in minor workers, particularly, the cuticle tends to be shagreenate and may be dull. *Melophorus bruneus* complex sp. JDM 520 is found throughout WA, including parts of the metropolitan area. Inspection of the antennae is needed to distinguish hirsute *M. turneri* from *M. bruneus* sp. JDM 520. *Melophorus bruneus* complex sp. JDM 600 is also very similar to *M. turneri*, but lacks semi-erect setae on the hind tibiae. Minor workers only of this mainly eremaean species have been collected; these being taken as far west as Westonia. This species appears to be very close to *M. bruneus*, based on the holotype in ANIC (a major worker).

*Melophorus* ANIC sp. 3, *Melophorus* sp. JDM 176 and *Melophorus* sp. JDM 500 are three small to minute species. The workers are very similar in structure and appearance. Minor workers are glabrous, but major workers usually have some erect setae, these being modified in major workers of *Melophorus* sp. JDM 176. *Melophorus* sp. JDM 500 has thus far only been found within a few kilometres of the coast, on white, sandy soil, between Perth and Shark Bay. Both major and minor workers have a mesonotum that is paler than the surrounding mesosoma, sometimes being white and translucent. In major workers the mesonotum tends to be bulbous. The body colour varies from yellow to brown. *Melophorus* ANIC sp. 3 varies in respect of the mesosoma, which is of an even, yellow colour, and the mesonotum, which is less pronounced in major workers. The head of the minor worker is also slightly more rounded than that of *Melophorus* sp. JDM 500. This ant is abundant in the wetter south-west corner of the State, including urban areas. Both of these species are virtually unsculptured, whereas *Melophorus* sp. JDM 176 has distinct, superficial microsculpture, most notably on the lower mesopleuron (i.e. the katepisternum) and propodeum. In lighter-coloured forms of *Melophorus* sp. JDM 176 the orange colour is of a slightly deeper hue than in *Melophorus* ANIC sp. 3, and this colour form is mostly found in the drier wheatbelt and mallee country north-east, east and south-east of Perth. Brown and reddish-brown morphs of *Melophorus* sp. JDM 176 are abundant in the northern sandplains. The major worker of the two species can be distinguished by the type of pilosity on its pronotum: in *Melophorus* sp. ANIC 3 the standing setae are fine and longer than the eye width, while the setae in *Melophorus* sp. JDM 176 are shorter than the eye width, and stout. The above three taxa constitute the bulk of the small to minute *Melophorus* pitfall-trapped, mainly in the form of minor workers, in Curtin research projects in both dry and wetter areas of the SWBP.

In many parts of the state, minuscule minor workers with a morphology resembling that of *Melophorus* ANIC sp. 3 have been collected. These ants, however, are darker in colour, and resemble *Plagiolepis lucidula* Wheeler. In some goldfields populations the metanotal groove is very weakly impressed, but in other populations this groove is more deeply impressed. The propodeum ranges from smoothly rounded and scarcely raised above the mesonotum (seen in outline) to distinctly raised with an abrupt angle separating the dorsal from the declivitous faces. Thus far major workers have not been associated with this ant, despite the ubiquitous nature of the minor workers, and an assessment of its taxonomic status in relation to *Melophorus* ANIC sp. 3 is therefore difficult. The minor workers, however, can be separated from minor workers of *Melophorus* sp. JDM 176 by their generally smaller size and smooth, shiny cuticle.

*Melophorus* sp. JDM 470, as here defined, may be a complex of two species, both apparently close to *Melophorus* sp. JDM 176. Major and minor workers are a little larger than their counterparts within *Melophorus* sp. JDM 176, and are decidedly hairy. This is a mainly northern taxon, which occurs in the upper fringes of the SWBP. Dull little minor workers of *Melophorus* sp. JDM 1180 were recently pitfall-trapped in the Eneabba region in a project associated with Curtin University. The species was not uncommon in the traps, and evidence of its presence in sandplain country in the north of the Swan Coastal Plain botanical district would not be unexpected.

Small size is also characteristic of what is probably a related group of ants. *Melophorus* sp. JDM 230 and *Melophorus* sp. JDM 1063 represent two species in which the posterior sector of the mesonotum is extended as a lobe in the minor workers, so that it overhangs the propodeum

(this feature is less accentuated in major workers, which are known only for *Melophorus* sp. JDM 230). *Melophorus* sp. JDM 230 has thus far been found only in the Perth region, while *Melophorus* JDM 1063 is represented by a single series from a nest near the Billabong Roadhouse, south of Shark Bay and from Barrow Island (in the Pilbara, and thus outside of the SWBP). Apart from the position of the propodeal spiracle, the two taxa are differentiated on the basis of presence or absence of pilosity.

*Melophorus* sp. JDM 786, known from a single minor worker collected near Southern Cross, and a major and media worker collected east of Hyden on sand-plain, and *Melophorus* sp. JDM 1070, known from minor workers taken from near Billabong Roadhouse and from Kwelkan in the eastern wheatbelt, have only slight differences apart from the pilosity aspect, and the colour pattern is identical. A possible major worker, belonging to the latter species, was collected at Sandford Rock Reserve in the eastern wheatbelt. The higher-level affinities of these and the ants mentioned in the previous paragraph are uncertain, but the appearance of the major workers suggests they probably belong to the *M. turneri* species-group.

Only a few minor worker specimens are known for *Melophorus* sp. JDM 1102. The head of this gracile little ant has a domed vertex, the mesonotum is straight and the femora are long and thin for much of their length. These specimens have been pitfall-trapped in and around the Zuytdorp region, north of Kalbarri. (Media and major workers that could belong to this species have been taken in the Pilbara by DEC workers, but unfortunately have not been able to be associated with workers of the minor subcaste from the same area.)

*Melophorus insularis* Wheeler is the member of the *M. aeneovirens* species-group found mainly in the wetter, open-woodland regions of the south-west, but it also occurs at least as far north as Shark Bay. In more inland areas, particularly in the northern and central parts of the State, it is replaced by *Melophorus* sp. nr. *aeneovirens* (Lowne). *Melophorus insularis* is extremely common in and around Perth, and in some southern suburbs and in the nearby Darling Range it is the most common *Melophorus* species. The ant is also found on Rottnest Island from where the type material for the taxon was collected. Minor workers of *M. insularis* vary greatly in colour, ranging from light yellow or ochre to almost black. *Melophorus* sp. near *aeneovirens* is a handsome, fast moving orange- or red-and-black ant. *Melophorus* sp. JDM 199 is another large orange or orange-and-black ant that resembles *Melophorus* sp. near *aeneovirens* in the field, but belongs to the northern *M. bagoti* species-group. This species is also found in drier areas, and its range extends at least to the NT. Workers have a very even dorsal profile.

*Melophorus mjobergi* Forel and *Melophorus* sp. JDM 784 have a similar appearance and may be related. *Melophorus* sp. JDM 784, however, has scattered, short, thickened setae, whereas the erect setae on *M. mjobergi* are plentiful, long and thin. Both have abundant pubescence on all body surfaces. *Melophorus mjobergi* was described from Broome, in the Kimberley region. The fact that this species can also be found within 200 km of Perth, suggests that it has a broad distribution throughout mainland Australia. *Melophorus mjobergi* has been collected generally throughout the SWBP. *Melophorus* sp. JDM 784 has been collected in open woodland at Dryandra, but is more commonly encountered in arid and semi-arid localities. This species forages on tree-trunks as well as on the ground; the Dryandra specimens being collected in an intercept trap set on a Wandoo trunk. Minor workers of *Melophorus mjobergi* complex sp. 1121 differ from *M. mjobergi* in the more rounded pronotum and mesonotum, although the single known major worker of this species cannot easily be separated from majors of *M. mjobergi*. Specimens of this species have been collected only at Westonia within the SWBP, with another minor worker being taken at Queen Victoria Spring, outside of the SWBP. Another, larger species, *Melophorus* sp. JDM 1105, collected only at Nerren Nerren Stn. (just outside of the NE boundary of the SWBP) may be related to the preceding taxa.

The remaining seven *Melophorus* species found in the SWBP have an unmistakeable *facies* that implies specialist habits. All are uncommon in the Province, and are known, at the most, from a small handful of specimens. *Melophorus potteri* McAreavey was described from Victoria, where these ants are known to prey on termites (McAreavey 1947). Records from the SWBP have come from Eneabba, Kellerberrin and West Arthur in the central wheatbelt, but the ant appears to be more common north of the SWBP. These ants are rather stocky and compact, and have an exceptionally large propodeal spiracle. Another species in this group, *Melophorus potteri* group sp. JDM 1032, is known in the SWBP from a series from Kwelkan, in the Eastern wheatbelt. This *Melophorus*, which has very characteristic mandibles, is illustrated in Figure 15f in Greenslade's 1979 handbook on the ants of South Australia. A third species in this group, *Melophorus potteri* group sp. JDM 1082, mostly occurs outside of the SWBP, but one specimen has been collected on the eastern fringe of the Province, near Warrachupin. The bizarre *Melophorus majeri* Agosti is known thus far only from a couple of records from heathland near the south coast of WA (Agosti 1997) and, more recently, from Eneabba. The one known nest was made directly into white

sand. Minor workers of *M. majeri* are the only *Melophorus* with propodeal spines, and the dorsal and lateral surfaces of their flattened mesosomas are delimited by carinae. The minors also have very elongate heads and antennal scapes. *Melophorus* sp. JDM 613 is notable in that the sole known worker, a small minor, appears to belong to the aberrant *M. fulvihirtus* group of species that is otherwise unknown in the SWBP. The worker was pitfall trapped at Boddington, 130 km south-east of Perth. This ant is stocky and strongly shagreenate in appearance, and the mesosoma is covered with short, blunt, bristly setae.

*Melophorus* JDM 788 and *Melophorus* JDM 787 are represented by line drawings (figures 15a and d, respectively) in Greenslade's (1979) book on South Australian ants. Material collected in WA pertaining to the former species consists of a few minor workers, one of which was hand-collected on Mambemarra Hill, on the outskirts of Geraldton. The minor worker strongly resembles a medium-sized *Iridomyrmex*, and this species may have a biology associated with that genus. Elsewhere, this ant is known to occur in the Pilbara and goldfields. *Melophorus* JDM 787 is a tree forager, and the odd, flattened shape may be an adaptation to hiding under bark on smooth-barked eucalypts in order to evade predators. (n.b. Greenslade (1979) offers an alternative explanation that the adaptation relates to foraging for food under bark, but the two ideas are not mutually exclusive.) In the SWBP this ant is known from the eastern and north-eastern wheatbelt.

### *Myrmecorhynchus*

*One species,* Myrmecorhynchus emeryi *André.*

*Myrmecorhynchus emeryi* André is the only WA representative of this genus. The species is very occasionally collected on or near the south coast of WA and in the eastern wheatbelt. The only material in the Curtin Ant Collection was taken from Mt Lindesay, near Denmark. In the SWBP this genus is most likely to be confused with *Notoncus*, but the projecting central anterior margin of the clypeus is rectangular in *Myrmecorhynchus* and convex or sinuate in WA *Notoncus* species. These ants are most commonly collected from vegetation (Greenslade 1979).

### *Notoncus*

1. Posterior pronotum not raised, unarmed; mesonotum without posterior lobe (Figure 374)..... ***N. hickmani* Clark**

   Posterior pronotum raised, with pair of laterally directed denticles; mesonotum with posterior lobe (Figure 375)..... **2**

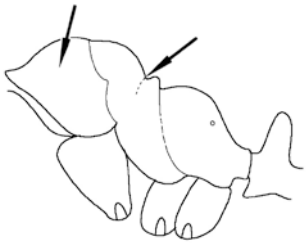

**Figure 374**

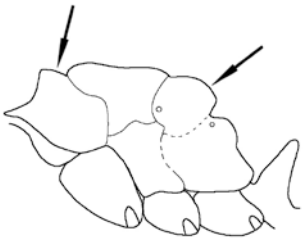

**Figure 375**

2. Depigmented yellow species, frons of head capsule darker; dorsum of propodeum narrow with pair of small denticles at propodeal angles..... ***Notoncus* sp. JDM 487**

   Brown or reddish-brown species; dorsum of propodeum broad, propodeal angles present or absent, but denticles usually absent..... **3**

3. Mesosoma smooth and shining; gaster lacking pubescence.....***N. gilberti* Forel**

   Mesosoma sculptured, dull; gaster may be wholly pubescent..... **5**

4. First gastral tergite strongly pubescent amid erect setae, striolae on mesosoma tending to weak and superficial; upper vertex of head smooth and shining (Figure 376)..... ..... ***Notoncus cf. capitatus* Forel**

   First gastral tergite with well scattered appressed setulae only amid erect setae; mesosoma strongly striate; upper vertex of head striolate (Figure 377).....***N. enormis* Forel**

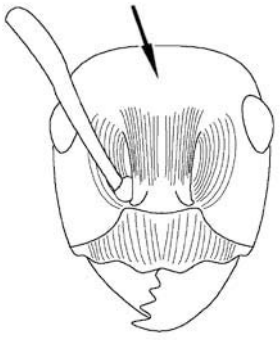

**Figure 376**

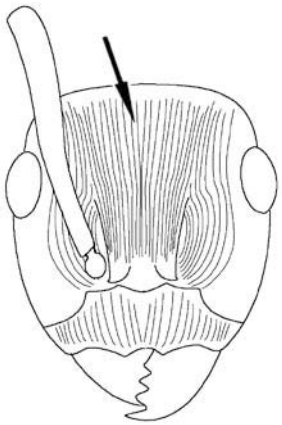

**Figure 377**

*Notoncus* is an inconspicuous but not uncommon genus in the SWBP province. Because of the complex profile of their mesosoma, most *Notoncus* species are unlikely to be confused with anything else, though *Myrmecorhynchus* (see above) is somewhat similar to *Notoncus hickmani* Clark in outline. Local species tend to be winter active general foragers.

*Notoncus gilberti* Forel is abundant in and around Perth, and quite commonly colonises suburban gardens. Here, small granules of soil heaped into amorphous clumps are often the only sign of its presence during the day, as the ant is usually a nocturnal forager. This species has cornicles on the humeral angles, and the metanotum, which is posteriorly lobate, is raised above the level of the propodeum. *Notoncus gilberti* can be found in wetter parts of the south-west, but its more general range also includes NSW and Qld. *Notoncus hickmani* lacks processes on the trunk, and is another common species of the Perth region. This taxon has been recorded from all mainland states except the NT.

The identity of Western Australian *Notoncus* species that are similar to *N. gilberti*, but of a more sculptured appearance, is somewhat confused. There appear to be one or two taxa, depending on the significance of the gastral pubescence. Large specimens of *Notoncus* from the Pilbara (HW = 1.8 mm), with strongly rugose-striate sculpture and sparse gastral pubescence, have been identified as *Notoncus capitatus* Forel, based on type material. However, according to the key contained in Taylor (1992), this species is close to *Notoncus enormis* Szabó. Much smaller specimens of a similar appearance also occur in both the Pilbara and in the SWBP. Ants approximating to the description of *Notoncus capitatus*, according to the published description by Taylor (1992), have strong pubescence on the first gastral tergite. Like the preceding species, these ants appear to have a wide distribution in WA, although not recorded from this State in the published literature. The supposed diagnostic features appear variable, and pending examination of eastern states material I tend to favour Brown's decision to combine the two taxa but retain the key containing Taylor's amendment for the present.

Unlike the former *Notoncus* species, which are widespread, the undescribed *Notoncus* sp. JDM 487 appears to be confined to the Swan Coastal Plain. The ant is currently known only from a small area of relictual bushland in Canning Vale not far from the Perth CBD, where recent subdivision threatens local extinction. The only other record of this species in the Curtin Ant Collection is from the Medina-Kwinana area, many years ago, where a couple of workers were pitfall-trapped from (then existing) open woodland. The ANIC, in Canberra, has a solitary pin of three worker specimens collected from Ludlow, on the south-west coast. This is a very pale species somewhat in the general mould of *N. enormis* and *N. gilberti* but with a very narrow propodeal dorsum that terminates in two small denticles. Several nests of *Notoncus* sp. JDM 487 have been found around the roots of *Calytrix flavescens* Cunn.

### *Opisthopsis*

*One species,* Opisthopsis rufithorax *Emery.*

To the uninitiated observer, *Opisthopsis* species neither look nor behave like ants. The massive compound eyes are evident to the unaided human eye, and the total impression is of a small, wingless wasp. Even more eccentric is *Opisthopsis'* method of progressing in small jerks, earning it the soubriquet in some circles of 'electric', 'robot' or strobe' ant (Andersen 2000). These ants are most common in the tropics and are untroubled by the encroachment of urbanization, indeed may be benefited by it: the author has observed the undignified spectacle of filthy urban rubbish bins being raided by *Opisthopsis* species in Brisbane. The only species of *Opisthopsis* in the SWBP is *Opisthopsis rufithorax* Emery, which has an Australia-wide distribution. Within the SWBP this ant is found mainly east and north of Perth. Workers are rather timid and will rapidly dart to the opposite side of a tree-trunk or drop down on the ground when approached.

### *Paratrechina*

1. Yellowish species; erect, bristly setae on head capsule confined to two pairs on margin of vertex and several pairs straddling midline (*minutula* species-group) ..... **2**

   Brown species; erect, bristly setae well distributed on head capsule ..... **3**

2. Eye elliptical, moderate in size (Eye length < 1/3 head length) (Figure 378); brownish-yellow species..... ***P. minutula*** **(Forel)**

Eye slightly asymmetrical (as in *Iridomyrmex hartmeyeri* group), larger (Eye length ≈ 1/3 head length) (Figure 377); depigmented yellow .....***P. minutula* group sp. JDM 916**

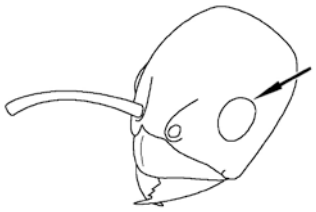

**Figure 378**

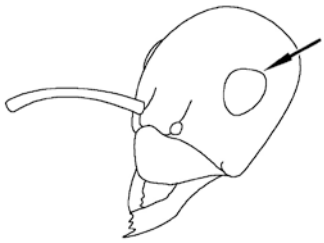

**Figure 379**

3. Antennal scapes very long, exceeding vertex of head capsule by 2/3 their length (Figure 380); eye large (eye length ≥ 1/3 length of head capsule) (introduced to SWBP)..... ..... ***P. longicornis* (Latreille)**

Antennal scapes much shorter, exceeding vertex of head capsule by ≤ 1/2 their length (Figure 381); eye smaller (eye length ≤ 1/4 length of head capsule) (introduced to SWBP)..... **4**

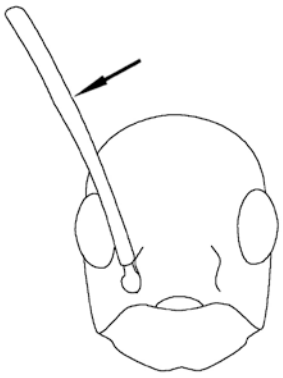

**Figure 380**

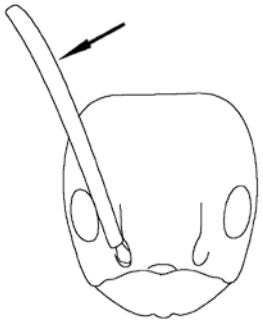

**Figure 381**

4. Mesopleuron lacking distinct pubescence, appressed setae, if present, very few in number (Figure 382) ..... ..... ***P. braueri glabrior* (Forel)**

Mesopleuron uniformly covered with pubescence (Figure 383)..... ***Paratrechina* cf. *obscura* (Mayr) (ANIC SOS sp. 3)**

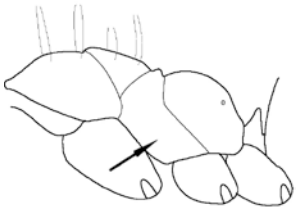

**Figure 382**

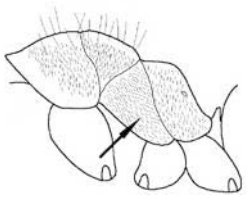

**Figure 383**

Pairs of stout setae on the upper surface of the mesosoma serve to characterise this genus. The genus *Prolasius* sometimes also has stout setae, which in one species often occurs as a pair on the mesonotum, but elsewhere on the body these setae are never closely paired. *Paratrechina* species are opportunists, and some have become tramp ants; at least three of the five species known from the SWBP are introductions. Three evolutionary radiations are evident among the local species. Members of the *P. minutula* species-group, which contains two taxa, are small and yellowish, and the erect, bristly setae on the head capsule are confined to the vertex and midline of the head capsule. *Paratrechina minutula* (Forel) is a rare inhabitant of urban bushland in the Perth area, where it was found nesting in rotting wood on one occasion. Specimens have also been collected on Rottnest Island (Wheeler 1934). Since the species is common on the east and south-east coasts of Australia, it is possible, though perhaps unlikely, that it has been introduced to Perth by human agency. *Paratrechina* sp. JDM 916 is an undescribed species in the *P. minutula* group that can be distinguished from *P. minutula* by its larger, asymmetrical eye. This species is a nocturnal forager in drier woodlands and semi-arid areas in the SWBP, and its range extends into the Eremaean Botanical Province.

*Paratrechina longicornis* (Latreille), found throughout the world's tropics, is a tramp species that reaches pest proportions in some places. As well as WA, it has been recorded from the NT

and Qld. In WA this ant is most common in the Kimberley region, but it also occurs in the more built up areas of Perth. This species is very gracile, with long appendages.

The remaining two *Paratrechina* species belong to the *obscura* group (S. Shattuck, unpublish.) The large, blackish-brown *Paratrechina* ANIC SOS sp. 3 is an apparent introduction in the SWBP, as it not found in undisturbed woodland or other native habitats. The same species occurs naturally in the Pilbara and Kimberley regions. In the Perth metropolitan area, the numbers of this ant appear to be increasing and it is becoming something of a minor pest. Although the workers do not usually forage indoors, they are great excavators of sand and leave unsightly mounds in patios, on lawns and between paving stones on footpaths. *Paratrechina braueri glabrior* (Forel), common in the north and north-west of this state, is known in the SWBP from a few records in the Fremantle area. A third species, *Paratrechina rosae* (Forel), has been collected near Eucla, and may occur in the far south-eastern fringes of the SWBP.

### *Plagiolepis*

1. Eye small (eye width ≈ greatest width of antennal scape); yellowish brown species ..... ..... ***Plagiolepis* sp. JDM 189**

   Eye larger (eye width ≥ 2x greatest width of antennal scape); usually brown to black species..... **2**

2. Cuticle smooth and shining..... ..... ***P. lucidula* Wheeler**

   Cuticle finely sculptured, dull..... ..... ***P. squamulosa* Wheeler**

Ants of the genus *Plagiolepis* are very small to minute general predators, and also tend Hemiptera (Shattuck 1999). Small turrets of soil often betray the presence of the local species. *Plagiolepis* workers are distinguished from other minute formicines and dolichoderines by the combination of an acidipore (which sets them apart from dolichoderines like *Bothriomyrmex* and *Tapinoma*), a PF of 6,4 (which sets them apart from *Acropyga*), a smooth, unarmed propodeum (which differentiates them from *Stigmacros*) and 11-segmented antennae.

Three *Plagiolepis* taxa have been described from the SWBP, but only two of these appear to be good species. A third species appears to be undescribed. The two named *Plagiolepis* species found in the SWBP Province are common in the vicinity of Perth. *Plagiolepis lucidula* Wheeler has only been recorded from Rottnest Island, Hamelin Bay (specimens in the California Academy of Sciences Ant Collection) and Perth. This ant is winter active and is common in some gardens in the Fremantle area. The very small size of this species may be a factor that enables it to co-exist in urban locations with aggressive exotics like the big-headed ant. *Plagiolepis squamulosa* Wheeler was also described from Rottnest Island, but has a much wider range in southern WA, and possibly beyond. (The holotype of *Plagiolepis nynganensis* McAreavey, described from inland NSW, appears to be identical with workers of *P. squamulosa*, and I suspect the two may be conspecific. *Plagiolepis clarki* Wheeler, syntypes of which are in the MCZ, also looks to be conspecific with this species. The name *squamulosa* would have priority because of pagination.) Replete workers are often discovered in nests of *P. squamulosa*. *Plagiolepis* sp. JDM 189 is common in white, sandy soils between Eneabba and the south coast.

### *Polyrhachis*

1. Humeral angles of pronotum armed with sharp spines, directed anteriad at angle of 45° (Figure 384) (subgenus *Chariomyrma*)..... ... ***P.* (*Chariomyrma*) *'aurea'* sp. A (JDM 807)**

   Humeral angles of pronotum armed with, at most, a pair of short, laterally directed denticles (e.g. Figure 385)..... **2**

**Figure 384**

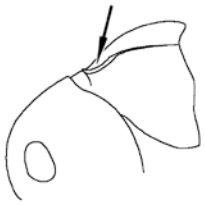

**Figure 385**

2. Node armed with two long, downwardly curved lateral spines only (Figure 386a); dorsum of node flat; in dorsal view, propodeum armed with two long, sinuate, cylindrical spines extending slightly beyond sides of ant when viewed dorsally (Figure 386b) (subgenus *Hagiomyrma*)..... ***P. ammonoeides* Roger**

   Node usually with four denticles or short spines (if middle pair obsolete or vestigial, then dorsum of node a thin scale) (e.g. Figure 387); propodeum either unarmed, or armed with short, upturned flanges, denticles or short, flattened spines (e.g. Figure 388) (subgenus *Campomyrma*) ..... **3**

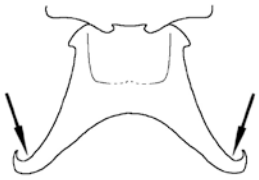

**Figure 386a**

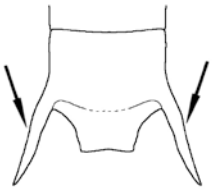

**Figure 386b**

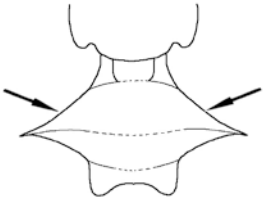

**Figure 387**

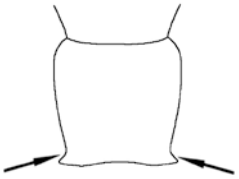

**Figure 388**

3. Dorsum of node with weak denticles or angles, or dorsal margin entire ..... **4**

   Dorsum of node with pair of distinct spines or sharp denticles ..... **8**

4. Gaster yellow, contrasting with black head and mesosoma; smaller (HW ≈ 1 mm) ..... ***Polyrhachis (Campomyrma)* sp. JDM 670**

   Head, mesosoma and gaster entirely or predominantly black or dark brown; larger species (HW ≥ 1.5 mm)..... **5**

5. Pronotum rounded, or with vestigial humeral angles; mesonotum rounded anteriad, strongly tapering towards junction with propodeum (Figure 389a); distance between frontal carinae broad, 1/3 HW >; head capsule without trace of angle between upper margin of eye and vertex (e.g. (Figure 389b) ..... .....***P. femorata* F. Smith**

   Pronotum and mesonotum distinctly angulate anteriad, mesonotum tapering weakly towards junction with propodeum (e.g. Figure 390); distance between frontal carinae narrow, 1/3 HW<; head capsule with dull to sharp angle between upper margin of eye and vertex (Figure 391)..... **6**

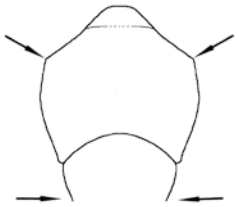

**Figure 389a**

**Figure 389b**

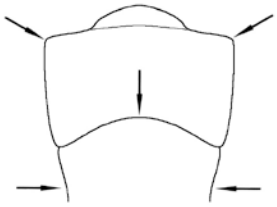

**Figure 390**

**Figure 391**

6. Angle between posterior margin of eye and vertex of head capsule strongly carinate, the upper gena slightly excavate (Figure 392a); lateral margins of node armed with sharp teeth, directed posteriad (Figure 392b)..... .....***P. schwiedlandi* Forel**

   Angle between posterior margin of eye and vertex of head capsule usually not strongly carinate; or, if strongly carinate, then teeth on lateral margins of node vestigial and directed laterad ..... **7**

**Figure 392a**

**Figure 392b**

7. Propodeal angles terminating in short, upturned denticles; viewed dorsally, mesosoma with finely striate sculpture only, that on pronotum usually in form of distinct whorl (Figure 393); ... ***Polyrhachis (Campomyrma)*** **sp. JDM 1010**

   Rear of propodeum terminating in shelf, slightly lobate at angles; viewed dorsally, mesosoma with traces of superficial pits in addition to finely striate sculpture; sculpture of pronotum not in form of whorl (Figure 394);..... .....***Polyrhachis (Campomyrma)*** **sp. JDM 805**

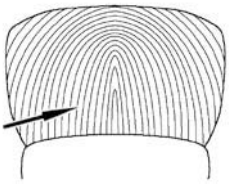

**Figure 393**

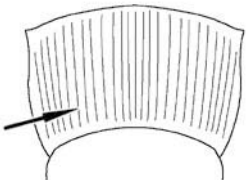

**Figure 394**

8. Few to many erect and semi-erect setae on first gastral tergite (may be short)..... **9**

   First gastral tergite lacking erect and semi-erect setae ..... **12**

9. Head and mesosoma covered with long, slightly curved, erect setae; downy pubescence present on gaster; appearance non-gracile with short appendages..... ***P. hirsuta*** **Mayr**

   Head and mesosoma with sparse, short, straight setae; downy pubescence absent from gaster; gracile appearance with long appendages..... ..... **10**

10. Lateral pair of spines on petiolar node shorter than dorsal pair and directed laterad (Figure 395) .....***P. gravis*** **Clark**

    Lateral pair of spines on petiolar node longer than dorsal pair, and directed vertically (Figure 396) ..... **11**

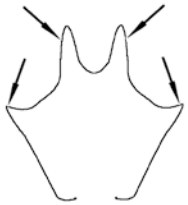

**Figure 395**

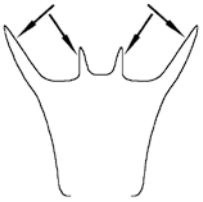

**Figure 396**

11. Propodeum only slightly longer than wide; flattened; sculpture of mesosoma often coarse (Figure 397) ..... ***P. macropa*** **Wheeler**

    Propodeum much longer than wide; gently excavate towards its centre; sculpture of mesosoma a uniform,very fine micro-reticulation (Figure 398).....***P. pyrrhus*** **Forel**

**Figure 397**

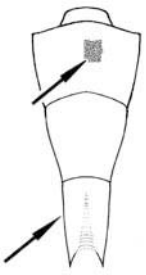

**Figure 398**

12. Gaster covered in fine pubescence..... **13**

    Gaster lacking fine pubescence ..... **14**

13. In dorsal view, pronotum, mesonotum and propodeum of uniform appearance; propodeal spines short to very short and weakly upturned ..... ***P. phryne*** **Forel**

    In dorsal view, mesonotum and propodeum irregularly sculptured, while pronotum is more-or-less longitudinally striate; propodeal spines long and strongly upturned..... .....***Polyrhachis (Campomyrma)*** **sp. JDM 118**

14. Smaller species (HW ≈ 1 mm); lateral processes of node weak denticles..... .....***Polyrhachis (Campomyrma)*** **sp. JDM 802**

    Larger species (HW ≥ 1.5 mm); lateral processes of node usually strong denticles or spines, if weak, ant large (HW ≥ 2 mm) ..... **15**

15. In full-face view, angles of vertex in form of small boss or protuberance just above each eye (Figure 399a); lateral spines on node distinctly longer than pair of spines on dorsum of node (Figure 399b) .....***P. leae*** **Forel**

    In full-face view, angles of vertex not protuberant (Figure 400); lateral spines on node the same size or smaller than pair of spines on dorsum of node (Figure 401) ..... **16**

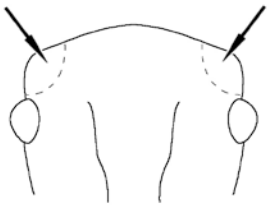

**Figure 399a**

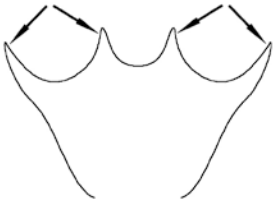

**Figure 399b**

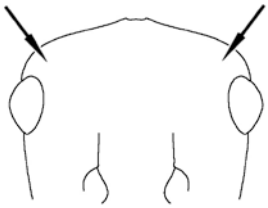

**Figure 400**

**Figure 401**

16. In dorsal view, vertex of head capsule without fine, microscopic microreticulation, vertex shining in appearance.....***P. ops*** **Forel**

    In dorsal view, vertex of head capsule with distinct microreticulate sculpture, vertex more dull in appearance..... **17**

17. In dorsal view, mesonotum distinctly wider than long (Figure 402a); propodeal angles directed upwards as weak denticles; in profile, spines on dorsum of node directed upward (Figure 402b) .....***P. sidnica*** **complex sp. JDM 390**

    In dorsal view, mesonotum about as wide as long; propodeal angles directed upward as flattened spines (Figure 401a); in profile, spines on dorsum of node tilted posteriad (Figure 401b) ..... .....***P. sidnica*** **complex sp. JDM 671**

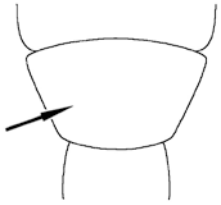

**Figure 402a**

**Figure 402b**

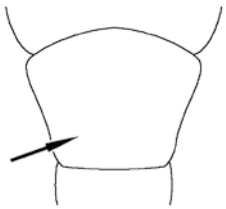

**Figure 403a**

**Figure 403b**

Globally, this is an enormously diverse genus, rivalling genera like *Camponotus* and *Pheidole* in size. The common name of 'spiny ants' sometimes given to *Polyrhachis* species is well-deserved in most cases. The spinose appearance of these usually black ants is normally distinctive, but the lack of a metapleural gland (an uncommon feature in Formicinae), an angular or toothed petiolar node and the large first gastral tergite set them apart from the few species of other genera with which they could be confused. Many species have colourful white to orange pubescence on their gasters. *Polyrhachis* ants are normally terrestrial, but a number of lignicolous

species make their nests in holes in tree-trunks and a few make silk nests among the leaves of trees. Two species actually nest in mangrove mudflats and forage at times of low tide (Shattuck 1999; Andersen 2000). The Australasian members of the genus have been undergoing a long process of revision by R. J. Kohout and R. W. Taylor, which has resulted in a periodic release of mainly short taxonomic articles (see Shattuck and Barnett [2007] for a full listing).

Eighteen species of this mainly tropical genus are covered in the key to the SWBP *Polyrhachis* fauna, though other species may occur on the fringes of the Province. Most of the taxa belong to the sub-genus *Campomyrma*. *Polyrhachis ammonoeides* Roger is the only member of the sub-genus *Hagiomyrma* occurring in the SWBP. In WA, this attractive, black-and-gold coastal species can be found from about Dongara to at least Barrow Island. Likewise, the northern *Polyrhachis* (*Chariomyrma*) sp. JDM 807 (in the *aurea* complex) is probably the only species in sub-genus *Chariomyrma* to occur in the SWBP. This is an arid area form that is a typical feature of the ant fauna of the inland Pilbara.

The remaining *Polyrhachis* all belong to the sub-genus *Campomyrma*. Undoubtedly the most common of these is *Polyrhachis phryne* Forel. According to Kohout (Kohout and Taylor 1990), *P. phryne* is one of the most widespread of all Australian ants, being definitely known from all Australian states except the NT and Tas. *Polyrhachis phryne* has an apparently close relative that can be found throughout the SWBP. This species, *Polyrhachis* (*Campomyrma*) sp. JDM 118, can be recognised by its longer propodeal spines and distinct sculpture of the mesosoma. *Polyrhachis phryne* itself may actually include sibling forms (R. Kohout, pers. comm.). Another widespread species is *Polyrhachis femorata* F. Smith, which occurs on the east coast of Australia (including Tasmania) as well as in south-west WA (Kohout 2000). In this taxon the humeri are rounded, which is not the case in other south-west *Polyrhachis* in the sub-genus *Campomyrma*. The author has seen workers of *P. femorata* emerging from holes, probably excavated by other insects, in the trunk of a Perth suburban jacaranda tree (Bignoniaceae).

Ants in the *Polyrhachis sidnica* complex appear to be closely related to *P. phryne*. These are species in which the workers have a petiolar node that is armed with paired spines both dorsally and laterally, and the gaster is lacking in distinct pubescence. In *Polyrhachis* (*Campomyrma*) sp. JDM 390 the petiolar node and its dorsal pair of spines, seen in profile, are directed vertically. These same structures are tilted posteriad in *Polyrhachis* (*Campomyrma*) sp. JDM 671 (possibly a species complex). *Polyrhachis* (*Campomyrma*) sp. JDM 390 is found inland of the Darling Range, south-east of Perth, while *Polyrhachis* (*Campomyrma*) sp. JDM 671 has a more extensive range throughout southern parts of the SWBP. *Polyrhachis ops* Forel is differentiated from these two taxa only by the smoother and shinier head capsule, and is found on the western south coast. An undescribed member of the *Campomyrma* subgenus, collected by a non-Curtin researcher in 2005 on Whitlock Island near Jurien Bay townsite, is currently on loan to Dr. Rudy Kohout, and has not been available for comparison with existing material in the Curtin Collection. Nor has it been assigned a JDM number. This species is likely to constitute a nineteenth south-western member for the genus. The sole specimen is morphologically close to *Polyrhachis patiens* Santschi, but is not identical to that eastern Australian species (R. Kohout, pers. comm.). This worker would come out in the SWBP *Polyrhachis* key somewhere near *P. ops* but has a much more gracile appearance than the latter species. Polyrhachis *leae* Forel, described from Tasmania, is similar to the aforementioned species but the corners of the vertex are slightly protuberant, so that the vertex resembles that of certain *Rhytidoponera*. Within the SWBP, specimens have mostly been collected in wetter coastal parts of the south-west, but have also been recorded from bark and intercept traps on Wandoo (*Eucalyptus wandoo* Blakely) and Powderbark Wandoo (*Eucalyptus accedens* W. Fitzg.) trunks in Dryandra State Forest.

*Polyrhachis gravis* Clark has a few erect and semi-erect setae on the gaster. The propodeum is strongly tapered posteriad. In the SWBP this species has been collected from the sandplain around Eneabba and in the Esperance district, but also occurs throughout inland WA. *Polyrhachis gravis* was originally described from the NT. The closely related and well-known mulga ant (*Polyrhachis macropa* Wheeler) has a range that extends to the northern fringe of the SWBP, and is part of a complex consisting of many species. *Polyrhachis pyrrhus* Forel has recently been found at Bunketch, in the north-east of the Province, and this ant also occurs in the Pilbara and the NT. The clay nests of this species are among the most spectacular ant nests in the SWBP, resembling large clay vases that have been half-buried in the ground. The entrance hole or holes in some instances are large enough to admit an animal the size of a rat.

*Polyrhachis schwiedlandi* Forel is one of the few *Polyrhachis* in the SWBP in which the dorsum of the petiolar node in the workers is unarmed. *Polyrhachis schwiedlandi* was described from NSW, but, like many of its southern brethren, its true range is probably much more extensive than that recorded in the literature. Workers are usually easily recognized by the carina extending from the posterior margin of the eye to the vertex of

the head capsule. The upper sector of the gena is slightly excavate. However, for northern collections examination of the configuration of the node is needed to distinguish this ant from two very similar species, i.e. *Polyrhachis* (*Campomyrma*) sp. JDM 1010 and *Polyrhachis* (*Campomyrma*) sp. JDM 805. In *C. schwiedlandi*, on either side of the node is a sharp, lateral tooth that projects posteriad. In the other species the lateral tooth is shorter and usually vestigial. *Polyrhachis* (*Campomyrma*) sp. JDM 1010 has been collected from Eneabba and from Nanga and Nerren Nerren Stations, south of Shark Bay, as well as from places north and east of the SWBP. In this species the lateral tooth or denticle projects laterad. *Polyrhachis* (*Campomyrma*) sp. JDM 805 is very similar to the preceding two species, but the head is less angular and the sculpture on the dorsum of the mesosoma is more delicate. The lateral processes on the petiolar node are vestigial and oriented posteriad, as with *P. schwiedlandi*. This is a mainly northern and eremaean species. *Polyrhachis hirsuta* Mayr is known in the Curtin Ant Collection from one nest discovered in soil in Jarrah-Marri woodland near Sawyers Valley, some 45 km east of Perth. However, other specimens from south-west WA are held at ANIC (R. Kohout, pers. comm.), and the species is also known to occur in NSW and QLD. The workers are extremely hairy.

Finally, two small and apparently uncommon *Polyrhachis* are *Polyrhachis* (*Campomyrma*) sp. JDM 620 and *Polyrhachis* (*Campomyrma*) sp. JDM 802. *Polyrhachis* (*Campomyrma*) sp. JDM 620 is unusual in that the cuticular colour of the whole gaster ranges from gold to light tan, a departure from the usual black or dark red found in the genus. Specimens have been collected only from Amery Siding in the central wheatbelt, and from 101 km SSE of Newman. *Polyrhachis* (*Campomyrma*) sp. JDM 802 is similar in size but its gaster is of the normal black colouration, and the petiolar node has paired dorsal spines (lacking in the other species). The only known specimens are from Torndirrup National Park, near Albany. Both species have very pale legs.

### *Prolasius*

1. Pale, usually depigmented light yellow to orange species..... **2**

   Darker, brown to black species..... **5**

2. Pronotum with one pair of erect, bristly setae; dorsum of mesosoma pale yellow, sides of mesosoma distinctly darker..... ***P. hemiflavus* Clark**

   Pronotum with two pairs of erect, bristly setae (additional setae may be present); mesosoma not bicoloured..... **3**

3. Mesonotum with one erect, bristly seta at most; erect and semi-erect setae on antennal scape not conspicuous; propodeum smoothly rounded (Figure 404)..... ***Prolasius* sp. JDM 551**

   Mesonotum with two pairs of erect, bristly setae; erect and semi-erect setae on antennal scape conspicuous; propodeum with distinct dorsal and declivitous surfaces, often separated by a small, transverse carina (Figure 405)..... **4**

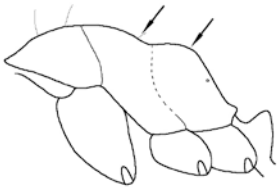

**Figure 404**

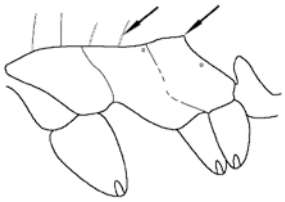

**Figure 405**

4. Seen from behind, propodeal dorsum laterally compressed, separated from declivitous face by a small, transverse carina (Figure 406)..... ***Prolasius* sp. JDM 109**

   Seen from behind, propodeal dorsum not laterally compressed, transverse carina absent (Figure 407)..... ***Prolasius* sp. JDM 1044**

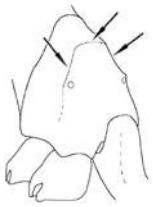

**Figure 406**

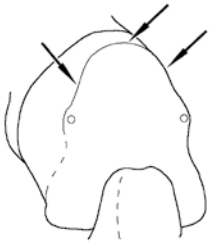

**Figure 407**

5. Mesosoma with 15 ≥ erect setae..... ***P. antennatus* McAreavey**

   Mesosoma with 10 ≤ erect setae..... **6**

6. Appressed setae very short, pubescence absent; mesosoma smooth and shining..... ..... ***Prolasius* sp. JDM 957**

   Appressed setae longer and dense, forming distinct pubescence; mostly duller in appearance with microsculpture present ..... **7**

7. Mesosoma smooth and shining; erect setae on mesosoma (one pair on pronotum) and gaster fine and pale ..... ***Prolasius* sp. JDM 1120**

   Mesosoma duller with fine microsculpture; erect setae on mesosoma and gaster stout and dark ..... ***P. reticulatus* McAreavey**

In the field, workers of dark *Prolasius* species can be confused with those of *Iridomyrmex* and *Paratrechina*. Closer examination of specimens under a microscope will readily eliminate *Iridomyrmex* (a dolichoderine genus), but species of *Prolasius* and *Paratrechina* share a number of features, including a bulbous clypeus, placement of the propodeal spiracle near the declivitous face of the propodeum, and, often, the presence of stout setae on the mesosoma. However, on the pronotum in *Prolasius* only two sets of setae, at most, are closely paired, whereas there are at least several adjacent pairs of setae on the pronotum of *Paratrechina* workers. *Prolasius* colonies are quite common in wetter parts of the south-west, where workers are found mainly on the soil surface or foraging on tree-trunks or on low vegetation. The diet of the WA species has not been studied, though some may take seeds (by inference from the known diet of related eastern states species – see Ashton 1979). Although several species of *Prolasius* may still be found in relictual native woodland in the Perth metropolitan area, they do not seem to persist in settled parts.

In the SWBP eight species of *Prolasius* have been identified, among which names can currently be assigned to only three species (a fourth available name, *Prolasius wheeleri* McAreavey, appears to the author to be no more than a synonym of *Prolasius reticulatus* McAreavey). Apart from *Prolasius hemiflavus* Clark, the known range of WA *Prolasius* species is restricted to the SWBP, but a revision of the group could well change this, as *Prolasius* taxa are also common in the humid south-east of Australia (Andersen 1991a).

*Prolasius antennatus* McAreavey is the species most frequently encountered in wooded parkland in the Perth metropolitan area and in central parts of the Darling Range. This is a brown ant with relatively long, downy pubescence and 15 or more erect setae on the mesosoma. *Prolasius reticulatus* is a large medium-brown to blackish species in which the cuticle is dull, and stout setae occur on the pronotum and, in some populations, the mesonotum. *Prolasius reticulatus* is commonly found in both the Darling Range and the Swan coastal plain. Workers have been collected in intercept traps on Wandoo and Powderbark Wandoo trunks at Dryandra. Workers collected in coastal woodlands growing on white sand in the lower west coast and south-west districts tend to be darker and hairier than those collected in the thicker forests of the Darling range. *Prolasius* sp. JDM 957 is similar to the above species, but is smooth and shining and lacks pubescence. This ant is known from one worker specimen collected in a pitfall trap at Dwellingup. Also occurring in the Dwellingup area is a large, gracile, pale species, *Prolasius* sp. JDM 109. This ant is not infrequently captured in pitfall traps, but has also been collected in an intercept trap on a Marri (*Corymbia calophylla* (Lindl.) K. D. Hill and L. A. S. Johnson) trunk. The range of this species extends to at least Manjimup, near the south coast. A very similar species to *Prolasius* sp. JDM 109 is the large, orange *Prolasius* sp. JDM 1044. This is the only *Prolasius* known from the central wheatbelt, and is represented by a single worker specimen held by WAM. This worker was collected 10 km north of Yorkrakine, and 240 km east of Perth.

*Prolasius hemiflavus* Clark and *Prolasius* sp. JDM 551 have small, yellow or depigmented workers. *Prolasius hemiflavus* has a distinct propodeal angle and one pair of erect setae on the pronotum. A few collections have been made of this species from trees, in pitfall traps, or under stones, on or near the south coast. The ant has also been recorded from an Alcoa site near Jarrahdale, some 60 km south of Perth. Outside of WA, this species is known from NSW, Tas., and Vic. *Prolasius* sp. JDM 551 has a rounded propodeum and is known from one collection taken from the south coast near Hopetoun, east of Albany and a single specimen collected at Lake Warden, near the Esperance townsite. *Prolasius* sp. JDM 1120, a brown species with fine, golden setae, was formerly thought to be confined to the heart of the Warren District, but recent records have come from the Huntly forest block, near Jarrahdale and Kings Park, near the Perth CBD.

### *Stigmacros*

The key produced by McAreavey (1957) is, unfortunately, not easy to use, and may not reflect the outcome of a modern revision of the group; hence it has not been followed here.

1. Dorsum of node with pair of spines directed posteriad (Figure 408) ..... **2**

   Dorsum of node unarmed, or nearly so (may be divided into pair of blunt lobes or vestigial denticles) (Figure 409) ..... **6**

2. Propodeum armed with two pairs of stout spines; one pair at propodeal angles and one pair directly above propodeal spiracles, respectively (sub-genus *Hagiostigmacros*) (possibly two species represented here) (Figure 410)..... ***S. spinosa*** **McAreavey**

   Propodeum armed with one pair of spines or denticles directly above propodeal spiracles, propodeal angles produced as weak or vestigial denticles (Figure 411) ..... **3**

**Figure 408**

**Figure 409**

**Figure 410**

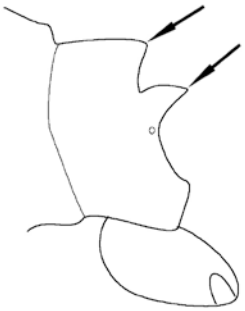

**Figure 411**

3. Head and mesosoma glossy black..... .... ***S. brachytera*** **McAreavey (a few workers)**

   Head and mesosoma yellow or reddish-brown .. ..... **4**

4. Process directly above propodeal spiracle a short denticle (Figure 412)..... ..... ***Stigmacros*** **sp. JDM 832**

   Process directly above propodeal spiracle a stout spine (Figure 413) ..... **5**

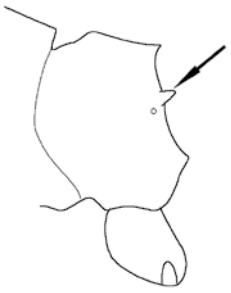

**Figure 412**

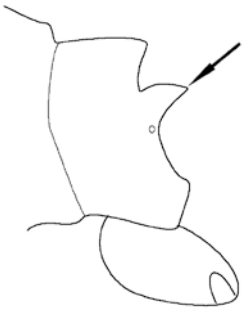

**Figure 413**

5. Yellow species; mesosoma and gaster with many erect setae, gaster also pubescent.. ..... ..... ***Stigmacros*** **sp. JDM 831**

   Gaster and head brown, mesosoma and appendages light reddish brown; sparse erect setae present only on margins of gastral tergites and underside of gaster, gaster not pubescent ..... ***Stigmacros*** **sp. JDM 622**

6. Gaster moderately to densely pubescent; cuticle of mesosoma microreticulate and usually matt, with many short, erect setae ..... **7**

   Gaster, at most, with weak pubescence with appressed setulae normally sparse; cuticle of mesosoma often smooth, shining, rarely with erect setae (if present, these are normally long) ..... **9**

7. Black or dark brown species with orange or brownish appendages, petiolar node orange to black..... ***Stigmacros*** **sp. JDM 341**

   Uniformly orange species ..... **8**

8. Propodeum with distinctly longitudinal impressed furrow; propodeal angles blunt (Figure 414); sculpture of head and mesosoma superficial, cuticle more-or-less shiny; pubescence on first gastral tergite dense ..... ..... ***Stigmacros*** **sp. JDM 396**

Propodeum without longitudinal furrow or furrow vestigial and barely discernible; propodeal angles denticulate (Figure 415); cuticle of head and mesosoma finely microreticulate; dull; shagreenate; pubescence on first gastral tergite moderate, with short, appressed setae visibly separate..... ..... ***Stigmacros* sp. JDM 829**

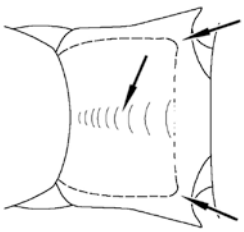

**Figure 414**

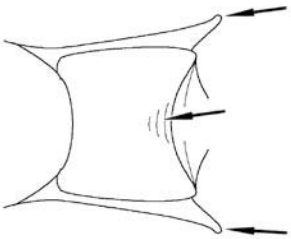

**Figure 415**

9. Erect setae present on mesosoma; non-marginal, erect setae present on gastral tergites..... **10**

   Erect setae absent from mesosoma; if erect setae present on gaster, then confined to margins of tergites ..... **13**

10. Propodeum smoothly rounded without longitudinal furrow or lateral carinae (Figure 416)..... ***Stigmacros* sp. JDM 1046**

    Propodeum laterally carinate, longitudinal furrow present or absent (Figure 417) ..... **11**

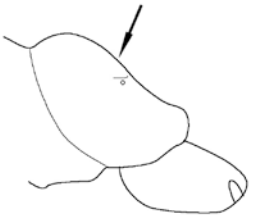

**Figure 416**

**Figure 417**

11. In profile, mesonotum convex, its dorsum smoothly rounded into its lateral surfaces (Figure 418)..... ***S. inermis* McAreavey**

    In profile, mesonotum flat, its dorsal and lateral surfaces distinct, often separated by a strong carina extending fully or partly along the length of the mesonotum (Figure 419)..... **12**

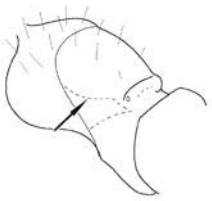

**Figure 418**

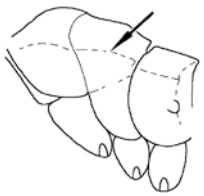

**Figure 419**

12. In profile, dorsum of propodeum smoothly confluent with declivitous face; propodeal angle absent (Figure 420); erect setae present on all surfaces of mesosoma..... ..... ***S. pilosella* (Viehmeyer)**

    In profile, dorsal and declivitous faces of propodeum distinct; propodeal angle present (Figure 421); erect setae virtually confined to pronotum (one or two short setae may be evident on mesonotum) ..... ..... ***S. stanleyi* McAreavey**

**Figure 420**

**Figure 421**

13. In profile, pronotum and mesonotum flat and on same plane, or mesonotum weakly convex; mesonotum and often pronotum laterally carinate (Figure 422); ants bicoloured, head,

mesosoma and gaster always black or shades of dark red-and-brown, appendages usually much lighter coloured, often yellow or orange ..... **14**

In profile, pronotum and mesonotum weakly to strongly convex; pronotum never carinate, dorsum of mesonotum usually smoothly rounded onto sides (Figure 423), occasionally with weak angle between dorsal and lateral surfaces; species concolorous light yellow or orange or shades of brown without strong contrast between body and appendages ..... **19**

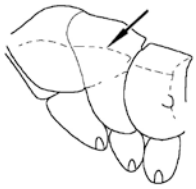

**Figure 422**

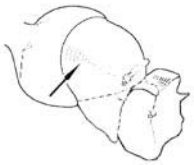

**Figure 423**

14. In dorsal view, head distinctly darker than mesosoma ..... **15**

In dorsal view, head same colour as, or slightly lighter than mesosoma..... **16**

15. Propodeum with flat dorsal and declivitous faces, in profile, propodeal angle strong (Figure 424) ..... ***S. aemula*** **Forel**

Propodeum with a short dorsal face merging imperceptibly into a long, smooth, slightly concave declivitous face (Figure 425); in profile, propodeal angle very weak ..... ***S. epinotalis*** **McAreavey**

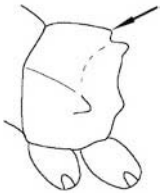

**Figure 424**

**Figure 425**

16. In dorsal view, mesonotum with strong punctate-microreticulate sculpture, appearance dull..... ..... ***S. anthracina*** **McAreavey**

In dorsal view, mesonotum with very fine microreticulation or sculpture lacking, appearance shining ..... **17**

17. In profile, propodeum narrow, about 1/2 as wide as high, longitudinal furrow absent, propodeum with oblique outline (Figure 426); fine, microreticulate sculpture present on mesonotum ..... ***Stigmacros*** **sp. JDM 1045**

In profile, propodeum about as wide as high; longitudinal furrow present, propodeum with outline of anterior lateral carinae rectangular or describing an arc in a horizontal plane (Figures 427, 428); mesonotal sculpture absent ..... **18**

**Figure 426**

**Figure 427**

**Figure 428**

18. Eye large, its width ≥ width of fore tibia; in full-face view (Figure 429a); dorsum of node bilobate (Figure 429b) ..... ..... ***S. elegans*** **McAreavey**

Eye smaller, its width < width of fore tibia (Figure 430a); in full-face view, dorsum of node straight or slightly concave, meeting the sides at an angle (Figure 430b)..... ..... ***S. brachytera*** **McAreavey (most workers)**

**Figure 429a**

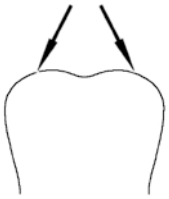

**Figure 429b**

**Figure 430a**

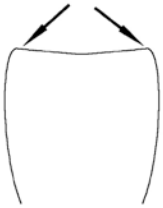

**Figure 430b**

19. Head, mesosoma, node, gaster, most of femora and extreme end of antenna chocolate, tips of femora, tibiae, tarsi and most of antenna ochraceous ..... ***S. reticulata*** **Clark**

    Appearance not as above ..... **20**

20. Mesonotum smooth and shining; in profile, weakly convex (Figure 431); head and mesosoma nearly always concolorous yellow or light orange ..... **21**

    Mesonotum with distinct, though sometimes weak sculpture; in profile strongly convex (Figure 432); colour yellowish or brown, head often darker than mesosoma (*S. occidentalis* complex) ..... **24**

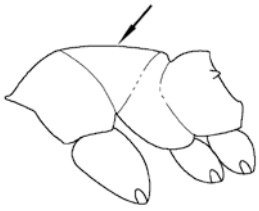

**Figure 431**

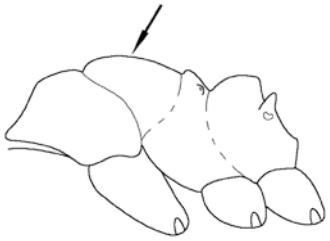

**Figure 432**

21. In profile, dorsum of propodeum rounded before it meets denticles directly above the spiracles (Figure 433) ..... ***Stigmacros*** **sp. JDM 1050**

    In profile, dorsum of propodeum angular or rectangular (*S. pusilla* complex) (Figure 434).... ..... **22**

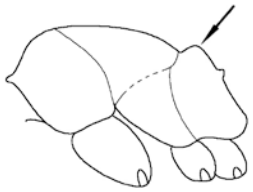

**Figure 433**

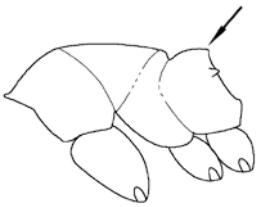

**Figure 434**

22. In profile, propodeal angles denticulate, directed upward (Figure 435); larger (HW > 0.5 mm) ... ..... ***Stigmacros pusilla*** **McAreavey**

    In profile, propodeal angles not denticulate, directed laterally (Figure 436); smaller (HW < 0.5 mm) ..... **23**

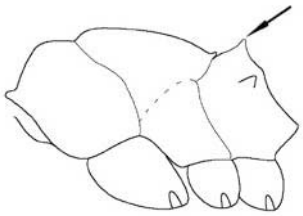

**Figure 435**

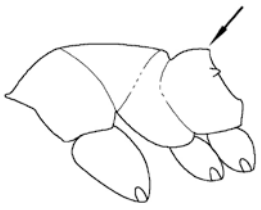

**Figure 436**

23. Eye moderate (eye width ≈ 0.25 × width of side of head capsule) ..... ***Stigmacros* sp. JDM 115**

    Eye large (eye width < 1/3 × width of side of head capsule) ..... ***Stigmacros* sp. JDM 188**

24. Pale yellowish species, head concolorous with mesosoma or only slightly darker ..... **25**

    Brownish species, head usually distinctly darker than mesosoma ..... **28**

25. Node deeply bilobate, lateral processes distinct denticles..... ***Stigmacros* sp. JDM 1067**

    Node not deeply bilobate, lateral processes vestigial or absent ..... **26**

26. Eye width moderate (eye width, at most, only fractionally greater than greatest width of scape) ..... ***S. flava* McAreavey**

    Eye large (eye width ≥ 3 x greatest width of scape) ..... **27**

27. In dorsal view, mesonotum as long as wide; (Figure 437) ..... ***Stigmacros* sp. JDM 1135**

    In dorsal view, mesonotum 1.5 – 2 x as long as wide (Figure 438) ..... ***Stigmacros* sp. JDM 443**

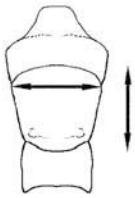

**Figure 437**

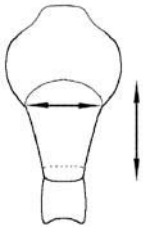

**Figure 438**

28. Eye large, ≈ 3 times as wide as antennal scape at its widest point ..... ***S. termitoxena* Wheeler**

    Eye smaller, ≈ as wide as antennal scape at its widest point ..... **29**

29. Node with small but distinct lateral denticles (Figure 439) ..... ***S. occidentalis* (Crawley)**

    Node lacking lateral denticles (Figure 440) ..... ..... ***S. glauerti* McAreavey**

**Figure 439**

**Figure 440**

With possibly as many as thirty species, *Stigmacros* is one of the most speciose formicine genera found in the SWBP. Despite this, the genus is poorly known, since most workers are small, inconspicuous ants that are mainly found in litter and are easily overlooked. McAreavey (1957) revised the genus but, unfortunately, the characters he used to distinguish the major radiations do not seem to be particularly robust, and his approach has not been adopted in my key to members of the genus. McAreavey separated this endemic Australian genus into subgenera based on such characters as the presence or absence of teeth on the propodeum and petiolar node, and the distinctiveness of the mesonotum. These characters are somewhat variable, however, and this author doubts their validity for separating most of the major groupings within the genus. As regards the fauna of the SWBP, the small, often black or bicoloured taxa with a smooth, flattened profile and carinate mesonotum placed by McAreavey in the subgenus *Campostigmacros* seem to stand apart from the other species as a monophyletic unit. *Stigmacros* are small, generalist predators that forage on the ground, in leaf litter or arboreally (Shattuck 1999). In the SWBP they are most frequently found under litter, stones or dead bark lying on the ground. Less frequently they nest under dead wood or directly into the soil surface. The author is unaware of any local species that nest in trees.

*Stigmacros aemula* (Forel) is the most common member of McAreavey's subgenus *Campostigmacros*, and is often found in Perth gardens. This shiny, brown-and-black species forages diurnally, and usually makes its nests directly into soil. Commonly, there is a cluster of nests. Larger ergatogynes, recognizable by their ocelli, which the workers lack, excavate nests and forage with the workers. *Stigmacros aemula* occurs on the Swan coastal plain and adjacent parts of the Darling Range. In general appearance *Stigmacros epinotalis* McAreavey is identical to *S. aemula*, except for the oblique declivitous face of its propodeum, and it is found over a similar range. *Stigmacros* sp. JDM

622 can be distinguished from *S. epinotalis* only by the appearance of its petiolar node, which bears a pair of short spines. This ant has been collected at Boddington and at Brookton, south-east of Perth.

*Stigmacros brachytera* McAreavey and *Stigmacros elegans* McAreavey are two jet-black ants with an oblique propodeum. In *S. brachytera* the head is rather flattened and the eyes are small. This species has been found from Perth to the south-west tip of the State and there is also one record from Lake Warden, near Esperance. *Stigmacros elegans* has relatively large eyes and the head is not so flattened. *Stigmacros elegans* also occurs in the Perth region, but has a much more extensive range than *S. brachytera*, and can be found throughout the State. The taxon was described from material collected in Nyngan, NSW. *Stigmacros anthracina* McAreavey is closely related to these ants, but can be recognized by the punctate-microreticulate sculpture of the mesonotum. In the SWBP this rather uncommon ant has only been collected in the Darling Range south of Perth, but it was originally described from Mt Lofty, near Adelaide, SA. *Stigmacros* sp. JDM 1045 also has a jet-black head and mesosoma, but possesses a light tan petiolar node and gaster. The propodeum is very oblique. One worker specimen, held in the WAM, is known. This species, which is near the South Australian *Stigmacros flavinodis* Clark, was collected at Durokoppin Nature Reserve, in the central wheatbelt.

*Stigmacros stanleyi* McAreavey and *Stigmacros pilosella* McAreavey are two reddish brown species that differ from the foregoing in that they have erect setae on the mesosoma, and non-marginal as well as marginal setae on the tergites of the gaster. The propodeum in *S. stanleyi* is truncate and rather square in dorsal view, whereas the propodeum in *S. pilosella* is oblique and identical with that of *S. epinotalis*. Within the SWBP both ants are typically part of the *Stigmacros* fauna of the wheatbelt and goldfields regions, but a queen and worker of *S. stanleyi* were collected at Martin in the Darling Range, on the outskirts of Perth. The two ants also occur interstate, *S. stanleyi* being found in NSW and Vic, and *S. pilosella* having been described from NSW. Both species are normally found in litter. Another litter-loving, hirsute species, *Stigmacros* JDM 341, also belongs to this subgenus, but may not be closely related to the other members of the subgenus discussed. The gaster of this ant is densely pubescent and its cuticle is dull and finely sculptured. This species is widely distributed throughout WA, and in the Perth metropolitan area has been collected in East Fremantle and at Buckland Hill Reserve, just north of Fremantle.

McAreavey's subgenus *Hagiostigmacros* has two representatives in the SWBP, though the true relationship between these and the plethora of species identified with McAreavey's subgenus *Cyrtostigmacros* is a moot point. *Stigmacros spinosa* McAreavey, as defined in the key, is variable in appearance, and WA material may include more than one species. A worker collected close to Eurardy Station, near Shark Bay, is yellow and more angulate in appearance compared with a reddish-brown worker collected near Eucla. Another worker collected 60 km south of Kambalda varies again, and none of these ants quite matches the holotype (from NSW) held in the Melbourne Museum. The pale *Stigmacros* sp. JDM 831 is a related but undescribed species that forages nocturnally in woodland around Perth. Specimens have been collected from both the Darling Range and the Swan coastal plain.

The subgenus *Stigmacros* includes one distinct complex related to *Stigmacros pusilla* McAreavey. The pale yellow *Stigmacros* sp. JDM 115, is common in wetter areas of the Darling Range. *Stigmacros* sp. JDM 1050 has a brown gaster and the propodeum is more rounded, but otherwise varies little from *Stigmacros* sp. JDM 115. This rather uncommon ant may be a wood specialist, the three specimens in the JDM Collection having been collected from a tree-trunk, a tree-trap and rotting wood, respectively. The species has been collected from between Perth and Denmark, on the south coast. *Stigmacros pusilla* McAreavey, itself, is also very similar to *Stigmacros* sp. JDM 115, but the propodeal angles are denticulate and directed vertically. This species is not uncommon in drier woodlands in the eastern wheatbelt. At least one worker in the Curtin Ant Collection was taken while foraging on a tree-trunk. Another likely member of the group, *Stigmacros* sp. JDM 443, is occasionally found in jarrah-marri woodland.

*Stigmacros inermis* McAreavey, placed in the subgenus *Pseudostigmacros* by McAreavey, appears to this author to be no more than a hairy variation on the *Cyrtostigmacros* theme. The spiracular spines are more pronounced in some northern specimens of this ant, which occurs throughout drier areas of the State. *Stigmacros inermis* also occurs in inland NSW. This is a rather large ant for a *Stigmacros*, one queen in the Curtin Ant Collection measuring 5 mm. *Stigmacros* sp. JDM 1046, known from one specimen held by WAM, is very close to *S. inermis*, but has a un-*Stigmacros*-like rounded propodeum. The single worker was collected 7 km south-east of Kodj-Kodjin in the central wheatbelt.

The largest grouping of *Stigmacros* in the SWBP includes most of the species placed by McAreavey in the subgenus *Cyrtostigmacros* and several placed in subgenera *Stigmacros* and *Campostigmacros*. Much of the WA fauna is undescribed, but even many named taxa, both from WA and from other Australian states, are doubtful: this author can see

no meaningful differences between a slew of ants described by McAreavey, including *S. aciculata*, *S. brooksi*, *S. clarki*, *S. castanea*, *S. rectangularis* (all from WA), *S. armstrongi, S. extreminigra,* S. *clivispina* and *S. ferruginea*. Among this group of taxa, *Stigmacros reticulata* Clark stands somewhat apart, both in terms of its *facies* and in terms of its behaviour. This shiny black (southern zone) or reddish-and-black (eastern and northern zones) species is a diurnal forager on white sand heathland and *Banksia* woodlands. If disturbed, the worker will freeze and remain immobile for some time. *Stigmacros flava* McAreavey is a very pale form from near Perth. Another pale, large-eyed member of this complex, *Stigmacros* sp. JDM 1135, is known from one specimen collected at Depot Dam, south of Merredin. *Stigmacros occidentalis* (Crawley) (with small teeth on the side of the node) and *Stigmacros glauerti* McAreavey (similar to the preceding, but without teeth) are found in the Perth area and the jarrah forest south of Perth. *Stigmacros glauerti*, however, although it is retained for now, on any future revision is likely to finish up as junior synonym of one of the other *Cyrtostigmacros* or *Stigmacros* subgenus species mentioned above. *Stigmacros termitoxena* Wheeler, thus named because the original colony was associated with a termite mound, is a large *Stigmacros* found in the more northern parts of the SWBP as well as regions to the north of the Province.

*Stigmacros* sp. JDM 188 and *Stigmacros* JDM 1067 are two apparently undescribed species that are small and pale yellow in colour. Both resemble members of the S. *occidentalis* complex, but the propodeal angle is more strongly defined in the form of small denticles. *Stigmacros* JDM 188 has a rounded petiolar node without lateral teeth, and is most characteristically a denizen of Jarrah-Marri woodland in the Perth region, and in areas to the south of Perth. Elsewhere, it has occasionally been recorded from the goldfields and the mid-north. In this species the mesonotum is only weakly convex, and its true affinities may lie with the *S. pusilla* complex. Stigmacros JDM 1067 has a bilobate petiolar node with small teeth on its lower lateral edges, and is known from one series of workers taken at Guilderton, at the mouth of the Moore River, and a few specimens from the Zuytdorp region. In the northern specimens the petiolar lobes are more spinose, and one of the ants has a few erect setae on the mesosoma. Finally, there are three *Stigmacros* species of uncertain affinities. *Stigmacros* sp. JDM 832 is known from one dark brown worker hand collected in the Darling Range just east of Perth. This specimen has short, paired dorsal spines on the petiolar node, but the mesosoma is reminiscent of subgenus *Cyrtostigmacros*. *Stigmacros* sp. JDM 396, on the other hand, resembles *S. stanleyi*, but workers of the former have a more rounded mesonotum. The species is known from four workers collected at Wongamine, north-east of Perth. A similar species, *Stigmacros* sp. JDM 829, is found in drier regions from the eastern goldfields to the Pilbara.

## SUBFAMILY MYRMECIINAE

Members of this subfamily are now placed in two tribes (Bolton 2003). The tribe Myrmeciini contains the well-known bulldog ants. These ants are easily recognised by their combination of slightly curved, elongate mandibles with at least vestigial teeth on the inner margin, two distinct waist segments, and large eyes placed very near the mandibular insertions. *Myrmecia* are principally predators, but also garner nectar and plant juices (Shattuck 1999). The sting of at least some of these species can be dangerous, even life threatening to people who have a sensitivity to hymenopteran (i.e. bee, ant and wasp) venoms (Street *et al*. 1994).

The monotypic tribe Prionomyrmecini contains one extant genus and species *Nothomyrmecia macrops* Clark, though the tribe is more diverse in the fossil record. *Nothomyrmecia macrops* is superficially similar to bulldog ants. However, there is only one waist segment, the eyes are well separated from the mandibular insertions and the mandibles themselves have more than 15 intermeshing teeth.

### Tribe Prionomyrmecini

#### *Nothomyrmecia*

One genus and species, *Nothomyrmecia macrops*, that is possibly extinct in this State. This species may readily be separated from members of the Tribe Myrmeciini by the many small, intermeshing teeth on the mandible. Workers and queens of Myrmeciini have linear, non-intermeshing mandibles with a mixture of large teeth and small denticles.

The single extant species *Nothomyrmecia macrops* Clark was discovered in Western Australia in 1931 in an unspecified locality east of Esperance, but has not been seen in this State since that time. The ant was rediscovered on the Eyre Peninsula in South Australia in 1975 (Taylor 1978), where it is a nocturnal forager in low temperatures (Hölldobler and Taylor 1983).

### Tribe Myrmeciini

#### Myrmecia

This key adapted from Ogata and Taylor (1991): readers are also referred to illustrations in that key.

Note: The workerless parasite *Myrmecia inquilina* Douglas and Brown is not included in this key, which treats workers only.

1. Occipital carina present (indicated by broken lines) (Figure 441) ..... **2**

Occipital carina lacking (curvature of occiput indicated by dotted lines) (Figure 442) ..... **19**

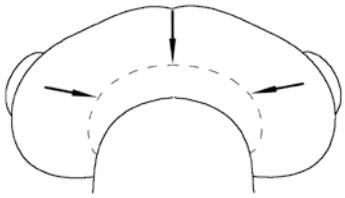

**Figure 441**

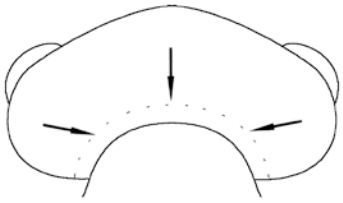

**Figure 442**

2. Subapical portion of mandible with a supplementary ventral tooth (Figure 443) ..... **3**

   Subapical portion of mandible without a supplementary ventral tooth (Figure 444) ... **17**

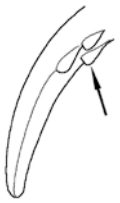

**Figure 443**

**Figure 444**

3. Mandibles each with 3 enlarged teeth apart from the apical tooth (Figure 445)..... ..... ***M. forceps*** **Roger**

   Mandibles each with 4 or more enlarged teeth apart from the apical tooth (Figure 446)..... **4**

**Figure 445**

**Figure 446**

4. Mandibles medium reddish-brown to dark brown, approximately concolorous with head capsule ..... **5**

   Mandibles light yellowish- to reddish-brown, distinctly lighter in colour than head capsule. ..... **6**

5. Apex of gaster reddish to yellowish ..... ..... ***M. regularis*** **Crawley**

   Apex of gaster dark brown to blackish-brown .... ..... ***M. erecta*** **Ogata and Taylor**

6. Apex of gaster yellowish; scapes darker than head..... **7**

   Apex of gaster blackish; scapes concolorous with, or lighter than head..... **8**

7. Basal portion of gaster dark blackish-brown ..... .....***M. analis*** **Mayr**

   Basal portion of gaster reddish-brown ..... .....***M. nigriscapa*** **Roger**

8. Mandibular shaft generally even in width, not narrowed basally (Figure 447) ..... **9**

   Mandibular shaft narrow at extreme base, broadened over basal quarter to fifth of its length (Figure 448)..... **11**

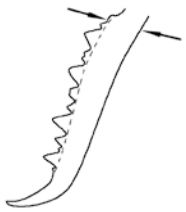

**Figure 447**

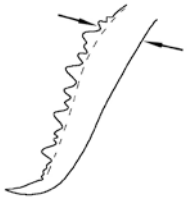

**Figure 448**

9. Petiolar peduncle short, at most as long as node, and not reaching the apices of the hind coxae when they are extended posteriad (Figure 449) ..... ***M. picticeps*** **Clark**

Petiolar peduncle longer than petiolar node; reaching or exceeding the apices of the hind coxae when they are extended posteriad (Figure 450) ..... **10**

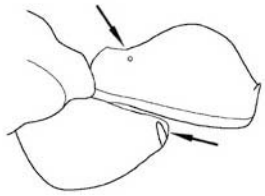

**Figure 449**

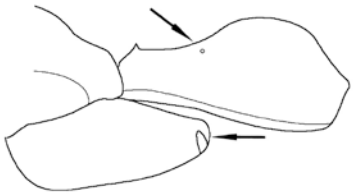

**Figure 450**

10. Pronotum with erect setae shorter than those of first funicular segment..... ***M. rubripes*** **Clark**

    Pronotum with erect setae longer than those of first funicular segment..... ***M. arnoldi*** **Clark**

11. Clypeus dark brown, concolorous with head ..... ***M. pavida*** **Clark**

    Clypeus yellowish, concolorous with mandibles ..... **12**

12. Setae on head and mesosoma long and thick, those on sides near posterior corners of head extending beyond outer margins of eyes ..... ***M. fulgida*** **Clark**

    Setae on head and mesosoma short and thin, those on sides near posterior corners of head not extending beyond outer margins of eyes .. ..... **13**

13. Head blackish, concolorous with gaster; mesosoma and nodes pale yellow, concolorous with mandibles..... **14**

    Head dark reddish-brown to yellowish-brown, lighter than gaster; mesosoma and nodes light reddish-brown to dark brown, darker than mandibles..... **15**

14. Legs blackish-brown, much darker than mesosoma ..... ***M. fuscipes*** **Clark**

    Legs yellowish, concolorous with mesosoma ..... ***M. desertorum*** **Wheeler**

15. Scape with numerous erect or suberect setae (Note: this character may be hard to see on abraded specimens) ..... ***M. nigriceps*** **Mayr**

    Scape almost lacking erect or suberect setae ... **16**

16. Mesosoma light reddish-brown; head concolorous with mesosoma; petiolar spiracle usually situated somewhat dorsally on peduncle..... ***M. gratiosa*** **Clark**

    Mesosoma yellowish-brown to dark brown; petiolar spiracle usually situated laterally on peduncle..... ***M. vindex*** **F. Smith**

17. Coxae orange; femora predominantly orange tending to brown near attachment of tibiae .... ..... ***M. urens complex*** **sp. JDM 728**

    Coxae dark brown; femora predominantly dark brown tending to orange near attachment of tibiae..... **18**

18. Viewed dorsally, mesosoma and node rugose and punctate (Figure 451); length of ocular setae usually < diameter of one facet..... ..... ***M. urens*** **complex sp. JDM 1**

    Viewed dorsally, mesosoma and node with reduced sculpture (node may be virtually smooth and shining) (Figure 452); length of ocular setae > width of one facet..... ..... ***M. urens*** **complex sp. JDM 71**

**Figure 451**

**Figure 452**

19. Posterior tibial spur of hind leg a simple spine-like process (Figure 453)..... ..... ***M. callima*** **(Clark)**

    Posterior tibial spur of hind leg distinctly pectinate (Figure 454)..... **20**

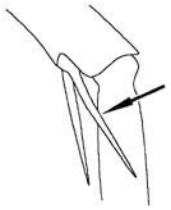

**Figure 453**

**Figure 454**

20. Subapical portion of mandible with a single row of teeth (Figure 443); head bicoloured with anterior section yellow, posterior section brown to black ..... ***M. picta*** **F. Smith**

    Subapical portion of mandible with a supplementary ventral tooth (Figure 444); head uniformly coloured ..... **21**

21. Dentition strongly developed along entire inner margin of mandible (Figure 455) ..... **22**

    Dentition reduced or vestigial in the sub-basal portion of mandible (Figure 456) ..... **30**

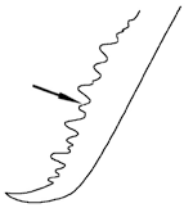

**Figure 455**

**Figure 456**

22. Clypeal setae long, reaching at least to the basal quarter of mandibles (Figure 457) ..... **23**

    Clypeal setae short, at most only slightly exceeding anterior clypeal margin (Figure 458) ..... **25**

**Figure 457**

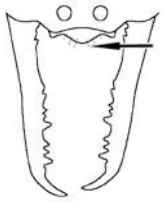

**Figure 458**

23. Postpetiole distinctly sculptured (Figure 459); pubescence on gaster yellow ..... ***M. rugosa*** **Wheeler**

    Postpetiole with at most vestigial sculpture (Figure 460); in doubtful cases, pubescence on gaster bright orange ..... **24**

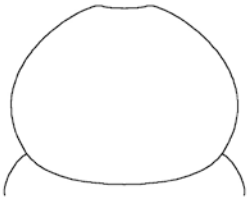

**Figure 459**

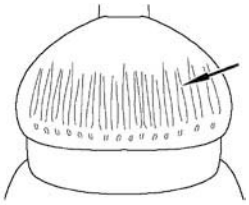

**Figure 460**

24. Standing setae on pronotum mostly longer than first funicular segment; clypeus without yellow pubescence; mandible of more-or-less the same width throughout its length; (bright orange pubescence on gaster distinctive) ..... ***M. michaelseni*** **Forel**

    Standing setae on pronotum mostly shorter than first funicular segment; clypeus may have yellowish pubescence; mandible noticeably tapered along its length (gastral pubescence off white to yellowish in specimens seen) ..... ***M. varians*** **Mayr**

25. Erect setae on hind tibia abundant and long, some as long or longer than maximum width of tibia (Figure 461) ..... **26**

Erect setae on hind tibia sparse and short, shorter than maximum width of tibia (Figure 462) ..... 27

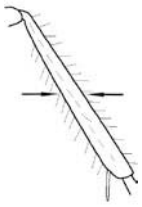

**Figure 461**

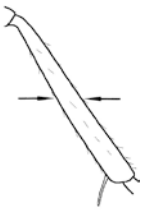

**Figure 462**

26. Mandibles yellowish, lighter than head ..... ..... ***M. chasei*** **Forel**

Mandibles dark brown, concolorous with head .. ..... ***M. ludlowi*** **Crawley**

27. Mesosoma essentially uniformly black; petiole black ..... .....***Myrmecia*** **sp. near** ***M. pilosula*** **F. Smith**

Mesosoma more-or-less uniformly light reddish to yellowish or bicoloured black-and-red; petiole yellowish to reddish brown ..... **28**

28. With combination of mandibles dark brown, concolorous with head, and pubescence on clypeus whitish ..... ***M. dispar*** **(Clark)**

Either mandibles lighter in colour, or pubescence on clypeus yellowish ..... **29**

29. Pubescence of clypeus yellowish; scape not exceeding posterior border of head (and see Species Description) .....***M. elegans*** **(Clark)**

Pubescence of clypeus whitish; scape exceeding posterior border of head by about half the length of first funicular segment (and see Species Description) ..... .....***M. occidentalis*** **(Clark)**

30. Clypeus with distinctly long, forwardly directed setae, reaching to about half the length of the mandibles, or further ..... .....***M. mandibularis*** **F. Smith**

Clypeus with shorter setae ..... **31**

31. Body more-or-less uniformly blackish brown..... ..... **32**

Body bicoloured: head and gaster blackish-brown, mesosoma and petiole reddish ..... **33**

32. Mandibles dark brown; dorsal surface of second and following gastral segments with gold pubescence .....***M. tepperi*** **Emery**

Mandibles yellowish; dorsal surface of second and following gastral segments with sparse white pubescence .....***M. clarki*** **Crawley**

33. Legs reddish-brown, approximately concolorous with mesosoma (often a little lighter); postpetiole usually lighter in colour than gaster.....***M. testaceipes*** **(Clark)**

Legs distinctly darker brown than mesosoma; postpetiole dark in colour, concolorous with gaster..... **34**

34. Dorsal projection of labrum obtuse, broadly rounded (Figure 463) .....***M. swalei*** **Crawley**

Dorsal projection of labrum narrow and acute (Figure 464) .....***M. acuta*** **Ogata and Taylor**

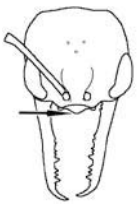

**Figure 463**

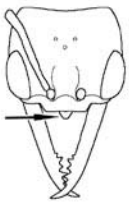

**Figure 464**

With at least 32 species out of a total of 89 named Australian species recognized by Ogata and Taylor (1991), and a further four taxa of uncertain identity, the SWBP has an impressive bulldog-ant fauna. Sixteen of these species belong to the *M. gulosa* group, these being large to very large bulldog-ants colloquially called 'inch ants' or 'sergeant ants'. *Myrmecia forceps* Roger has been collected rarely in this State, mainly from the wheatbelt. The blood-red *Myrmecia regularis* Crawley is common in more southerly regions, particularly the karri belt near the south-west coast. Another south coastal species is *Myrmecia analis* Mayr. The apex of the gaster in this red-and-black ant is a conspicuous yellow. *Myrmecia nigriscapa* Roger, which is widespread

in other states but seems to have a localised distribution in the Darling Range south of Perth in Western Australia, also has a yellow apex to the gaster. However, in this ant the basal portion of the gaster is red, rather than black.

*Myrmecia arnoldi* Clark, *Myrmecia pavida* Clark and *Myrmecia rubripes* Clark are closely related (Ogata and Taylor 1991) and, as a group, range from south-western WA to southern SA. *Myrmecia desertorum* Wheeler, *Myrmecia fuscipes* Clark, *Myrmecia gratiosa* Clark, *Myrmecia nigriceps* Mayr and *Myrmecia vindex* F. Smith are large to very large, reddish ants with red, brown or black heads and a black gaster. These are formidable insects: *M. desertorum* and *M. vindex*, in particular, are always ready to rush out of their mound nests to attack an intruder. *Myrmecia desertorum* is possibly the most common bulldog ant in the SWBP, and its mounds may be huge, up to 2 m in diameter (Ogata and Taylor 1991). Unlike the more aggressive bulldog-ants, *Myrmecia nigriscapa* Roger appears to be timid, members of one nest completely refusing to confront the author. The usual range of the hirsute *Myrmecia erecta*, according to its authors (Ogata and Taylor 1991), has a distribution ranging from south-eastern WA through to the southern gulfs of SA. However, the Curtin Ant Collection has a specimen, apparently of that species, that was collected at Karragullen, near Perth. The head capsule in *Myrmecia picticeps* Clark is bicoloured, the posterior sector being black and the anterior sector reddish. This is another ant found near the south-western coast. *Myrmecia fulgida* Clark has been recorded from the western goldfields, and recently Curtin staff and students at Carrabin Nature reserve inspected an active nest of this huge species, near where a specimen was also collected in a pitfall trap. This is a true 'inch ant', and is distinguished by the long, erect setae on the side of the head capsule. *Myrmecia inquilina* Douglas and Brown is a social parasite on other *Myrmecia* species and is known only from the queen.

Many of the above species appear to be uncommon or, at least, localised, and four of those mentioned (namely, *M. inquilina*, *M. nigriceps*, *M. pavida*, and *M. picticeps*) are not represented in the Curtin Ant Collection, which otherwise has a comprehensive array of species from most of the other ant genera. A characteristic of the distribution of the *M. gulosa* group in WA is that the bulk of the fauna is to be found in the humid south and south-west of the State. Only *M. desertorum* is common in the north and north-east portions of the SWBP.

The remaining species-groups constitute what are sometimes known as 'jumper ants' or 'jack jumpers', smaller species formerly combined under the old genus-level name *Promyrmecia*. Many, but by no means all of these ants move in short hops. The *M. pilosula* group in the SWBP contains nine species, excluding *Myrmecia pilosula* F. Smith itself. The only member of the *pilosula* complex found in the south-west differs from *M. pilosula* (species *sensu stricto*) in that the hind tibiae and tarsi are always dark-coloured in the WA species and light-coloured in *M. pilosula*. At this point of time, the name given to this species has not been formally published, so does not appear here. The ant is rare, being represented in the WA Museum by specimens collected many years ago at Albany, Esperance, Hovea, Lake Grace and Walpole. The Curtin Ant Collection has only recently acquired specimens from Torbay, on the South Coastal Hwy.

Of the remaining species, the attractively marked *Myrmecia occidentalis* (Clark) is widespread throughout the SWBP. This ant is particularly common in the Kwongan sand-plain north of Perth, where it can often be seen foraging on vegetation. *Myrmecia dispar* (Clark) is found in the south east of the Province (ANIC, Curtin University). The Curtin Ant Collection has one specimen collected from Monkey Rock (near Jerramungup) and another worker from Lake Warden, near Esperance. Western Australian specimens of *Myrmecia elegans* (Clark) are very difficult to separate from *M. occidentalis*, and I am unable to follow Ogata and Taylor (1991) wholly in their diagnosis of the species. The mandibles are often quite dark in colour, but can also be light yellow (they are light-coloured in *M. occidentalis*). The mesosoma varies from uniformly red or orange to bicoloured dark red and black, similar to *M. occidentalis*. The yellowish pubescence on the clypeus, as well as the shorter antennal scape, seem to be the surest guides to *M. elegans*, and, at least in local workers, the individual mandibular teeth tend to be slanted posteriad in *M. elegans* but are mostly evenly triangular in *M. occidentalis*.

*Myrmecia chasei* Forel and *Myrmecia ludlowi* Crawley have the same coloration as *M. elegans*, but are more robust ants with hairy tibiae. The separation of the two species by Ogata and Taylor (1991) is based purely on the colour of the mandibles (yellow in *chasei*, dark brown in *ludlowi*), but specimens seen by this author are not so easily distinguished, many having intermediate light to medium brown mandibles. Both species (if indeed they are separable species) are found in the Darling Range, including the Perth area. *Myrmecia michaelseni* Forel and *Myrmecia rugosa* Wheeler are two black *Myrmecia* with yellow pubescence on the gaster. *Myrmecia rugosa* can be distinguished by its sculptured postpetiole and canary yellow (as opposed to more orange-yellow) gastral pubescence. These two taxa are not uncommon in the Jarrah-Marri forests of the wetter south-western parts of the State. Normally associated with the above two species in keys is *Myrmecia varians* Mayr. *Myrmecia varians*, described from the eastern states,

is represented by one specimen each from Nerren Nerren Stn, just outside the recently amended boundaries of the SWBP (McKenzie, Keighery *et al.* 2000) and from Westonia. Little separates *M. varians* from *M. michaelseni* and *M. rugosa*, but Ogata and Taylor (1991) use subtle differences in the length of the pronotal setae and the appearance of the mandibles to distinguish them.

The *M. tepperi* species-group has five species in the SWBP. *Myrmecia tepperi* Emery is quite similar to *M. michaelseni* and *M. rugosa*, but can be distinguished by its reduced mandibular dentition (a characteristic of this and the *M. mandibularis* species-groups) and the absence of yellow pubescence from the first gastral tergite (present on the second and subsequent tergites). *Myrmecia clarki* Crawley is a small, dark *Myrmecia* with yellow mandibles. This ant is quite common in *Banksia* woodland around Perth, but has been collected as far north as Ethel Creek in the Pilbara. *Myrmecia swalei* Crawley strongly resembles the *M. chasei* complex in appearance but can easily be distinguished by its reduced mandibular teeth. This species is quite common in more coastal parts of the south-west, but can be found near the south coast at least as far east as Bremer Bay. *Myrmecia testaceipes* (Clark) resembles *M. swalei* but has reddish-brown legs (compared with blackish legs) and a postpetiole that is lighter in colour than the gaster (compared with one that is concolorous with the gaster). *Myrmecia acuta* Ogata and Taylor appears to have a restricted distribution in the Esperance area. I am not totally convinced that *M. acuta* is a distinct species: several representatives of *M. swalei* in the Curtin Ant Collection have a labral process almost as acuminate as that illustrated in Ogata and Taylor (1991), while others have a more broadly trapezoid process, and these extremes are connected by intermediate states in other workers.

*Myrmecia picta* F. Smith, the only member of the *M. picta* group in the SWBP, has a characteristic bicoloured head capsule, yellow anteriorly and blackish posteriorly. Within the SWBP, this species is quite common in Wandoo woodlands, on the eastern slopes of the Darling Range. The taxonomy of the *M. urens* species-group is problematic, and most named taxa (including *Myrmecia infima* Forel described from Perth, and *Myrmecia nigra* Forel, described from East Fremantle) cannot be identified with any confidence based on morphological characters. However, possibly three species from this group are represented in the SWBP (see species key). The smallest of these, *Myrmecia urens* group sp. JDM 71, which is quite common in relictual bushland just south of Perth, is the smallest bulldog ant in WA, and possibly in Australia. Workers are barely 5 mm in length. In the Darling Range and adjoining Swan Coastal Plain, *Myrmecia urens* group sp. JDM 1 is the most frequently encountered of these small bulldog ants, while *M. urens* group sp. JDM 728 appears to be restricted to coastal areas. Specimens of the latter species have been collected from between the Zuytdorp region, north of Kalbarri, and Kwinana, just south of Fremantle. *Myrmecia mandibularis* F. Smith, the only species in the SWBP of the species-group that bears its name, is a common and very conspicuous member of the Darling Range ant fauna, but can be found from south-western WA to Victoria.

The two members of the *M. cephalotes* species-group found in WA, *Myrmecia callima* (Clark) and *Myrmecia hilli* (Clark), have not been taken in the SWBP by Curtin staff, but *M. callima* has been collected at Corrigin and Southern Cross by ANIC researchers. Ants in this group can be distinguished from other *Myrmecia* by virtue of the non-pectinate tibial spur on their hind leg.

## SUBFAMILY PSEUDOMYRMECINAE

Ants in this subfamily possess two waist segments. They are most likely to be confused with Myrmicinae, but, unlike the latter, the first segment of the mesosoma (the pronotum) is connected to the second segment (the mesonotum) by a flexible joint. The hind tibia is pectinate, a condition never found in myrmicine ants, and the tarsal claws are toothed (simple in Myrmicinae). This is an arboreal group of ants whose major centres of diversity are in the Old and New World tropics. Many of the New World species, in particular, are famous for their mutualistic associations with plants. The Oriental and Australian fauna has recently been revised by Ward (2001). Only the genus *Tetraponera* is represented in Australia, with one species in the SWBP.

### *Tetraponera*

*One species,* Tetraponera punctulata *F. Smith.*

*Tetraponera punctulata* F. Smith has a wide distribution throughout Australia, except for the deep south and the arid zone, and is also found in Papua New Guinea (Ward 2001). While the ant will nest in dead branches of trees of several genera, it favours eucalypts, and is known to tend Coccoidea (Ward 2001). Within the SWBP, *T. punctulata* is widespread and reasonably common, and can typically be seen foraging around the trunk of Wandoos. The unusually long, thin outline of this species makes it readily recognizable in the field.

## SUBFAMILY CERAPACHYINAE

Just two genera of this small subfamily occur in Australia, but both are well represented in the SWBP. Both genera are also specialist predators

on the brood of other ants. (For further details on the biology of the Australian fauna see Briese and Macauley (1981) and Shattuck (1999).)

*Cerapachys*

(Note: The current status of the Australian species found in this genus is confused, and badly in need of revision. The identity of a number of species keyed out below may alter substantially when this genus is revised. *Cerapachys mullewanus* (Wheeler) is described from a male, and *Cerapachys angustatus* (Clark) and *Cerapachys constrictus* (Clark) are described from queens (possibly ergatoid). They do not appear in this key, which deals with workers only.)

1. Eyes absent, antennae 9-segmented ..... ***C. edentatus* (Forel)**

   Eyes present, antennae 12-segmented ..... **2**

2. Petiolar node without carinae, a deep anteromedial depression present on dorsal face of node (Figure 465); middle and hind tibiae without spur ..... ***Cerapachys* sp. JDM 574**

   Petiolar node with at least lateral carinae, deep anteromedial depression absent from dorsal face of node (Figure 466); middle and hind tibiae always with pectinate spur..... **3**

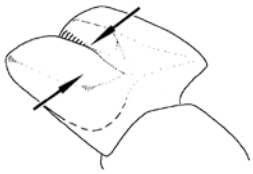

**Figure 465**

**Figure 466**

3. Petiolar node without distinct posterior angles, either square with an unbroken outline or sharply tapered posteriad, with a membranous border that is either entire or bifid in the form of a pair of lamellae (Figures 466–468)..... **4**

   Petiolar node with distinct posterior angles, these often produced as denticles or flanges... ..... **6**

4. Petiolar node square and concave anteriad, carinate on all sides (Figure 466) ..... ***C. simmonsae* (Clark)**

   Petiolar node with lateral margins convergent, ending in a blunt angle surrounded by a membranous lamina, or ending in a pair of processes ..... **5**

5. Posterior processes of petiolar node a pair of minute denticles (Figure 467)..... ..... ***C. picipes* (Clark)**

   Petiolar node with a pair of rounded, membranous lamellae posteriad (Figure 468), or with single, unbroken lamella (Figure 469). .....***Cerapachys* sp. JDM 745**

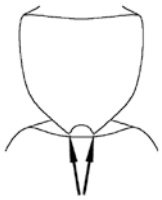

**Figure 467**

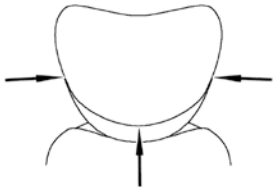

**Figure 468**

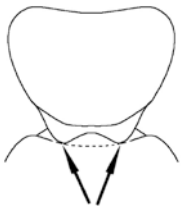

**Figure 469**

6. Posterior corners of head with well-developed dorsolateral carinae curving towards eye (Figure 470) ..... **7**

   Posterior corners of head without well-developed dorsolateral carinae curving towards eye (vestigial carinae may be present near vertex) (Figure 471)..... **8**

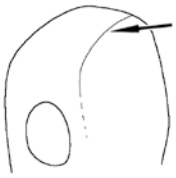

**Figure 470**

**Figure 471**

7. Eyes very large, length about one third length of side of head, eyes longer than distance between eye and mandibular insertion (Figure 472) ..... ***C. varians*** **(Clark)**

   Eyes smaller, length less than one-third length of side of head; length of eye ≤ distance between eye and mandibular insertion (Figure 473) ..... ....***C. brevicollis*** **(Clark)/*C. flammeus*** **(Clark)**

**Figure 472**

**Figure 473**

8. Dorsal surface of mesosoma rounded onto lateral surfaces, lateral carinae vestigial or absent (Figure 474) ..... **9**

   Dorsal surface of mesosoma delimited from lateral surfaces by distinct carinae (Figure 475) ..... **10**

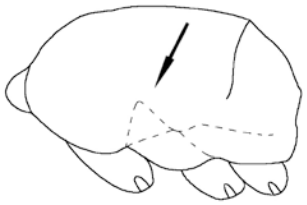

**Figure 474**

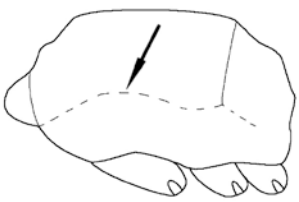

**Figure 475**

9. Head and abdominal segments IV-VII black, mesosoma, petiole and appendages light brown with some infuscation, abdominal segment III brown with an orange macula either side, its node wider than long; abdominal segment III only slightly narrower than segments IV-VII.....***C. longitarsus*** **(Mayr)**

   Head, mesosoma, petiole and abdominal segment III black, abdominal segments IV-VII black except for anterior orange band on abdominal tergite VI, appendages brown; petiolar node about as wide as long; abdominal segment III conspicuously narrower than segments IV-VII ..... .....***Cerapachys*** **sp. JDM 746**

10. Body concolorous red ..... **11**

    Body black, dark brown, bicoloured or variegated..... **20**

11. Head with three well-developed ocelli (Figure 476) ..... **12**

    Ocelli absent, or represented by minute, vestigial pits (Figure 477)..... **15**

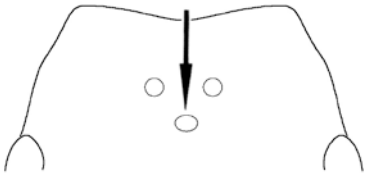

**Figure 476**

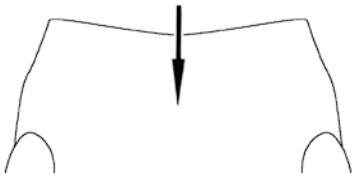

**Figure 477**

12. Abdominal segment III with anterior, transverse carina that joins each side at a distinct angle (Figure 478) ..... ***C. princeps*** **(Clark)**

    Abdominal segment III smoothly rounded towards its articulation with petiole (Figure 479) ..... **13**

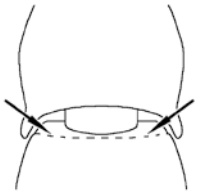

**Figure 478**

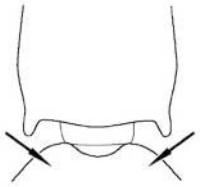

**Figure 479**

13. Posterior processes of node a pair of vestigial denticles; posterior corner of head with a faint, incomplete carina curving towards eye. .....*Cerapachys* **sp. JDM 1103**

    Posterior processes of node a pair of distinct, acute denticles; posterior corner of head smoothly rounded without trace of a carina ... ..... **14**

14. Larger (TL ≈ 8 mm); posterior carina of propodeum often distinctly concave in form of an inverted "V" (Figure 480)..... .....***C. sjostedti*** **Forel**

    Smaller (TL 7mm<); posterior carina of propodeum slightly indented to more-or-less straight (Figure 481).....***C. greavesi*** **(Clark)**

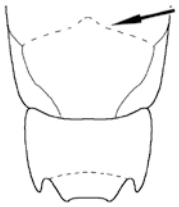

**Figure 480**

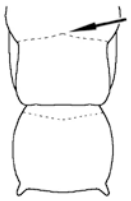

**Figure 481**

15. Posterior angles of petiolar node produced as acute-angled flanges that project beyond anterior corners of node (Figure 482)..... **16**

    Posterior angles of petiolar node either not armed, or produced as denticles that do not project beyond anterior corners of node (e.g. Figure 483)..... **18**

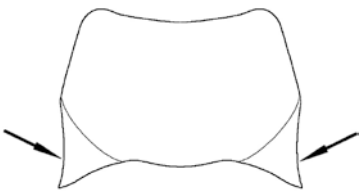

**Figure 482**

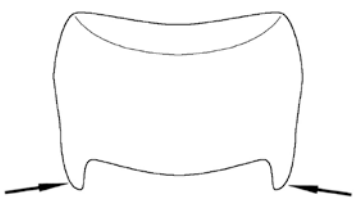

**Figure 483**

16. Petiolar node square or almost so, with nearly straight sides, broad lateral margins present that diminish towards posterior angles (Figure 484) .....***C. punctatissimus*** **(Clark)**

    Petiolar node about twice as wide as long, surrounded by lamellae that form an acute-angled flange at either posterior angle (Figure 485) ..... **17**

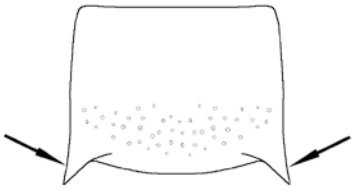

**Figure 484**

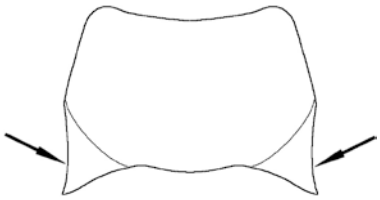

**Figure 485**

17. Dorsum of mesosoma smooth and unsculptured .....***C. clarki*** **(Crawley)**

    Dorsum of mesosoma finely, longitudinally striate .....*Cerapachys* **sp. JDM 941**

18. Dorsum of mesosoma finely, longitudinally striate; dorsum of petiolar node and postpetiole also finely sculptured ..... .....***C. latus*** **(Wheeler)**

    Dorsum of mesosoma, petiolar node and postpetiole smooth and shining..... **19**

19. Petiolar node much wider than long, without processes on posterior corners, distinctly concave anteriad and posteriad; eyes large, length about twice the distance between eye and mandibular insertion ..... .....***C. incontentus*** **Brown**

    Petiolar node only slightly wider than long, with denticles on posterior corners; not or only slightly concave posteriad; eyes smaller, length less than twice the distance between eye and mandibular insertion ..... .....***C. fervidus*** **(Wheeler)**

20. Body entirely black.....***C. ruficornis*** **(Clark)**

    At least the head and/or petiole coloured ..... **21**

21. Viewed dorsally, promesonotal humeri slightly but distinctly narrower than sides of propodeum, the area above the narrowest section of the mesosoma smaller than the area

below it (Figure 486) ..... ***Cerapachys* sp. JDM 1040**

Viewed dorsally, promesonotal humeri about as widely separated as sides of propodeum, the area above the narrowest section of the propodeum usually about equal to the area below it (Figure 487) ..... **22**

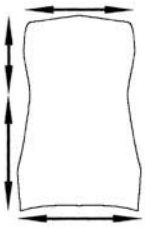

**Figure 486**

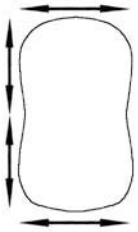

**Figure 487**

22. Petiole dark brown or blackish..... ..... ***C. gilesi* (Clark)**

Petiole lighter in colour (yellow to red, rarely light brown) ..... **23**

23. Length of eye less than one third side of head, equal to distance between eye and mandibular insertion; anteocular space with two distinct carinae that reach eye; mesosoma and abdominal segment II-VII dark brown, head reddish ..... ***C. bicolor* (Clark)**

Without the above combination of characters..... ..... **24**

24. Posterior angles of petiolar node produced as small denticles (Figure 488); eye smaller, length less than one third length of side of head.....***C. elegans* (Wheeler)**

Posterior angles of petiolar node weakly obtuse, not produced as denticles (Figure 489); eyes larger in most specimens, length more than one third as long as side of head ..... **25**

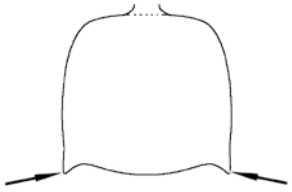

**Figure 488**

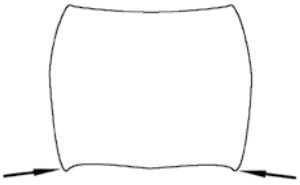

**Figure 489**

25. Head, mesosoma, petiole and abdominal segment III concolorous yellowish or reddish, remaining abdominal segments black or brown..... ***C. nigriventris* (Clark)**

Head, mesosoma, petiole and abdominal segment III not concolorous, petiole usually yellow (may be light brown contrasting with darker abdominal segment III), other parts variably coloured ..... ***C. brevis* (Clark)**

*Cerapachys* can be separated from *Sphinctomyrmex* by the outline of abdominal segments IV-VII, those parts possessing multiple constrictions in the latter genus. With 21 species described from workers and three other possible species (namely, *Cerapachys angustatus* (Clark), *Cerapachys constrictus* (Clark) and *Cerapachys mullewanus* (Wheeler)) described from queens or males, the SWBP is a major centre of diversity for *Cerapachys*. An additional six taxa are believed by this author to represent undescribed species. Despite the high species richness, many of the taxa are rare, being represented in the Curtin Ant Collection by one or a few specimens. Most frequently, stray workers have been collected by hand or in pitfall traps. Workers of the larger, reddish species are conspicuous in the field as they run over the ground, rapidly antennating the soil surface in search of their prey.

Like *Amblyopone*, *Cerapachys* appears to have been adversely affected by urbanization in the greater Perth area. Two species, i.e. *Cerapachys bicolor* (Clark) and *Cerapachys brevicollis* (Clark), described from material collected from Perth's eastern and south-eastern suburbs in the 1920's, have no representatives in the Curtin Ant Collection. Similarly, *Cerapachys punctatissimus* (Clark), described from specimens collected from Mundaring, near Perth, is only represented in the Curtin Collection by one specimen from Mt. Edith, in the Pilbara District (Eremaean Botanical Province).

*Cerapachys edentatus* (Forel) is the only SWBP representative of the group formerly placed in the genus *Syscia*. This eyeless ant is occasionally collected around Perth, even in Perth suburbs that retain some native vegetation, but has also been recorded in the ACT, NSW and Qld. The author notes that he has collected this species from under a rock on Mt Brown, near York in the western wheatbelt. The workers were in enormous numbers

and attached to one another by their mandibles, the insects falling away from the underside of the rock in huge, tangled skeins. The appearance of the colony, without any evidence of nest holes, suggested bivouacking in the manner of army ants. Indeed, *C. edentatus* bears some resemblance to species of *Aenictus,* from which it can quickly be distinguished by the appearance of abdominal segment III and the placement of the propodeal spiracle (posteriad in the former, and anteriad in the latter).

*Cerapachys longitarsus* (Mayr) is the only species in the SWBP formerly placed under *Lioponera*, the others, excluding *C. edentatus*, being subsumed under *Phryacaces* before Brown's (1975) revision of the Cerapachyini. The existence of this ant in Perth is interesting, given its tropical distribution elsewhere in Australia and overseas (south and south-east Asia). The species doubtless occurs as a tramp here: I have never seen specimens from outside of the Perth metropolitan area, and it is the only *Cerapachys* that can be found in built-up suburbs in Perth. Brown (1975) speculated that since it is a hollow twig dweller, it could have been transported across water in floating branches. However, the workers I have seen have all been found crawling on paths or grass.

*Cerapachys flammeus* (Clark), *Cerapachys greavesi* (Clark), *Cerapachys princeps* (Clark) and *Cerapachys sjostedti* Forel are all medium-sized to large, red species. Only *C. princeps* is known to occur outside of the State (i.e. also in SA), but the other species undoubtedly have a wide distribution in Western Australia, judging from local material. *Cerapachys flammeus* and *C. greavesi* occur at least as far north as the Pilbara region. The author also found the latter species in 1997 on newly rehabilitated minesites in Eneabba, where it was not uncommon. *Cerapachys* sp. JDM 1103 shares the same coloration as the preceding species, but the petiolar denticles are very rudimentary. This ant is known from a single worker collected at Nanga Stn., near the Peron Peninsula. *Cerapachys ruficornis* (Clark) is a black ant recorded from the south-west corner of the State and in the wheatbelt. *Cerapachys varians* (Clark) is a large-eyed species, of variable colouration, with a dorsolateral carina curving towards the eye. Specimens have mostly come from drier parts of the SWBP and the neighbouring Eremaean Botanical Province, but this species has also been recognised by the author among material collected from the Darling River region of NSW.

*Cerapachys clarki* (Crawley) is distinguished by the lack of a dorsolateral cephalic carina curving towards the eye, lack of ocelli and a wide node with posterior angles that in dorsal view extend laterally beyond its anterior margin. *Cerapachys clarki* is a predominantly sand-plain species that is also found in the NT and drier areas of south-eastern Australia.

*Cerapachys picipes* (Clark) and *Cerapachys* sp. JDM 745, from the eastern wheatbelt, are notable in that the lateral margins of the node converge strongly. Of the smaller, reddish species, *Cerapachys fervidus* is a rather variable ant (Brown 1975), which is widespread throughout Australia. Specimens referrable to this species are not uncommon in drier areas of the SWBP. *Cerapachys incontentus* Brown is an attractive, small, large-eyed species from the south-western woodlands and the wheatbelt, while *Cerapachys latus* Brown, found from at least the Perth region to Jurien Bay, possesses digitate spines on the posterior angles of the petiolar node. *Cerapachys* sp. JDM 941, with a heavily striate mesosoma, is known in the SWBP only from Jarrahdale. Elsewhere, it has been collected from Queen Victoria Spring Nature Reserve, east of Kalgoorlie

Of the smaller, bicoloured forms, *Cerapachys gilesi* (Clark), distinctive in that the pale head contrasts with a dark body, is one of the more common *Cerapachys* in woodlands around Perth. One record, possibly of this species, also comes from Ethel Creek in the Pilbara region. *Cerapachys elegans* (Wheeler) was described from NSW, but the Curtin Ant Collection also has a specimen from Corrigin in the south-eastern wheatbelt. *Cerapachys nigriventris* (Clark) is an inconspicuous small species found in the south-west and goldfields. The taxonomic boundaries of the minute *Cerapachys brevis* (Clark), found in, at least, WA and the NT, are unclear. Some forms have a distinctive yellow petiolar node that contrasts with the darker abdominal segment III, but the former feature is variable in colour. The morphology, however, is relatively uniform. *Cerapachys* sp. JDM 1040, which resembles *C. brevis* in general appearance, is known in the SWBP only from Jarrahdale (ALCOA site).

Two aberrant forms, which seem well removed from the above species phylogenetically, complete the list. Both lack a lateral mesosomal carina. The appearance of *Cerapachys* sp. JDM 746 is suggestive of a wasp mimic: the anterior sector of the abdominal tergite IV is bright orange, contrasting with the black posterior sector. Narrow orange bands are also formed by the pale-coloured margins of the tergites. This species is known from a single worker specimen collected near Mettler Lake, east of Albany.

*Cerapachys* JDM 574 is a goldfields form. The ant is known from a few workers, and is highly aberrant in several respects. The very placement of this species in *Cerapachys* is itself in question, since it lacks the pectinate spur on mid and hind tibiae said to be a diagnostic character of the genus *Cerapachys* (Bolton 2003). The extralimital cerapachyine genus *Simopone* also lacks a mid tibial spur, but has a

pectinate spur on the hind tibia, and workers and queens have preapically toothed claws (lacking in *Cerapachys* sp. JDM 574). The petiolar node in the worker of *Cerapachys* sp. JDM 574 possesses a large anterior pit or sulcus. The node itself lacks a lateral carina. With further analysis, this ant may require placement in a new genus, or the concept of *Cerapachys* may need to be expanded to incorporate this genus and *Simopone*.

***Sphinctomyrmex***

1. Antenna 11-segmented ... ***S. occidentalis*** **(Clark)**

   Antenna 12-segmented ..... **2**

2. Spaces between fovea on cuticle at sides of head and on dorsum of mesosoma and node very narrow so that these surfaces appear matt except in certain lights (Figure 490) ..... ..... ***S. emeryi*** **Forel**

2. Spaces between fovea on cuticle at sides of head and on dorsum of mesosoma and node often broad, so that these surfaces appear smooth and shiny (Figure 491) ..... ***S. imbecilis*** **Forel**

**Figure 490**

**Figure 491**

Two representatives of this genus occur in the south-west of the SWBP. *Sphinctomyrmex imbecilis* Forel has a wide distribution in Australia, whereas *Sphinctomyrmex occidentalis* Forel is confined to the south-west corner. The two species can readily be separated through a count of the number of antennal segments. In the SWBP neither is very often seen, but their colonies can be found under rocks or logs. A third species, *Sphinctomyrmex emeryi* (Forel), was described from a worker collected at Baudin Island on the northern fringe of the SWBP. Differences between the degree of punctation on the fovea on the cuticle separate this ant from *S. imbecilis*, with which it shares 12 antennal segments. Specimens from the Kimberley and Gascoyne region held in the Curtin ant Collection correspond to the description given for *S. emeryi* in Brown's (1975) key, and may belong to that species.

## SUBFAMILY LEPTANILLINAE

This is a subfamily consisting of minute army ants. *Leptanilla* is the only genus occurring in Australia, with one species, *Leptanilla swani* Wheeler, recorded from NSW, QLD, SA and WA. Workers in this subfamily may be confused with some very small, eyeless myrmicines, but the pronotum and mesonotum in *Leptanilla* are connected by a flexible hinge, and are not fused as they are in the Myrmicinae. Moreover, the antennal insertions are completely exposed in the former while they are at least partially covered in the latter. Nothing is known about the biology of the sole Australian species, but a Japanese relative specialises on geophilomorph centipedes (Hölldobler and Wilson 1990)

***Leptanilla***

One species, *Leptanilla swani* Wheeler. In this State, workers known from the type colony only and were taken many years ago. Males, however, are not infrequently taken in pitfall traps

*Leptanilla swani* Wheeler was described from a colony discovered at Goyamin Pool, near Chittering, approximately 75 km north of Perth. According to Shattuck (1999), workers have only been collected twice since that time. Males, however, have been collected more frequently, which suggests that current collecting techniques are not successfully sampling these tiny, exclusively subterranean ants. The Curtin Ant Collection holds two minute, male ants believed to be of this species, while males have also been collected in a Curtin project undertaken on Barrow Island. The sole SWBP specimen was collected on an Alcoa mine site in Jarrahdale.

## SUBFAMILY AMBLYOPONINAE

This is one of the resurrected or new subfamilies created by the recent splitting up of the portmanteau subfamily Ponerinae (Bolton 2003). Members of the subfamily are readily recognized through the broad attachment of the petiole to the abdominal segment III, and the row of small, dentiform teeth on the clypeus. Australia has a rich fauna of amblyoponine ants, with five genera being represented on the continent, but only one of these, *Amblyopone*, has representatives in the SWBP.

***Amblyopone***

1. Smaller species (HW < 1.5 mm) ..... ..... ***Amblyopone glauerti*** **(Clark)**

   Larger species (HW > 1.5 mm) ..... **2**

2. Mandible long and linear, virtually edentate except for the tip, which bears five denticles... ..... ***A. aberrans* Wheeler**

   Mandible not as above, broader, and bearing one or more teeth along its inner margin..... **3**

3. Mesosoma and dorsum of head with fine, longitudinal striae and elongate punctures..... .....***A. clarki* Wheeler**

   Mesosoma and dorsum of head shining and smooth, except for scattered punctation ..... **4**

4. Frons of head and mesosoma with distinct punctation; lower genae adjacent to mandibular insertions terminating in a spine; prominent middle tooth of mandible preceded by one or more smaller denticles (Figure 492). ..... ***A. australis* Erichson**

   Frons of head and mesosoma with vestigial punctation; lower genae adjacent to mandibular insertions not terminating in a spine; prominent middle tooth of mandible unaccompanied by smaller denticles (Figure 493) .....***A. michaelseni* Forel**

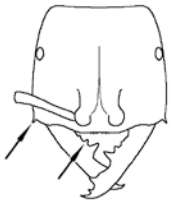

**Figure 492**

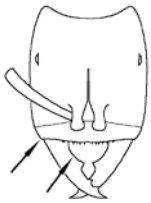

**Figure 493**

*Amblyopone* species have elongate, slender mandibles with teeth on the inner margins, and small eyes. These ants are cryptic predators in soil and litter, with some taxa preferring centipedes and others a range of soft-bodied arthropods (Shattuck 1999). The *Amblyopone* fauna of the SWBP includes one rather distinctive ant and two complexes, each consisting of two closely related species.

The distinctive *Amblyopone glauerti* (Clark) was originally described from the northern wheatbelt near Geraldton. Additional material in the ANIC comes from Bejoording and Pickering Brook in the Perth region and Mt. Ragged in the south-east. These are all old records. In contrast, *Amblyopone australis* Erichson has a broad distribution throughout Australia, but within the SWBP most records come from the Darling Range and near the south coast. Nests of this species are not uncommon under logs and rocks. This is the *Amblyopone* most commonly encountered in the hills behind Perth. The closely related *Amblyopone michaelseni* Forel has been collected in Western Australia and Victoria, but is apparently very rare in this State. Although the type specimen was taken at Jarrahdale, where Curtin University students and other researchers have done much work on ants, there are no specimens in the Curtin Ant Collection. Possibly this is a species that has been affected by alteration in land use around Perth.

*Amblyopone clarki* Wheeler and *Amblyopone aberrans* Wheeler also appear to form a taxonomic unit. The former is locally abundant on the sandy coastal plain north and south of Perth, especially in tuart (*Eucalyptus gomphocephala* DC.) and *Banksia* woodlands. Nests of this species are often conspicuous because of the presence of a peculiar little turret of sand, about 5 cm high. The author has often found just one worker (a sentry?) within the apex of the turret. The closely related *A. aberrans* is distinguished in having its mandibular teeth concentrated at the end of the mandible, rather than being distributed along the inner margin, as in *A. clarki*. The taxon was described from Mundaring, just east of Perth, but this is another *Amblyopone* that seems to have become increasingly rare with urbanisation, and there are no specimens in the Curtin Ant Collection.

## SUBFAMILY PONERINAE

In the SWBP, the newly reconfigured subfamily Ponerinae (Bolton 2003) has had its glory much diminished, with the genera *Amblyopone*, *Discothyrea*, *Heteroponera* and *Rhytidoponera* now excluded and placed in other subfamilies. Ponerinae, as it is now understood, includes those ants whose workers have the torulus completely fused to the frontal lobe, while the outer margins of the frontal lobes themselves are convergent posteriad (except in *Platythyrea*). The lobes thus have a 'pinched in' appearance, according to Bolton (2003). Ponerinae do not now include ants with a lamellar apron on the anterior clypeal margin, or a median longitudinal carina on the front of the head capsule. Ants of the genus *Platythyrea* have several unique or unusual features among the Ponerinae, including broad insertion of the clypeus, and the presence of pectinate meso- and meta-tibial spurs. No other ponerines have a broad insertion of the clypeus, and only a few *Leptogenys* and *Pachycondyla* species (none in the SWBP, to my knowledge) have pectinate tibial spurs. *Platythyrea* is therefore placed in a separate tribe, the Platythyreini, by Bolton (2003). The remaining ponerines are placed in the tribe Ponerini. The latter is poorly characterised at

the generic level, and recent molecular work has cast doubt on the validity of a number of genera. Undoubtedly, this area of ant taxonomy will change markedly with the publication of papers that will arise from research currently being undertaken.

All ponerine ants have a single waist segment, and possess a sting. In all but *Odontomachus*, the gaster is characterised by a slight though distinct girdling impression between the first and second segments. *Odontomachus*, the only ponerine with a smoothly rounded gaster, has distinctive, forceps-like mandibles articulated close together under the head capsule. Although this type of mandible is shared with the genus *Anochetus*, the latter has the usual impression between first and second gastral segments. Ponerine ants are typically cryptic, and are usually found in small colonies. Some are quite minute species while others rival the larger bulldog-ants in size. Most are solitary generalist predators, but a few are specialist predators. None of the eight genera of Ponerinae found in the SWBP is locally speciose. *Platythyrea* is the best-represented genus in the SWBP, with five species.

### *Anochetus*

*One species,* Anochetus armstrongi *McAreavey.*

The genus can readily be separated from all other ponerines except *Odontomachus* by virtue of its elongate spring-trap jaws. Jaws that have evolved separately along a similar principal can be found among some members of the unrelated myrmicine tribe Dacetini. Features of the gaster (mentioned above), the node (dorsally rounded or slightly bidentate in *Anochetus*, acuminate in *Odontomachus*) and the head capsule (smooth posteriad in *Anochetus* but with a pair of lines in *Odontomachus*) separate the genera *Anochetus* and *Odontomachus*. The genus *Anochetus* forms small nests, usually of less than 100 workers, the ants predating upon small arthropods and using their sting to subdue their prey (Shattuck 1999). Surprisingly, in view of its mandibular specialisations, the only species in the SWBP, *Anochetus armstrongi* McAreavey, may also take some seeds, since husks and other plant refuse have been found around its nests (pers. obs.). This insect is found fairly infrequently in the SWBP, including in the Perth region, but has a broad range in the lower half of Australia.

### *Hypoponera*

1. Body and legs concolorous yellowish to orange.. .....***H. congrua* (Wheeler)**

   Body a deep, rich brown contrasting with orange legs .....***H. eduardi* (Forel)**

In the SWBP, the genus *Hypoponera* can commonly be found under rocks or logs or in termite nests, where it is a cryptic predator. The genus locally is often confused with *Pachycondyla* (sub-genus *Brachyponera*) but can be distinguished by the absence of a simple spur on the hind leg (present in *Pachycondyla*). On a global scale this genus may also be confused with *Ponera*, although this is unlikely in the SWBP, since the latter is represented by just a few records. However, the anteroventral process is a simple flange in *Hypoponera*, whereas the same flange has a circular, translucent sector of very thin cuticle in *Ponera*. The PF in the two genera is also different, *Hypoponera* having a PF of 2,2 and *Ponera* a PF of 1,1 or 1,2.

Two, possibly three species of *Hypoponera* are found in the SWBP, mainly in the south and south-west. Two distinct species are frequently seen in a variety of habitats, including the better-vegetated Perth suburban yards. Individual workers can often be seen in minute furrows in damp soil under rocks or logs, and are very adept at evading capture by disappearing into litter under or beside the covering object. *Hypoponera congrua* (Wheeler) is quite common in limestone and sandy soils in the Fremantle area, but is also found in wetter areas of the south-west. Of what are possibly two other species present in the SWBP, one is here assigned to *Hypoponera eduardi* (Forel), a tramp species, based on comparison with material in the Australian National Insect Collection (ANIC) in Canberra. This species is more commonly found in urban or otherwise disturbed environments, but has also been collected in relatively undisturbed woodland. What is possibly an additional species has been collected at Mt. Frankland near the south coast. This ant is an overall dark maroon, with yellow legs and a straight mesosoma without a distinct metanotal groove (*Hypoponera eduardi*, as far as the author can tell, has a brownish mesosoma, a darker head and gaster and the metanotal groove is distinct). However, the current taxonomic situation with Australian *Hypoponera* is confused, and, based on the type material seen by the author in the ANIC, a revision of the group is likely to result in some synonymization as well as the erection of new species.

### *Leptogenys*

1. Head broader than long; mandibles longer than head, linear and evenly curved; median lobe of clypeus tridentate, with smaller teeth and denticles on adjacent anterior margin of clypeus (Figure 81); pronotum and mesonotum foveolate ..... ***L. clarki* Wheeler**

   Head longer than broad; mandibles distinctly shorter than head, straighter and more triangular in form; median lobe of clypeus beak-like, without additional teeth or denticles, these also lacking from adjacent

anterior portions of the clypeus (Figure 88); pronotum and mesonotum smooth and shining with scattered, small punctures only. ..... **2**

2. Eyes moderate, length one quarter to one fifth length of side of head (Figure 494); (n.b. small, ventral, plate-like process on underside of gastral presclerite that articulates with the node (the helcium) present) ..... ***L. neutralis* Forel**

Eyes larger, length almost one third of side of head (Figure 495); (n.b. small, ventral, plate-like process on underside of the helcium absent in the few specimens seen) ..... ***L. darlingtoni* Wheeler**

**Figure 494**

**Figure 495**

This is a distinctive genus in the SWBP, the local species being jet black with a strongly angular and projecting clypeus. The major diagnostic feature for the genus, however, is the pectinate tarsal claw. Specialised predatory behaviour is not known for the local species, but elsewhere in Australia some taxa specialise on Isopoda or termites (Shattuck 1999). Three taxa can be found in the SWBP.

*Leptogenys clarki* Wheeler is a very large, heavily sculptured and spectacular species found in coastal localities between Geraldton and Exmouth, but is rare in collections. However, a recent survey of the ants of the Carnarvon Basin (Gunawardene and Majer 2004) has revealed this ant to be quite common in the mid-west of WA. The remaining species are similar in appearance, being smooth and shining, and essentially black in colour. *Leptogenys neutralis* Forel is reasonably common in laterite soils in the Darling Range, whilst its counterpart in drier northern areas, *Leptogenys darlingtoni* Wheeler, has been collected as far north as the Pilbara.

### *Myopias*

*One species,* Myopias tasmaniensis *Wheeler.*

The uncommon genus *Myopias* is characterised by elongate, curved mandibles and a narrow, projecting clypeus. One species is known from the SWBP. *Myopias tasmaniensis* Wheeler has been collected just twice from near Manjimup, in the extreme south-west. The same species is otherwise known from Victoria and Tasmania, and this discontinuous distribution is potentially of considerable interest to biogeographers.

### *Odontomachus*

*One species,* Odontomachus ruficeps *Smith.*

The so-called 'trap-jaw ants' (http://www.myrmecos.net/anttaxa.html) cannot be mistaken for any other ant genus, except, perhaps, *Anochetus* (also a 'trap-jaw' ant), from which they may be distinguished by the features mentioned under the latter. When hunting, *Odontomachus* workers move about with their mandibles locked at 90° to the head capsule. The mandibles can close with phenomenal speed in a reflex action once certain sensory trigger hairs are touched, the speed of the reflex being possibly the fastest in the animal kingdom (Gronenberg 1995). These ants also possess a formidable sting. The only species recorded from the SWBP is *Odontomachus ruficeps* Smith, which has a wide distribution throughout the State. In the north of WA, *O. ruficeps* is one of the commonest ponerines, but further south it appears to be less abundant. Worker ants in localities at about the same latitude as Perth are generally concolorous black or reddish-black. Further north, workers usually have a bright red head capsule, contrasting with a darker red mesosoma and black gaster.

### *Pachycondyla*

1. Large species (HW ≥ 2 mm); heavily sculptured (*Bothroponera* subgenus)..... **2**

Smaller species (HW ≈ 1 mm); at most weakly sculptured ..... **3**

2. Mandibles densely punctate, individual punctations separated by less than their own width (Figure 496); appressed setae on body surface white..... ***P. regularis* Forel**

Mandibles sparsely punctate, punctations well separated by smooth surface (Figure 497); appressed setae on body surface yellow ..... ***P. denticulata* group sp. JDM 730**

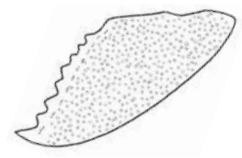

**Figure 496**

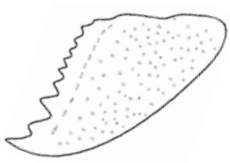

**Figure 497**

3. Mesonotal suture strongly defined, indented (Figure 498a); anterior clypeal margin straight (Figure 498b) .....***P. lutea*** **(Mayr)**

   Mesonotal suture weakly defined, not indented (Figure 499a); anterior clypeal margin gently convex (Figure 499b)..... ***P. rufonigra*** **(Clark)**

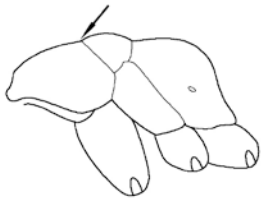

**Figure 498a**

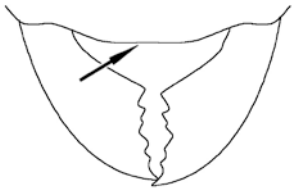

**Figure 498b**

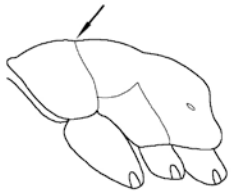

**Figure 499a**

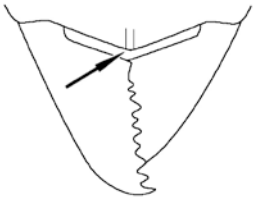

**Figure 499b**

Frederick Smith erected the genus *Pachycondyla* in 1858 (F. Smith 1858). Brown (1973) placed in provisional synonymy under this genus the genus-level names of two taxa found in the SWBP, namely, *Bothroponera* and *Trachymesopus*. Snelling (1981) made *Pachycondyla* a provisional senior synonym of *Brachyponera*, the other genus found in the SWBP. Unfortunately, confirmation of these provisional synonyms, among a number of others, has never been published; nor is it likely to be, since Brown, who was preparing a major revision of the group, died before publication of his work. Of those who have written recent taxonomic works on the Australian ant fauna, Bolton (1994, 1995) and Shattuck (1999) accept *Pachycondyla* as a senior synonym for the taxa mentioned above, while Andersen (2000) does not. Although, on a global basis, the monophyly of ants in the *Pachycondyla* group is problematic (e.g. do those taxa with a mandibular fovea belong here?), the Australian subgenera *Brachyponera*, *Bothroponera*, *Mesoponera* and *Trachymesopus*, at least, are united by well-defined taxonomic characters, and the name *Pachycondyla* appears to satisfy the conditions of the Zoological Code (International Commission on Zoological Nomenclature 1999). Hence, Bolton and Shattuck are followed here. Nonetheless, on a global scale, *Pachycondyla* awaits a more robust revisionary treatment than it has hitherto been given, which could well result in the reinstatement of some ancient genus-level names currently in synonymy.

In the SWBP, ants in the subgenera *Brachyponera* and *Trachymesopus* are most likely to be confused with *Hypoponera*, but possess both a pectinate and a simple spur on the hind leg. Ants in the subgenus *Bothroponera* are large, robust ants with a distinctive appearance, and are unlikely to be mistaken for anything else. The *Trachymesopus* and *Brachyponera* subgenera inhabit mainly the wetter, forested areas of the SWBP, where they are often found under rocks and logs, while the *Bothroponera* subgenus is characteristic of the wheatbelt and drier pastoral regions.

Four species of *Pachycondyla* can be found in the SWBP. *Pachycondyla* (*Brachyponera*) *lutea* (Mayr) is easily the most abundant species in the group, and occurs throughout Australia. Typically this species can be found cohabiting with termites under stones or rotting logs, and the latter are a prey item. As well as being widespread in native woodlands, *P. lutea* is common in suburban areas, where anecdotal reports suggest it not infrequently stings people tending their gardens. *Pachycondyla* (*Trachymesopus*) *clarki* (Wheeler) and *Pachycondyla* (*Trachymesopus*) *rufonigra* (Clark) appear to me to be no more than colour variations of the same species: *P. clarki* has a brown pronotum, but is otherwise indistinguishable from *P. rufonigra*, in which the pronotum varies from black to brownish-black. I here regard ***Pachycondyla*** (***Trachymesopus***) ***clarki*** (Wheeler) syn. revised as the junior synonym of

*Pachycondyla* (*Trachymesopus*) *rufonigra* (Clark), a position formerly entertained for this species (i.e. by Brown 1985). This species is confined to south-western WA, where it is mostly encountered as a retiring resident of litter in *Banksia* and Jarrah-Marri woodlands. *Pachycondyla* (*Bothroponera*) *piliventris regularis* Forel and *Pachycondyla* (*Bothroponera*) *denticulata* sp. JDM 730 are large, impressive ants that forage for prey on the ground surface. The former species has a broad distribution within more inland parts of the SWBP, while the latter has been collected in the vicinity of Shark Bay.

***Platythyrea***

1. Viewed dorsally, node longer than wide; dorsum of mesosoma without erect setae..... ..... ***P. parallela* (F. Smith)**

   Viewed dorsally, node wider than long; dorsum of mesosoma with erect setae ..... **2**

2. Posterior dorsal surface of node with distinct median protuberance (Figure 500)..... ..... ***P. dentinodis* (Clark)**

   Posterior dorsal surface of node without protuberance (Figure 501)..... **3**

**Figure 500**

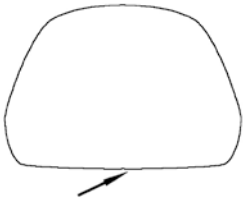

**Figure 501**

3. Erect setae long (≥ greatest width of antennal scape); head and mesosoma light reddish-brown; gaster dark brown ..... ..... ***P. brunnipes* (Clark)**

   Erect setae at most equal to greatest width of antennal scape, mostly shorter; if bicoloured then head darker than mesosoma..... **4**

4. Body distinctly bicoloured, mesosoma lighter than gaster and most of head, head with light coloured patches on genae ..... ***P. turneri* Forel**

   Body uniformly coloured dark brown..... ..... ***P. micans* (Clark)**

***Platythyrea***

*Platythyrea* comprises a group of rather neat-looking, moderate-sized ponerine ants. In the SWBP the widely separated antennal sockets and the presence of paired pectinate spurs on the hind tibiae are diagnostic for the genus. Although generally rare, several of the WA species have a broad distribution that extends overseas in one case. In the SWBP, the ants can be found in rotting wood or soil or foraging on logs and tree-trunks.

With five species, the *Platythyrea* fauna of the SWBP is rather rich. The *P. parallela* group has one representative in the south-west, *Platythyrea parallela* (F. Smith), which can also be found throughout much of Australia and south-east Asia. However, Andersen (1991a) challenges the synonymization of several names under the senior synonym *parallela* by Brown (1975). The remaining *Platythyrea* are obviously taxonomically close. *Platythyrea micans* (Clark) is possibly the most common of these, and workers have been collected from pitfall traps and hand collections from the ground and tree trunks in Jarrah-Marri woodland south and south-east of Perth. Like *P. parallela*, *Platythyrea turneri* Forel has a wide distribution throughout Australia, and in WA can be found in wetter areas of the south-west. In the field this species has a remarkable resemblance to *Pachycondyla* (*Brachyponera*) *lutea*. *Platythyrea brunnipes* (Clark) is also found in the wetter south-west of this State, as well as SA, and the very rare *Platythyrea dentinodis* (Clark) was described from Tammin, in the western wheatbelt, and has recently been collected by a Curtin researcher near Worsley in the lower Darling Range. Even more surprisingly, since this work has been submitted for publication, *P. dentinodis* has been collected by a Curtin student in the coastal Perth suburb of Cottesloe, in relictual bushland.

***Ponera*[3]**

*One species, Ponera sp. JDM 1122*

The recent identification of a species of *Ponera* from pitfall trapped material near Jarrahdale, just south of the Perth metropolitan area came as a surprise, since this area has been exposed to regular monitoring of ant species. In addition, many

[3] The single specimen appears to lack the sharp angle or pair of spurs on the posterior margin of the anteroventral process, a feature used to characterize the genus. However, the small 'window' or fenestra anteriad is distinct. The broad node and minute eye (barely more than a fleck of discoloration) also make it highly unlikely that the specimen represents an undescribed species of *Hypoponera*. The only other possibility (*Cryptopone*), I think, is excluded by virtue of the lack of a mandibular fovea and spiny mid-tibia.

other collections of ants have been taken by Curtin students and University staff, and the area was also well covered by early ant researchers such as Clark. Ants in this genus form small nests of less than 100 workers in soil or in other substrates such as fallen wood or moss, and are cryptic foragers (Shattuck 1999). The single specimen is tiny and yellow, and appears to lack the normal posterior angle on the anteroventral petiolar process. The eye is virtually absent in the local species (other Australian species have distinct, though tiny eyes), being represented by a minute fleck of pigment.

The same species is represented in the ANIC Collection, but under the label '*Cryptopone*'. However, the ant lacks the mandibular fovea normally seen in species of *Cryptopone*, likewise the spiny setae on the middle tibiae found in members of that genus. The placement of this species may become much simpler in the future if, as seems likely, *Cryptopone*, *Ponera* and some other Ponerini become united at the generic level.

## SUBFAMILY ECTATOMMINAE

This is one of the newly erected subfamilies introduced by Bolton (2003), after he had split the old subfamily Ponerinae. Ectatommine ants are most easily distinguished by the appearance of the metapleural gland orifice, which in profile is a longitudinal or obliquely curved slit or narrow crescent. Below, a convex rim of cuticle that directs the orifice dorsally or posterodorsally bounds this structure. Some myrmicine genera share this feature, but are distinguished by the presence of two strongly constricted waist segments, whereas in ectatommines the second waist segment is large and only weakly constricted. Nonetheless, the appearance of ectatommine ants suggests a relatively close if not sister group relationship with the myrmicines.

### *Rhytidoponera*

1. Viewed from front, occiput with distinct raised corners (Figure 502) ..... **2**

   Viewed from front occiput either rounded or square without raised corners (Figure 503) ... **3**

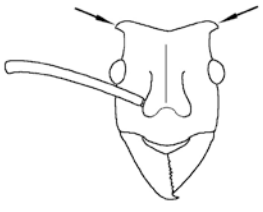

**Figure 502**

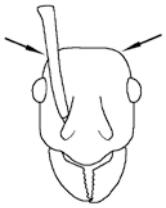

**Figure 503**

2. Corners of occiput in form of sharp, curved processes (Figure 504a); node conical (Figure 504b) ..... ***R. taurus*** **(Forel)**

   Corners of occiput in form of dull tubercles (Figure 505a); node subcuboidal (Figure 505b) ..... ***R. mayri*** **(Emery)**

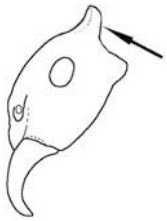

**Figure 504a**

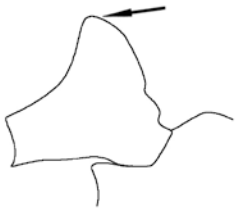

**Figure 504b**

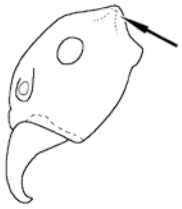

**Figure 505a**

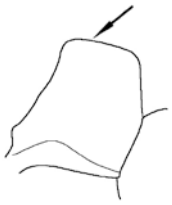

**Figure 505b**

3. Hind tibial spur absent..... **4**

   Hind tibial spur present, distinct..... **5**

4. Apex of node terminating as a sharp spur (usually) or dull point (rarely) directed posteriad (Figure 506) ..... ..... ***R. tyloxys*** **Brown and Douglas**

Apex of node rounded, lacking a process or point directed posteriad (Figure 507) ..... ..... ***R. dubia* group sp. JDM 904**

**Figure 506**

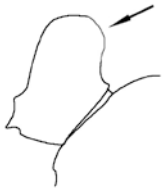

**Figure 507**

5. Eye very large, equal to ≈ 1/3 length of head capsule ..... **6**

   Eye smaller, equal to, at most, 1/4 length of head capsule ..... **7**

6. Mandible finely striate (Figure 508); head and body foveate-punctate, shining, without uniform fine microreticulation between striae and pits .... ***Rhytidoponera crassinoda* (Forel)**

   Mandible with superficial microreticulation only (Figure 509); head and body weakly to moderately sculptured, matt, with uniform microreticulation between larger sculpture .... ..... ***Rhytidoponera* sp. JDM 736**

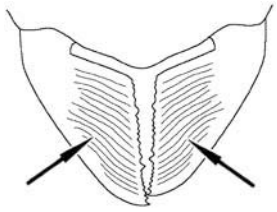

**Figure 508**

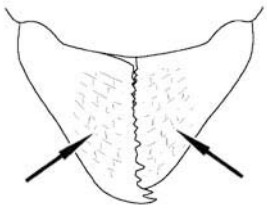

**Figure 509**

7. Head and mesosoma with shallow, vestigial punctation only (Figure 510), gaster glistening, with very fine, almost imperceptible stria ..... **8**

   Head and mesosoma usually punctate-striate or foveate-reticulate (e.g. Figure 511) or, if punctate only, gaster shagreenate with vestigial punctation ..... **9**

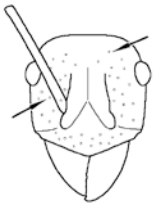

**Figure 510**

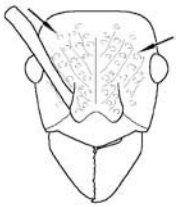

**Figure 511**

8. Fine striae on 2nd gastral tergite longitudinal without deviation (Figure 512) ..... ..... ***R. flavicornis* Clark**

   Fine striae on 2nd gastral tergite weakly arched around midline of tergite (Figure 513)..... ..... ***R. micans* Clark**

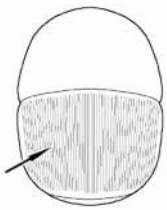

**Figure 512**

**Figure 513**

9. Head punctate (Figure 514) or reticulate-punctate (Figure 515); mesosoma punctate; gaster shagreenate with vestigial punctation..... **8**

   Head and mesosoma punctate-striate (Figure 516) or foveate-reticulate; gaster usually with fine to coarse circular striae ..... **9**

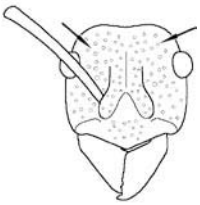

**Figure 514**

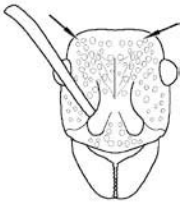

**Figure 515**

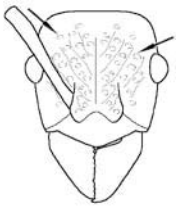

**Figure 516**

10. Frons punctate, with small, well-spaced pits (Figure 517a); ventral process of petiole a short spur (Figure 517b) ..... ***R. levior*** **Crawley**

    Frons more reticulate-punctate, particularly towards centre of head capsule, edges of pits often confluent (Figure 518a); ventral process of petiole long, needle-like (Figure 518b) ..... ***R. rufonigra*** **Clark**

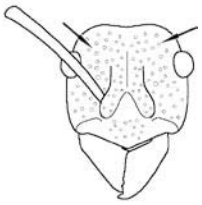

**Figure 517a**

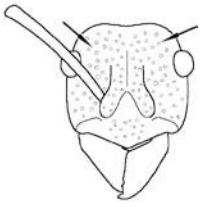

**Figure 517b**

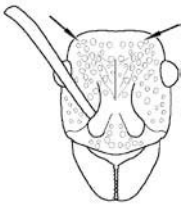

**Figure 518a**

**Figure 518b**

11. In profile, vertex of head capsule flattened, its posterior angles distinctly lobate (Figure 519); node thick, cuboidal or subcuboidal..... **12**

    In profile, vertex of head capsule more rounded, its posterior angles with at most a small, weak flange (Figure 520); node often thinner ..... **17**

**Figure 519**

**Figure 520**

12. In profile, petiolar node low, at least as wide as high; subpetiolar process a long spine (*R. anceps* group)..... **13**

    In profile, petiolar node distinctly higher than wide; subpetiolar process spurlike (*R. metallica* group) ..... **14**

13. First gastral tergite with fine, close, parallel striae (Figure 521)..... ***R. anceps*** **Emery**

    First gastral tergite with thick, discontinuous striae (Figure 522)..... ***Rhytidoponera*** **sp. ANIC 44**

**Figure 521**

**Figure 522**

14. Body without strong iridescence (gaster may have coppery sheen) ..... ***R. inornata*** **Crawley**

    Body with strong blue- or green-purple iridescence ..... **15**

15. First gastral tergite strongly areolate, the areolae confluent (Figure 523); second gastral tergite with many shallow, elongate pits in additional to the fine, circular striae ..... ***R. metallica*** **group JDM 1098**

    Sculpture of first and second gastral tergite usually confined to fine, circular striae, a few scattered, shallow pits may be present (Figure 524) ..... **16**

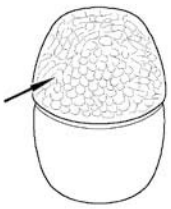

**Figure 523**

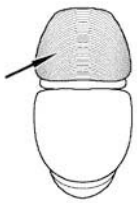

**Figure 524**

16. Appendages dark brown ..... ***R. metallica*** **(F. Smith)**

    Appendages orange ..... ***R. metallica*** **group JDM 1097**

17. Node thin, tapering, without vertical sulcus posteriad (Figure 525); gaster shiny; mostly with greenish-purple or coppery iridescence (lacking in a few northern populations)..... ***R. violacea*** **(Forel)**

    Node either thicker, not tapering, or with vertical sulcus posteriad (e.g. Figure 526); gaster usually duller; iridescence always absent .... **18**

18. In profile, node acuminate, with vertical sulcus posteriad (Figure 526); short, erect setae virtually absent from body surfaces, very sparse on legs and antennae ..... ***R. punctigera*** **Crawley**

    In profile, node cuboidal or subcuboidal without vertical sulcus (small, longitudinal sulcus may be present on dorsum) (Figure 527); short erect setae well distributed on body surfaces, legs and antennae ..... **19**

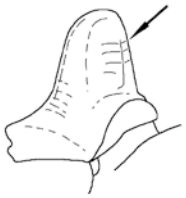

**Figure 525**

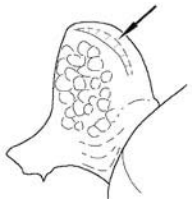

**Figure 526**

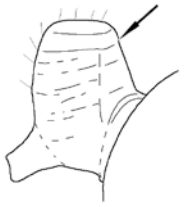

**Figure 527**

19. Frons finely longitudinally striate in dorsal sector, with scattered, sparse punctation (Figure 528) ..... ***R. micans*** **group sp. JDM 576**

    Frons reticulate-foveate in dorsal sector (Figure 529) ..... ***R. foveolata*** **Crawley**

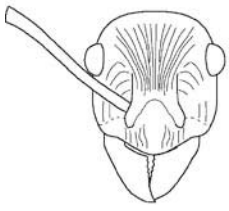

**Figure 528**

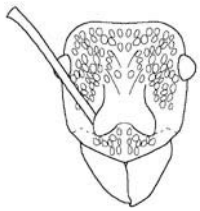

**Figure 529**

*Rhytidoponera* is the sole ectatommine genus found in the SWBP. However, from the standpoint of the applied myrmecologist this genus is of considerable importance. The dark-coloured, wrinkled integument of most species makes them easy to recognize in the field: indeed, to the mind of this author, 'wrinkled ants', which correctly reflects the genus name as well as the appearance, would be a preferable common name for the group rather than Andersen's punning name 'pony ants' (Andersen 2002). These ants are sometimes also called 'bull ants', but this name should be avoided because of confusion with the true bulldog ants (*Myrmecia* spp.). Rhytidoponera is speciose, with at least 20 representatives in the SWBP, several of which feature as valuable bioindicator species. Some, but probably not all of the species are opportunists, and their presence in numbers on a given site suggests that the habitat is likely to be disturbed or generally unsuitable for colonization by most ants. Clark (1936) produced an early monograph on *Rhytidoponera* and named many of the south-western species. Hanna Reichel (2003) has recently revised the genus.

In the SWBP, a very common smallish, iridescent species is probably identical with the well-known 'green-head' ant, *Rhytidoponera metallica* (Smith), of eastern Australia. In the suburbs of some major cities in the eastern states, where it is present in large numbers in parks and gardens, it is regarded as a stinging nuisance. This species, or a complex of sibling species, is found throughout Australia. *Rhytidoponera metallica* is fond of elaiosomes and has a significant role in dispersal of seeds (Hughes and Westoby 1992; Hughes *et al.* 1994). In the south-west corner of WA, the ant shares its habitat with a very similar but non-iridescent species, *Rhytidoponera inornata* Crawley. The two species are not normally collected together at a given site, however, suggesting they occupy different niches in the same habitat. Both ants can be found in urban areas, but *R. metallica* is by far the most common. In the extreme north of the SWBP a very similar species (*Rhytidoponera metallica* group sp. JDM 1097) has been collected. This ant has orange rather than dark brown appendages. Yet another *metallica*-like ant, with a strongly punctate gaster (*Rhytidoponera metallica* group sp. JDM 1098) occurs in the Shark Bay region. Belonging to a different group but with similar iridescence to *R. metallica*, is *Rhytidoponera violacea* (Forel). Unlike *R. metallica* and its relatives, *R. violacea* has a slender node. However, like *R. metallica*, *R. violacea* is abundant throughout WA, and is an important taxon for those using ants as bioindicators for environmental management purposes. A small population of this species on the northern coast around Geraldton lacks the usual iridescence, while specimens of *R. violacea* from more arid eastern and northern areas have a greenish-yellow rather than blue-purple iridescence on the head and mesosoma. Molecular or karyotype analysis of representatives of these populations may reveal that they are genetically distinct.

The remaining species of *Rhytidoponera* are much less conspicuous than those mentioned above. *Rhytidoponera punctigera* Crawley and *Rhytidoponera rufonigra* Clark are taxa whose main distribution is in the wetter areas of the Darling Range and Swan coastal plain. *Rhytidoponera levior* Crawley, which is morphologically very similar to *R. rufonigra*, has a predominantly coastal distribution in the Perth metropolitan area, but was described from Rottnest Island. *Rhytidoponera foveolata* Crawley is most common in the goldfields, although its distribution includes the Darling Range around Perth. *Rhytidoponera tyloxys* Brown and Douglas, one of the *R. dubia* group, can be found in the extreme north and probably also in the eastern fringes of the SWBP. Possibly consisting of a complex of two or more species, this highly distinctive taxon has an unmistakeable appearance, since the node is produced as a sharp spur or tooth directed posteriad. These ants may be specialist predators, unlike most *Rhytidoponera* (Andersen 2000). The worker of the closely related *Rhytidoponera dubia* group sp. JDM 904 has a rounded dorsum to the node. This species also possesses a smooth cuticle and large, protuberant eyes. Along with these two members of the R. *dubia* group, *Rhytidoponera flavicornis* Clark, *Rhytidoponera micans* Clark, *Rhytidoponera micans* complex sp. JDM 576 and *Rhytidoponera* sp. JDM 736 are also arid and semi-arid area species. *Rhytidoponera mayri* (Emery), the only member of the *R. mayri* group (*sensu* Andersen 2000) to be found in the SWBP, and the mostly northern *Rhytidoponera taurus* (Forel) are large ants, their workers easily being distinguished from other *Rhytidoponera* workers by their occipital cornicles.

Curtin specimens of the large-eyed *Rhytidoponera crassinoda* (Forel) come from outside the SWBP, but ANIC holdings suggest it may just enter the Province. Finally, two small, *metallica*-like species, *Rhytidoponera anceps* Emery and *Rhytidoponera anceps* group sp. ANIC 44, have been collected at various locations along the south coast of this state by ANIC workers, although neither is represented by SWBP material in the Curtin Ant Collection, and

the undescribed species is not represented at Curtin at all. The distribution of *R. anceps* is most peculiar, as it is otherwise known from the Qld and northern NSW coasts.

## SUBFAMILY HETEROPONERINAE

This is another subfamily newly constituted by Bolton (2003). In the SWBP these small, cryptic predators or scavengers may be mistaken for *Rhytidoponera* by the uninitiated, but their workers and queens have a simple orifice to the metapleural gland, which is directed posteriad or laterad. The group has no unequivocally unique apomorphies, but the median longitudinal cephalic carina extending from the occipital margin to the anterior margin of the clypeus seems to be universal in the subfamily, and is not found is any other group of ants that share a single distinct waist segment. As another point of contrast with Ectatomminae, Heteroponerinae always have a simple apical claw on the pretarsal claws whereas in most ectatommine species the preapical claw is toothed. This feature, though, needs to be treated with caution: in some extralimital ectatommine species the preapical tooth is restricted to the claw of the foreleg. I have also seen one series of Australian *Rhytidoponera*, held by the California Academy of Science and apparently in the *R. metallica* group, in which the preapical tooth appears to be missing entirely.

***Heteroponera***

1. Larger species (HW ≈ 2mm), petiolar node acuminate (highly localised in woodland around Dwellingup, south of Perth) (Figure 530) ..... ***Heteroponera* sp. JDM 92**

   Smaller species (HW ≈ 1 mm), petiolar node cuboidal or subcuboidal (Figures 531, 532) .... **2**

2. Eye moderate, about as wide as antennal scape at its widest point; petiolar node subcuboidal (Figure 531); body brownish, legs orange..... ..... ***H. imbellis* (Emery)**

   Eye large, much wider than antennal scape at its widest point; petiolar node cuboidal (Figure 532); body and legs blackish..... .....***Heteroponera* sp. JDM 732**

**Figure 530**

**Figure 531**

**Figure 532**

*Heteroponera* is the only genus from this tiny subfamily, which consists of just two genera (three, if one includes the extralimital *Aulacopone*, known only from the queen), that occurs in Australia. In the SWBP *Heteroponera* workers have been collected as strays in soil and litter. Three species, two of them undescribed, are known from the SWBP. The single described species, *Heteroponera imbellis* (Emery), also has a broad distribution on Australia's east coast. In Western Australia it is most common in the wetter south-west, but there is at least one goldfields record (Kambalda). This species has also been collected in suburban Perth and on Rottnest Island. The undescribed *Heteroponera* sp. JDM 732 is clearly closely related to *H. imbellis* but can be distinguished by its dark colouration and large eyes. The taxon is known from just a few workers taken by hand or pitfall trap at Kings Park, near the Perth CBD, and at Karragullen in the Darling Range near Perth. *Heteroponera* sp. JDM 92 is a much larger species than the previous two, and obviously belongs to a different lineage. This ant has been recorded only from Jarrah-Marri woodland in the Dwellingup district, some 80 km south of Perth.

## SUBFAMILY PROCERATIINAE

This is yet another subfamily created by Bolton (2003) from the deconstruction of the Ponerinae, though the group has previously enjoyed tribal status. The combination of the entirely exposed antennal sockets close to the anterior margin of the head, the fused promesonotal suture and the presence of a single distinct waist segment serve to separate members of this subfamily from other ants in the SWBP. Only the tribe Proceratiini occurs in the SWBP, and this tribe possesses an additional apomorphy in regards to abdominal tergite IV, which is enlarged and strongly arched. Sternite IV, by comparison, is very reduced in size. From a male collected from the far north of the State (held at the

California Academy of Sciences) I have recently recognized the genus *Probolomyrmex*, which belongs to a second tribe, Probolomyrmecini. *Probolomyrmex*, however, is most unlikely to occur in the SWBP.

***Discothyrea***

1. Propodeal declivity abrupt, propodeum with transverse carinae (sometimes crenulate in dorsal view) separating dorsal and declivitous propodeal faces (Figure 533); antennal club elongate, about three times as long as wide .... ..... ***D. crassicornis*** **Clark**

Propodeal declivity more gradual, propodeum without transverse carina separating dorsal and declivitous faces (Figure 534); antennal club ovate, about twice as long as wide..... ..... ***D. turtoni*** **Clark**

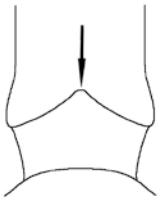

**Figure 533**

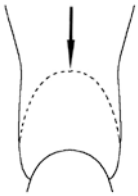

**Figure 534**

*Discothyrea* is the only proceratiine genus occurring in the SWBP. These peculiar little ants are thought to be specialist predators of arthropod eggs (Brown 1958). Since the ants are minute and have a cryptic lifeway, they are probably more common than records suggest, the two species occurring in the SWBP being known largely through a few stray workers collected in pitfall traps. Of the material housed in the Curtin Ant Collection, *Discothyrea crassicornis* Clark is known from one hand collected worker taken from under a log in the Darling Range, and a pitfall-trapped worker from Dwellingup. The other species, *Discothyrea turtoni* Clark, has been recorded from pitfall traps in Dwellingup, but was originally described from Victoria.

## SUBFAMILY MYRMICINAE

The three subfamilies Dolichoderinae, Formicinae and Myrmicinae constitute by far the most abundant, diverse and important groups of ants. At the genus level, the Myrmicinae include almost 50% (actually, 48.9%) of the world's extant ant genera at the time of writing. The figure as a proportion of the existing ant genera is somewhat lower for the SWBP (i.e. 31.1%) but is still substantial. The impact of the Myrmicinae on the environment, however, depends on other qualities they possess rather than simply crude numbers and biodiversity. For instance, whereas very few ants in the other subfamilies that possess stings could be considered pests (apart from a handful of taxa capable of potentially serious envenomation), myrmicine ants with 'tramp ant' tendencies often become a matter for concern when transported into an area away from their natural range.

In Australia, major myrmicine pests include the coastal brown ant also known as the big-headed ant (*Pheidole megacephala* (Fabricius)), the Singapore ant (*Monomorium destructor* (Jerdon)) and the Pharaoh's ant (*Monomorium pharaonis* (Linnaeus)). All of these species can be found in the SWBP. In other parts of Australia, exotic fire ants (i.e. the tropical fire ant, *Solenopsis geminata* (Fabricius), and the recently introduced red imported fire ant, *Solenopsis invicta* (Buren)) are of major concern. The red imported fire ant (usually abbreviated as RIFA) is an horrific pest whose destructive capacities are of almost sci-fi proportions. On the other hand, many native myrmicine ants play a vital role in ecosystem maintenance, especially as seed dispersal agents, as disposers of carrion and as recyclers of nutrients in the soil.

Myrmicines are highly variable in appearance: while many have a smooth, rounded body form, the intricate sculpture of the exoskeleton in such genera as *Colobostruma* can be breath-takingly beautiful when viewed under the microscope. Despite the variation in morphology, however, all Australian myrmicine ants share the diagnostic characters for the subfamily; viz. possession of two waist segments, wholly or partially covered antennal bases and the fusion of the first and second thoracic segments. In his most recent key to the world ant fauna, Bolton (2003) adds features of the anterior postpetiole as a means of defining this subfamily on a global basis. In Myrmicinae the presclerites (helcium) of the postpetiole (i.e. the top plate or tergite and the bottom plate or sternite) meet together, but, with the exception of the afrotropical *Ankylomyrma*, they do not fuse. The diet of myrmicine ants is as varied as their morphology: while many are generalist predator-scavengers, the SWBP fauna also includes seed harvesters and specialist hunters of small arthropods like Collembola (springtails). Minute species of *Carebara* and *Solenopsis* are lestobiotic, feeding on the brood or eggs of other ants or termites. Overseas taxa include fungus growers. Myrmicinae also include many forms in which the worker caste is subdivided into major, minor and sometimes media workers. Various tasks within

the colony are divided between these subcastes. Interestingly, some genera with very small workers have disproportionately large queens.

### *Adlerzia*

*One species,* Adlerzia froggatti *(Forel)*

The single species of *Adlerzia*, *A. froggatti* (Forel), has a wide distribution in southern Australia, but is absent from Tasmania (Shattuck 1999). The morphology of this genus and its worker subcaste structure link it closely to the more tropical *Machomyrma*, which in WA has been recorded in the Kimberley region. The workers of *Adlerzia* include large-headed majors as well as minor and media workers. The presence of large-headed majors suggests that the species may include seeds or similar hard plant material in its diet, but its biology has been scarcely studied. In the SWBP, *A. froggatti* is rarely encountered, but can be found at localities in the mid-north and south-west of the State, including parts of the Perth metropolitan area that retain tracts of native vegetation. The ant has also been recorded from Westonia in the western goldfields, and Rottnest Island.

### *Anisopheidole*

*One species,* Anisopheidole antipodum *(F. Smith)*

Like *Adlerzia* and *Machomyrma*, *Anisopheidole* is a member of the tribe Solenopsidini (*Carebara* genus group). Workers of *Anisopheidole* somewhat resemble those of *Adlerzia* although the largest major workers exceed *Adlerzia* majors in size. Unlike *Adlerzia* and *Machomyrma*, *Anisopheidole* has a 12-segmented antenna.

In the SWBP these ants can be locally common in both laterite and sandy soils in the Perth region, where they are often found in association with termites. Nests are very frequently located under rocks. They also occur in the wheatbelt and along the south coast. Elsewhere in Australia, this endemic genus has been recorded from NSW, the NT, SA and Vic. *Anisopheidole antipodum* (Smith) is the only species in the genus.

### *Aphaenogaster*

1. Eye relatively small, less than twice width of antennal scape at its widest point ..... ..... ***A. poultoni* Crawley**

   Eye larger, more than twice width of antennal scape at its widest point..... ..... ***Aphaenogaster* sp. JDM 854**

The gracile appearance of *Aphaenogaster*, along with its four-segmented antennal club, enable it to be set apart from all other myrmicine ants, although darker workers bear a resemblance to the rather large minors of *Pheidole hartmeyeri* Forel in the field. *Aphaenogaster* are sometimes called 'funnel ants', though this name can cause confusion between the inoffensive SWBP species and the notorious funnel ant *Aphaenogaster pythia* Forel of the eastern states, whose diggings cause degradation of pastures and recreational and service areas (such as unsealed airstrips). Local species of *Aphaenogaster* build highly distinctive nests, typically in sandy soils. In the lighter yellow soils of the wheatbelt and goldfields, these nests have a smooth, spherical entrance hole of approximately 1 cm diameter. A few workers can usually be seen loitering cautiously inside the entrance of the nest. The food of the species found in the SWBP is unclear, although eastern states taxa tend aphids (Saunders 1967). Andersen (1991a, 2000) and Shattuck (1999) have suggested that the nests act as pitfall traps for prey, but there is as yet little evidence for this theory (though Shattuck mentions the presence of arthropod fragments in upper portions of the nest).

Dr. Steve Shattuck (ANIC) is revising the Australian members of this genus. Two species, *Aphaenogaster barbigula* Wheeler and *Aphaenogaster poultoni* Crawley, have been recorded from the SWBP, but the former is likely to be only a synonym of the latter. Judging from local material, *A. poultoni* appears to be mainly confined to the wetter, western parts of the SWBP (one record from Westonia), but also occurs in the mid-west and the south-east of the Province (ANIC holdings). A large-eyed form, which will be described by Dr. Shattuck, has been collected in the eastern wheatbelt and the western goldfields in the SWBP, and also in the Pilbara.

### *Cardiocondyla*

At least one species, *Cardiocondyla 'nuda'* (Mayr), recorded by Seifert (2003). The question of whether just the one species occurs in the SWBP has yet to be resolved. If different species are involved, workers from the two taxa may be distinguished by the appearance of the petiolar node in dorsal view (rounded in *C. 'nuda'*; elongate in indubitable *C. nuda*) and by the duller, evenly microreticulate appearance of the cuticle of the mesosoma and petiole in *C. nuda*.

*Cardiocondyla* resembles members of the Solenopsidini in that some species have a long, central seta on the anteromedial margin of the clypeus. Among the taxa found in the SWBP, these ants are most likely to be confused with *Monomorium* species. However, the clypeus is not bicarinate, the maxillary palp is five-segmented and the postpetiole, seen from above, is more massive than the petiolar node. In contrast, in local *Monomorium* the clypeal carinae are usually distinct,

the maxillary palp is one- or two-segmented, and the postpetiole is more massive than the petiolar node in only two species (not found in the SWBP).

Seifert (2003) has revised the worldwide species-groups of *Cardiocondyla* that include at least one tramp species. Unfortunately, the key to individual groups and species is formidable, requiring careful attention to morphometric measurements and use of a higher power stereomicroscope than is often available in laboratories. On the other hand, Seifert mentions in his coverage of groups just three species with an Australian distribution. Of these, only *Cardiocondyla nuda* (Mayr) was recorded from the SWBP (from Goyamin Pool, near Chittering) in his 2003 paper. One form is commonly seen, often in disturbed habitats, in the SWBP, and this comprises the majority of specimens held in the Curtin Ant Collection. Specimens can be keyed to the *C. nuda* species-group, but do not comfortably fit *C. nuda* in terms of the appearance of the node when seen in dorsal aspect (elongate in *C. nuda*; rounded in the above morphospecies) and the shinier appearance of the nodes and mesosoma. In appearance, these local workers strongly resemble *Cardiocondyla mauritanica* Forel, which has not been recorded from the Australasian region. A small number of workers from suburban Perth, in contrast, have the evenly microreticulate mesosoma and nodes associated with *C. nuda*, although their coloration is the same as workers of the preceding form. According to Seifert's current research (S. Shattuck, pers. comm.), *Cardiocondyla atalanta* Forel is the species found in southern Australia (including the SWBP), *C. nuda* being confined to the north and eastern coasts of Australia. This being said, the duller form does seem to match *C. nuda*. Since aspects of neither local morphospecies matches all the data provided by Seifert under *C. atalanta* in his published paper, the name '*nuda*' is here left in apostrophes, until the status of the local species can be more carefully considered.

In south-western Australia, *Cardiocondyla 'nuda'* is ubiquitous in most habitats, where in all likelihood it acts as a small generalist scavenger, but is particularly prevalent in towns and cities. This species avoids aggressive confrontation with other ants, and probably has a benign role in ecosystems where it occurs. The males of the local species, as in other *Cardiocondyla*, are very unusual in that they are wingless and resemble workers, except for the presence of ocelli (Seifert 2003; Heinze *et al*. 1993; pers. obs.).

### *Carebara*

*One species,* Carebara sp. *JDM 440.*

Australian species of *Carebara* (formerly placed in *Oligomyrmex*) have a dimorphic worker caste. The major workers often possess a pair of minute denticles on the vertex of the head capsule. Even where these are absent, the major workers can be distinguished from small majors of *Pheidole* (the most similar genus) by the nine to 11-segmented antenna with a two-segmented club (the antenna is 12-segmented in *Pheidole* with a three-segmented club). Minor workers are among the world's smallest ants. I have measured the total length of a minor worker of the local species as just 0.75 mm. However, minor workers of the tropical *Carebara atomus* (Emery) are about one third smaller again! Paired setae on the clypeus will separate minor workers from *Solenopsis*, the genus with which they are likely to be confused. Based on overseas observations (e.g. Wilson 1962), it is reasonable to suppose Australian *Carebara* species feed on a range of small prey as well as arthropod eggs.

One undescribed species of *Carebara*, apparently in the *corniger* group (Taylor 1991), is known from the SWBP. Minor workers only of *Carebara* sp. JDM 440 have been collected from a handful of sites in the Darling Range, just east of Perth. Specimens collected near Gleneagle were found foraging under a boulder on a granite outcrop.

**Colobostruma**

(Adapted from the key in Shattuck 2000)

1. In lateral view, mesosoma strongly arched, propodeum low in relation to petiole and postpetiole (Figure 535) .....***C. nancyae* Brown**

   In lateral view, mesosoma at most weakly convex ..... **2**

2. Lamellae absent from lateral face of postpetiole, expanded posteriad only (pale, depigmented species) (Figure 536) .....***C. cerornata* Brown**

Lamellae present on both lateral and posterior faces of postpetiole, expanded to form wing-like flanges (Figure 537) ..... **3**

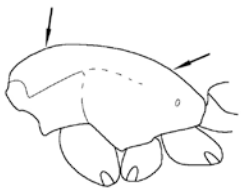

**Figure 535**

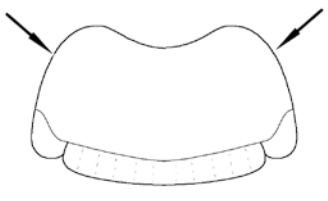

**Figure 536**

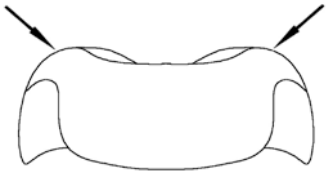

**Figure 537**

3. Wing-like flange of postpetiole with translucent windows along both anterior and posterior margins, its anterior margin formed by band of thickened integument (Figure 538)..... .....***C. mellea*** **Shattuck**

   Wing-like flange of postpetiole with a translucent window on its posterior margin only, its anterior margin formed by band of thickened integument (Figure 539)..... **4**

4. Antennae 4 or 5-segmented.... ***C. elliotti*** **(Clark)**

   Antennae with 6 or more segments..... **5**

5. Antennae gently elbowed, lacking ventral lobe, antennal diameter changing gradually along its length..... ***C. australis*** **Brown**

   Antennae strongly elbowed, with ventral lobe, greatest diameter of antenna being across lobe..... **6**

6. In full-face view, ridges immediately in front of eyes nearly parallel or diverging posteriad (Figure 540) ..... ***C. papulata*** **Brown**

   In full-face view, ridges immediately in front of eyes converging posteriad (Figure 541) ..... .....***C. froggatti*** **(Forel)**

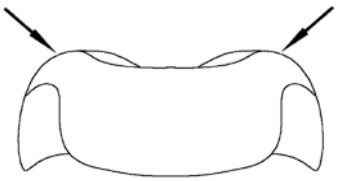

**Figure 538**

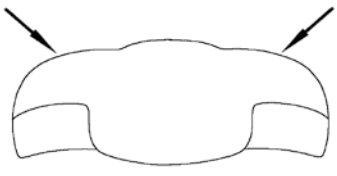

**Figure 539**

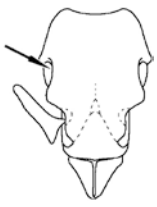

**Figure 540**

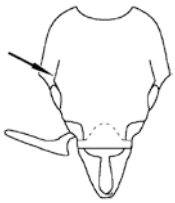

**Figure 541**

*Colobostruma* is one of the Dacetini, and the various species have attractively sculpted wing-like flanges and sometimes spines. Workers can be most easily confused with *Mesostruma*, but the latter lacks flanges on the post-petiole (always present in *Colobostruma*). *Colobostruma* and its close relatives, *Epopostruma* and *Mesostruma*, have been the subjects of a recent revision by Shattuck (2000). *Colobostruma* species are foragers in litter or vegetation. Although most species have a broad distribution within Australia, the genus is very rare in Western Australia, and colonies or even individual workers are seldom seen. Seven species are present in the SWBP, but the Curtin Ant Collection has representatives of only four of these. No specimens of *Colobostruma australis* Brown, *Colobostruma froggatti* (Forel) and *Colobostruma papulata* Brown are held in the Collection.

Of the four WA species originally described by Brown (1959), *C. papulata* has a south-eastern distribution, and was described from material collected in the Esperance region. *Colobostruma nancyae* Brown occurs in the same area, but has a much wider distribution in the SWBP and has been found as far north as the Moore River (Shattuck 2000). *Colobostruma cerornata* Brown was also described from specimens collected in Esperance but has a distribution that includes the eastern wheatbelt and Kwongan sand-plains around Eneabba, north of Perth, while *C. australis* has a broad distribution in eastern Australia, but is only known in the SWBP from the Thomas River, east of Esperance. *Colobostruma elliotti* (Clark) and *C. froggatti* are two other species found throughout much of temperate Australia. *Colobostruma mellea* Shattuck can be found in the northern wheatbelt and south-west corner of WA, and also in SA.

***Crematogaster***

1. Propodeum flattened and all sectors on the same plane (except for a narrow anterior strip behind metanotal groove in some specimens); anterior lateral carinae often present, extending from metanotal groove to propodeal angles (subgenus *Orthocrema*) (Figure 542) ..... **2**

   Anterior sector of propodeum not flattened, often convex, not on same plane as posterior sector; anterior lateral carinae always absent (Figure 543) ..... **7**

**Figure 542**

**Figure 543**

2. Head, mesosoma and nodes finely and uniformly microreticulate (Figure 544); stout, erect setae absent from dorsum of head, mesosoma (rarely present on humeral angles) and often nodes and gaster ..... .....***Crematogaster*** **sp. JDM 859**

   Sculpture not as above; stout, erect setae always present on dorsum of head, mesosoma and gaster..... **3**

3. Viewed in profile, at least three lines of paired setae on promesonotum (Figure 545), or setae numerous, not always in line..... **4**

   Viewed in profile, two lines of setae on promesonotum (Figure 546)..... **6**

**Figure 544**

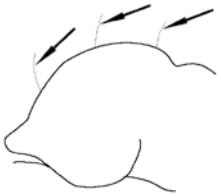

**Figure 545**

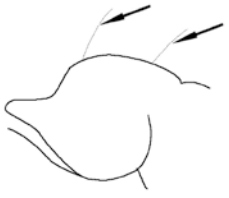

**Figure 546**

4. Postpetiole without longitudinal sulcus separating node into two lobes (Figure 547); promesonotal sulcpture weak to vestigial, promesonotum often smooth and shining..... .....***C. dispar*** **Forel (pt.)**

   Postpetiole with longitudinal sulcus (may be weak and shallow) separating node into two lobes (e.g. Figure 548); promesonotum moderately to strongly sculptured..... **5**

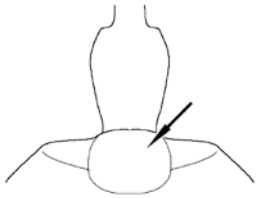

**Figure 547**

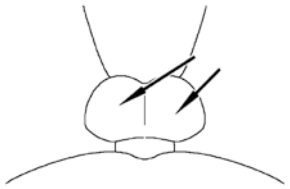

**Figure 548**

5. Sculpture of promesonotum medially with large reticulations, with microreticulation in between (Figure 549); viewed dorsally, lobes of postpetiole poorly developed, shining and close together; spines short, ≈ 1 x width of femora..... .....***C. queenslandica*** **group sp. JDM 1099**

   Sculpture of promesonotum medially with longitudinal striolae, with microreticulation in between (Figure 550); viewed dorsally, lobes of postpetiole relatively well-developed, matt and widely separated, with microreticulate sculpture in between them; propodeal spines very long in some northern populations, length ≈ 2 x width of femora..... .....***C. queenslandica gilberti*** **Forel**

**Figure 549**

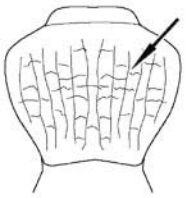

**Figure 550**

6. Viewed dorsally, postpetiole not wider than petiole and without two distinct lobes (Figure 551); promesonotum shining, often with reduced sculpture or unsculptured; head and gaster light brown, mesosoma yellowish..... .....***C. dispar*** **Forel (pt.)**

   Viewed dorsally, postpetiole wider than petiole, with two distinct lobes (Figure 552); promesonotum finely striate or microreticulate; mostly concolorous brown..... .....***C. queenslandica*** **group sp. JDM 428**

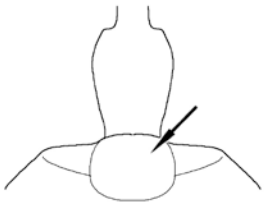

**Figure 551**

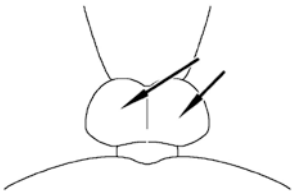

**Figure 552**

7. Stout, erect setae absent from dorsum of head, mesosoma and gaster..... .....***C. cornigera*** **group sp. JDM 126**

   Stout, erect setae present on dorsum of head, mesosoma and gaster..... **8**

8. Dorsum of mesosoma matt, strongly rugose-striate ..... ..... ***C. frivola*** **Forel/*C. perthensis*** **Crawley**

   Dorsum of mesosoma shining, often almost unsculptured..... **9**

10. Lateral projections of petiolar node rounded (Figure 553) .....***C. laeviceps chasei*** **Forel**

    Lateral projections of petiolar node rather angular (Figure 554) ..... .....***C. laeviceps*** **group sp. JDM 858**

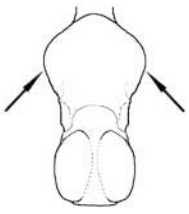

**Figure 553**

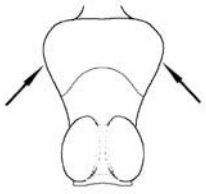

**Figure 554**

Once seen, this genus is not easily forgotten. *Crematogaster* workers have a heart-shaped gaster, the upper surface of which is attached to the postpetiole. The petiole lacks a node and the postpetiole usually possesses one or two small dorsal lobes. Workers forage on vegetation or on the ground, and are believed to be generalist predators, but also tend Hemiptera and some lepidopteran caterpillars (Sampson 1989; Shattuck 1999; Fiedler 2001). Overseas, members of the genus are called 'acrobat ants', presumably because their tilted gasters suggest a tumbler about to perform a somersault.

The current tally of *Crematogaster* species in the SWBP is nine, though this figure may rise with revision of the genus. The author can find no difference between *Crematogaster frivola* Forel and *Crematogaster perthensis* Crawley, and in his opinion they should be considered conspecific. ***Crematogaster frivola*** Forel is here considered the senior synonym of *Crematogaster perthensis* Crawley syn. nov. *Crematogaster frivola* is found throughout the SWBP, and is often seen trailing on the ground as well as on vegetation. *Crematogaster frivola sculpticeps* Forel, possibly also a candidate for synonymy, was described from Kalgoorlie, east of the SWBP.

The *C. queenslandica* group contains several species in the SWBP. *Crematogaster dispar* Forel is a small, yellowish-and-brown species in which the promesonotum is often smooth and shining. Colonies are often found in cryptic situations such as inside rotting logs or within moss. A larger, usually concolorous brown species (*C. queenslandica* group. sp. JDM 428), often occurs in sympatry with *C. dispar*. Apart from its generally larger size and duller, more striate promesonotum, *C. queenslandica* group. sp. JDM 428 differs from *C. dispar* in that its postpetiole is distinctly bilobate, whereas the postpetiole of the latter lacks a central furrow. *Crematogaster queenslandica* group sp. JDM 1099 differs from *C. queenslandica* group. sp. JDM 428 in possessing three instead of two lines of erect setae on the lateral margins of the promesonotum, and from *C. dispar* in the bilobate nature of its postpetiole. The promesonotum of this arid zone ant is strongly reticulate. *Crematogaster queenslandica gilberti* Forel, which also has at least three lines of erect propodeal setae, has thus far been found in

the GS and MAL districts in the SWBP, but was originally described from specimens collected in Mackay, QLD. Populations from the northern fringe of the SWBP have very long propodeal spines, but all specimens seen thus far lack the large reticulations of *Crematogaster queenslandica* group sp. JDM 1099. Workers of *Crematogaster* sp. JDM 859 can be distinguished from other members of the *C. queenslandica* group living in the SWBP by the usual absence of erect setae on head and mesosoma. The head and mesosoma are densely microreticulate. This is an ant of drier woodlands, north and east of the Jarrah-Marri belt.

The *C. cornigera* group is represented in the SWBP by *Crematogaster cornigera* group sp. JDM 126. This is a rather smooth-bodied ant, in which the propodeal spines are much reduced or represented by dull protuberances. The distribution of *Crematogaster cornigera* group sp. JDM 126 extends at least as far as the Kimberley region. In the south, workers of this species can often be seen trailing on the trunks of smooth-barked eucalypts.

*Crematogaster laeviceps chasei* Forel is the most common of the *Crematogaster* species in the SWBP, and is ubiquitous in nearly all environments. The ant is an arboreal nester. An eastern states relative is associated with the endangered Illidge's blue butterfly, whose larvae feed on the ants (Beale 1998). *Crematogaster laeviceps* group. sp. JDM 858 has been recorded from Mt Gibson, on the NE fringe of the SWBP. Worker specimens have also been collected on eucalypts near Paynes Find just north of the SWBP. The distinctly angular projections of the petiole separate this species from *C. laeviceps chasei*.

### *Epopostruma*

Key adapted from Shattuck 2000.

1. Anterior as well as posterior angles of postpetiole expanded laterally in the form of spines or "wings" (Figure 555) ..... **2**

   Anterior postpetiole either rounding smoothly on to sides or anterior angles in form of denticles only, never spinous or winglike (however, posterior extensions may form spines or angles, e.g. Figure 556)..... **3**

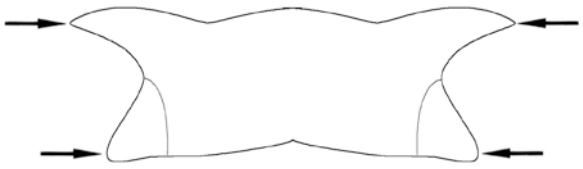

**Figure 555**

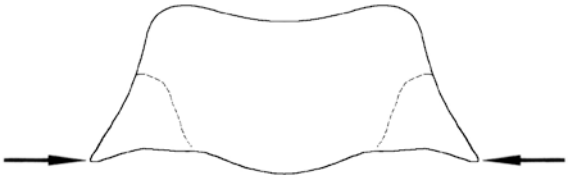

**Figure 556**

2. Area immediately above eye with a small tooth (Figure 557) ..... ***E. frosti* (Brown)**

   Area immediately above eye with a rounded angle (Figure 558)..... ***E. lattini* Shattuck**

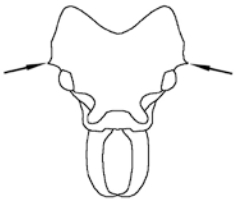

**Figure 557**

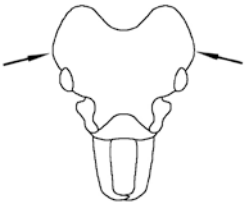

**Figure 558**

3. In dorsal view posterior angles of postpetiole forming distinct wings (e.g. Figure 559)..... ..... **4**

   In dorsal view postpetiole either rounded posteriad or posterior angles weakly denticulate; not expanded as wings (e.g. Figure 560)..... **5**

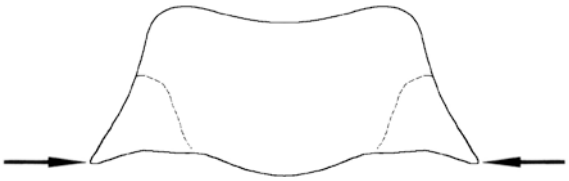

**Figure 559**

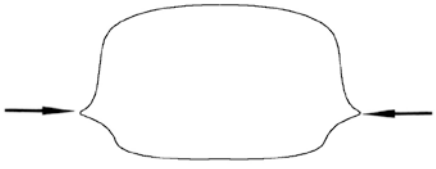

**Figure 560**

4. Bases of the propodeal spines and lobes not connected by flanges of any sort, petiolar spines well developed, distinct..... ..... ***E. mercurii* Shattuck**

Posterior face of propodeum with broad, distinct flanges, which connect the bases of the spines to the propodeal lobes, petiolar spines well developed or indistinct, reduced to sharp angles ..... ***E. sowestensis*** **Shattuck**

5. Propodeal angles connected to propodeal lobes by flanges, developed propodeal spines lacking (Figure 561)..... ***E. inornata*** **Shattuck**

Propodeal angles not connected to propodeal lobes by flanges, distinct propodeal spines present (Figure 562) ..... **6**

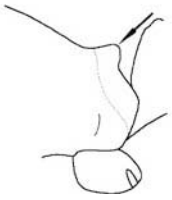

**Figure 561**

**Figure 562**

6. Posterolateral margin of petiole rounded, without protuberance (Figure 563)..... ..... ***E. quadrispinosa*** **(Forel)**

Posterolateral margin of postpetiole with a sharp angle or dentiform lateral protuberance (Figure 564) ..... **7**

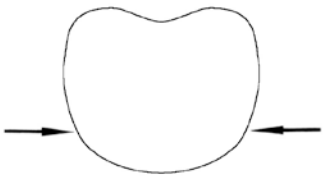

**Figure 563**

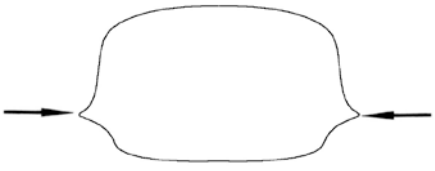

**Figure 564**

7. Postpetiole with distinct angle between anterior and dorsal faces (Figure 565); gaster with slight traces of superficial microreticulation, otherwise smooth and shining..... ..... ***E. natalae*** **Shattuck**

Postpetiole generally rounded without differentiation between anterior and dorsal faces (Figure 566); gaster evenly microreticulate, matt and dull ..... ..... ***E. kangarooensis*** **Shattuck**

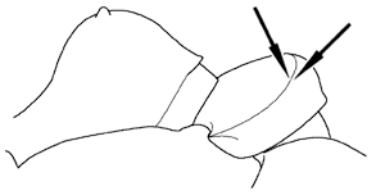

**Figure 565**

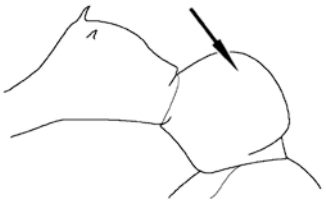

**Figure 566**

Like *Colobostruma*, *Epopostruma* is a member of the Dacetini, and in appearance closely resembles *Mesostruma*. However, the thin mandibles are well separated for most of their length, and meet only at the tips. The mandibles are in the form of a trap-jaw, by which means the ant can capture soft arthropod prey like Collembola (Shattuck 2000).

The SWBP has a rich *Epopostruma* fauna with eight described and one undescribed species. Tree-trunks are clearly an important substrate for foraging workers. These ants are not uncommon on eucalypts in the Darling Range, where several taxa have been collected in bark traps designed to sample invertebrate fauna (Heterick *et al*. 2001). *Epopostruma frosti* (Brown) is one of the species collected by this means at Dryandra and on the Brookton Hwy, SE of Perth, but occurs as far afield as the Southern gulfs in South Australia. This is perhaps the most distinctive of the local species, workers having a very broad head with a small projection or tooth above the eye. *Epopostruma natalae* Shattuck has a wide distribution across temperate Australia, and has recently been collected in Goomalling townsite. *Epopostruma sowestensis* Shattuck was described from material collected at Kojonup, in the southern wheatbelt. Specimens held in the Curtin ant Collection differ from the typical form in that the propodeal spines are well developed. In WA, *Epopostruma quadrispinosa* (Forel) has been collected from near North Bannister in the JF district, near Shark Bay, at Madura (near the edge of the Nullarbor), and Kambalda (in the goldfields). Elsewhere, it occurs along the east coast of Australia. *Epopostruma lattini* Shattuck and *Epopostruma mercurii* Shattuck,

described from material collected at Goomalling, in the western wheatbelt, and Eneabba, respectively, are not represented in the Curtin Ant Collection, and may be very rare.

*Epopostruma kangarooensis* Shattuck is represented by a single specimen from relictual woodland on Curtin University campus, and another specimen collected many years ago in Dwellingup. These represent new range extensions for this species. *Epopostruma mornata* Shattuck is only known from Karragullen near Perth.

### *Mayriella*

One specimen from the south coast, *Mayriella occidua* Shattuck

The Australian distribution of these small ants, whose mesosoma and nodes resemble those of a *Carebara* minor worker, was thought to be restricted to the east and south-east coasts of Australia, with one record from Tasmania (Shattuck 1999). In a recent survey of the Nuyts wilderness area in the Walpole-Nornalup NP, however, DEC workers recovered a single worker of this genus. The specimen is held by DEC. The elongate eye (which is not dissimilar to some *Monomorium* species), deep antennal scrobes and ten-segmented antennal club distinguish this genus from all other myrmicine genera found in the SWBP. Dr. Shattuck (ANIC) has recently reviewed the genus.

### *Meranoplus*

(Note: *Meranoplus dichrous* Forel was described from a queen (holotype, probably destroyed in World War I), and is not included in this key.)

1. Translucent fenestrae or flanges on sides of promesonotal shield lacking or vestigial; flanges on posterior margin of shield lacking or reduced to a short strip (species with shining black or dark-brown mesosomas) (e.g. Figure 567)..... **2**

   Translucent fenestrae or flanges generally present on sides of promesonotal shield; fenestrae and/or flanges always present on posterior margin of promesonotal shield (e.g. Figure 568)..... **3**

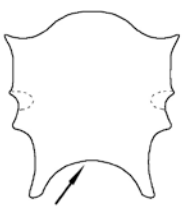

**Figure 567**

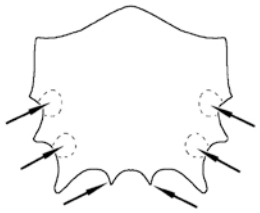

**Figure 568**

2. Promesonotal shield without spines or a flange on posterior margin (Figure 567)..... .....***M. dimidiatus*** **F. Smith**

   Promesonotal shield with a small flange on the posterior margin (Figure 569) ..... ..... ***M. dimidiatus*** **complex sp. JDM 423**

3. Large species (HW ≥ 1.5 mm); in dorsal view, head massive, extending well beyond humeral angles (Figure 570)..... ***M. diversus*** **F. Smith**

   Smaller spp. (HW ≤ 1.2 mm); in dorsal view, head less massive, not extending beyond humeral angles (e.g., Figure 571)..... **4**

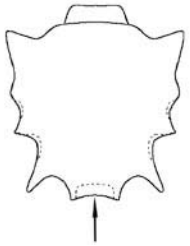

**Figure 569**

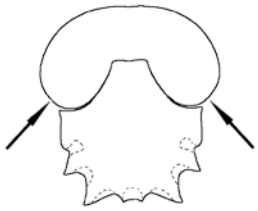

**Figure 570**

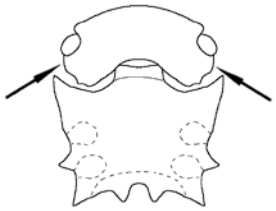

**Figure 571**

4. Promesonotal shield broadly expanded, fenestrae extensive, occupying about one third of surface area of shield (Figure 572); first gastral tergite strongly sculptured over most of its surface, and with its anterior margins expanded as flanges ..... **5**

   Promesonotal shield not so broadly expanded, fenestrae occupy much less than one third

of surface area of shield (e.g. Figure 573); sculpture of first gastral tergite (if present) usually confined to basal portion of tergite; anterior margins of first gastral tergite usually not expanded ..... **6**

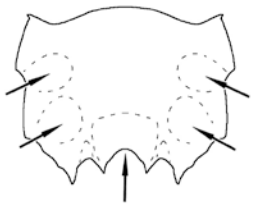

**Figure 572**

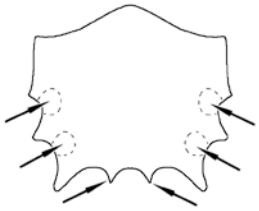

**Figure 573**

5. Viewed dorsally, postpetiole areolate; dorsum of first gastral tergite reticulate (more pronounced anteriad), with sculpture extending to expanded flanges of the tergite (Figure 574)..... ***Meranoplus* sp. JDM 922**

   Viewed dorsally, sculpture of postpetiole consisting of undulating striae; dorsum of first gastral tergite longitudinally striate, the expanded flanges on its anterior margin virtually without sculpture (Figure 575)..... ..... ***Meranoplus* sp. JDM 1101**

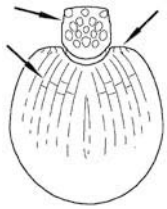

**Figure 574**

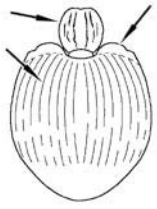

**Figure 575**

6. In full-face view, clypeus strongly incurved, weakly tapered anteriad, emarginate in appearance and extended only slightly beyond the apices of the antennal lobes; antennal lobes broad, often hiding most of the eye (*M. fenestratus* group) (Figure 576) ..... **7**

   In full-face view, clypeus weakly incurved, moderately to strongly tapered anteriad with a straight anteromedial margin and extended well beyond the apices of the antennal lobes; antennal lobes more narrow, so eye can often be clearly seen (Figure 577)... ..... **12**

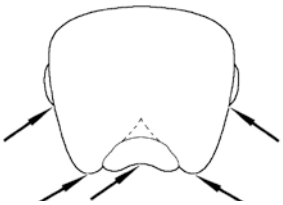

**Figure 576**

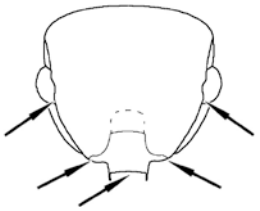

**Figure 577**

7. Dorsum of promesonotal shield smooth, with sculpture limited to very fine microreticulation and a few minute, circular striolae ..... **8**

   Dorsum of promesonotal shield rough in appearance, always with conspicuous sculpture ..... **9**

8. Humeral projections of promesonotal shield only slightly shorter than posterior angles; latter not incurved (larger ants; HW ≈ 1 mm) (Figure 578) ..... ***M. fenestratus* F. Smith**

   Humeral projections of promesonotal shield much shorter than posterior angles; latter long and incurved (smaller ants; HW < 1 mm) (Figure 579) ..... ***Meranoplus* sp. JDM 866**

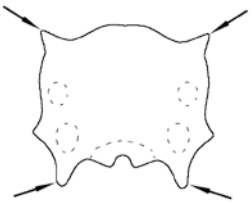

**Figure 578**

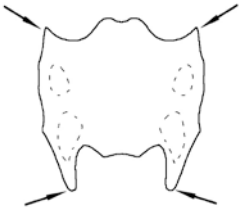

**Figure 579**

9. Posterior margin of postpetiole delimited by a strong carina and with a distinct, sharp overhang (Figure 580); sculpture on dorsum of promesonotal shield almost exclusively consisting of fine microreticulation and a lattice-work of weak striae.....
.....***M. oceanicus* F. Smith**

Posterior margin of postpetiole not delimited by a carina and with a weakly defined overhang or its posterior face more-or-less straight (Figure 581); dorsum of promesonotal shield with at least some areolate or reticulate sculpture ..... **10**

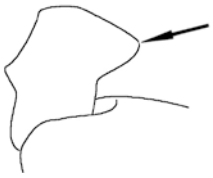

**Figure 580**

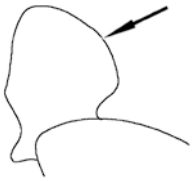

**Figure 581**

10. In dorsal view, posterior angles of promesonotal shield directed mesad (Figure 582a); in profile, apex of petiolar node wedge-shaped, tapering to a blunt edge (Figure 582b) .....
.....***M. ferrugineus* complex sp. JDM 424**

In dorsal view, posterior angles of promesonotal shield directed laterad (Figure 583a); in profile, apex of petiolar node not tapering to a blunt edge, so that structure is subcuboidal or nearly so (Figure 583b) ..... **11**

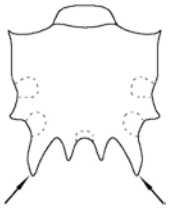

**Figure 582a**

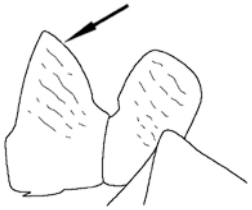

**Figure 582b**

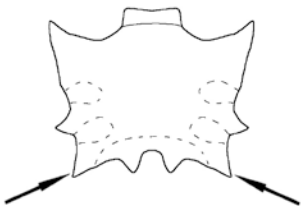

**Figure 583a**

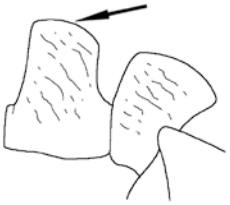

**Figure 583b**

11. In dorsal view, membrane of promesonotal shelf vestigial or restricted to narrow lamina around protruding processes (Figure 584); fenestrae relatively small; microreticulation between striae on promesonotal shield mostly absent, giving surface a shining appearance...
.....***M. ferrugineus* Crawley**

In dorsal view, membrane of promesonotal shield broader, particularly prominent between posterior processes (Figure 585); fenestrae relatively large; microreticulation between striae on promesonotal shield well-defined, giving surface a matt appearance.....
.....***M. ferrugineus* complex sp. JDM 267**

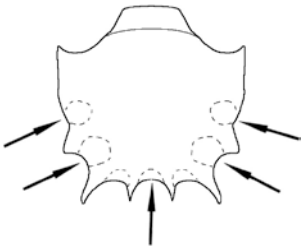

**Figure 584**

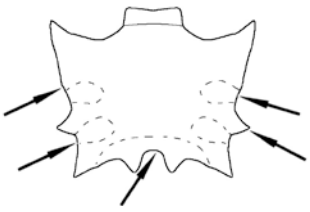

**Figure 585**

12. Petiole and post-petiole very thin, smooth and shining in appearance.....
.....***Meranoplus* sp. JDM 491**

Post-petiole, at least, broad, sculptured and matt in appearance ..... **13**

13. Head and body clothed in very long, curved

setae, length of longest setae only slightly less than half width of promesonotal shield ..... ..... ***M. rugosus* group sp. JDM 677**

Head and body clothed in much shorter setae, length of longest setae < quarter of width of promesonotal shield ..... **14**

14. Posterior face of petiolar node with sculpture almost effaced, shining; appressed setae on gaster very short, with or without a few longer, dark, suberect setae; postpetiole distinctly concave posteriorly, in dorsal view more-or-less triangular with a blunt apex facing posteriad ..... **15**

Posterior face of petiolar node with well-defined sculpture, often matt; gaster normally with longer, abundant and often flexuous, decumbent, pale setae, but one species with many short, stout, dark, erect setae; postpetiole not triangular in dorsal view .... **16**

15. Viewed dorsally, posterior angles of promesonotal shelf connected by a more-or-less unbroken flange (Figure 586); postpetiole in form of flattened, inverted triangle ..... ..... ***Meranoplus* sp. JDM 627**

Viewed dorsally, posterior margin of promesonotal shelf denticulate (Figure 587) appearance of postpetiole less obviously triangular ..... ***Meranoplus* sp. JDM 1071**

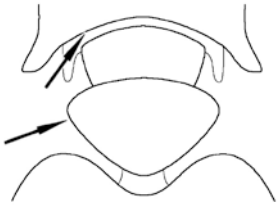

**Figure 586**

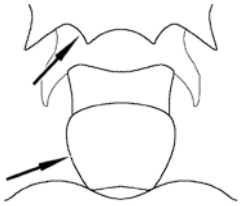

**Figure 587**

16. Large species (HW ≈ 1.2 mm); anterior angles of gaster markedly flattened (Figure 588); basal portion of gaster with many, fine, parallel striae that extend across anterior angles of gaster ..... ***M. similis* Viehmeyer**

Smaller spp. (HW ≤ 1 mm); anterior angles of gaster not markedly flattened (Figure 589); basal portion of gaster usually without fine, parallel striae (except *M. rugosus* – see below). ..... **17**

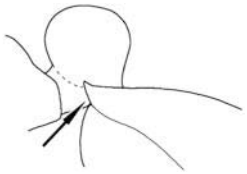

**Figure 588**

**Figure 589**

17. Seen in profile, eye large, eye length ≈ 1/3rd length of head capsule ..... **18**

Seen in profile, eye moderate, eye length ≤ 1/4 length of head capsule ..... **19**

18. Seen in profile, eye distinctly emarginate posteriad, reniform (Figure 590); colour variable, most commonly uniformly brown, or brown with a yellow gaster ..... ..... ***Meranoplus* sp. JDM 673**

Seen in profile, eye more-or-less elliptical or subcircular (Figure 591); colour uniform light orange ..... ***Meranoplus* sp. JDM 1107**

**Figure 590**

**Figure 591**

19. Posterior angles of promesonotal shield, long, digitate, extending well beyond peripheral membrane and directed posteriad (Figure 592) ..... ***Meranoplus* sp. JDM 967**

Posterior angles of promesonotal shield often obscure, frequently not extending beyond peripheral membrane, where present directed laterad (Figure 593) ..... **20**

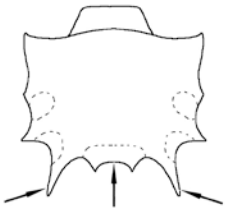

**Figure 592**

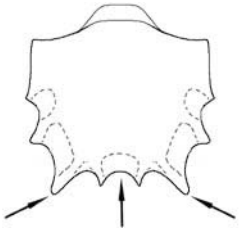

**Figure 593**

20. Basal portion of gaster, at least, with numerous distinct longitudinal striae; other sculpture (e.g. pitting) may be present, especially in samples from near the south coast..... .....***M. rugosus* Crawley**

Basal portion of gaster with, at most, a few vestigial striolae ..... **21**

22. In full-face view, clypeus moderately tapered (Figure 594); mostly larger ants (HW ≈ 0.7 mm)..... ***M. puryi* complex sp. JDM 968**[4]

In full-face view, clypeus strongly tapered (Figure 595); mostly smaller ants (HW ≤ 0.7 mm, usually ≈ 0.5mm)..... .....***Meranoplus* sp. JDM 74**

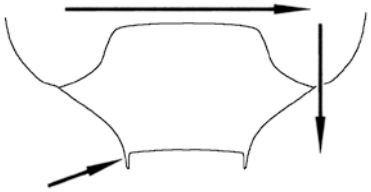

**Figure 594**

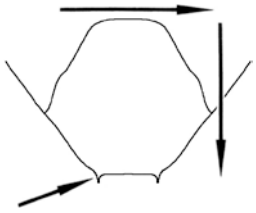

**Figure 595**

Prior to his recent untimely death, Dr S. Schödl (Museum of Natural History, Vienna) was revising this genus. Unfortunately, of those species found in the SWBP, only those taxa that have been previously described have been identified in the Curtin Ant Collection. *Meranoplus* workers and queens cannot be mistaken for anything else, their promesonotal shield and nine-segmented antennae pulling them apart from all other ants in any taxonomic key. The conspicuous promesonotal shield has caused Andersen to name the members of the genus 'shield ants' (Andersen 2002). Many habitats support several, if not many species of *Meranoplus*, which can be seen foraging in the cooler hours of the day for seeds or invertebrate carcases. Some species are nocturnal. The genus includes specialist seed harvesters in the *M. diversus* group, but there is probably only one member of this mainly northern group in the SWBP.

With at least 22 species in or near the SWBP, *Meranoplus* is one of the more significant genera of the region. The genus, in fact, accounts for a very high proportion of the novelties still trickling into the Curtin Collection. Many of these species are common. Within the group there are possibly five separate radiations that can be identified in the SWBP. Several other distinctive species have affinities that are at present uncertain.

The *M. rugosus* group can be identified by the large translucent windows or fenestrae on the promesonotal shield, and these ants often have a characteristic postpetiole that is very thick and has a smoothly vertical anterior face. *Meranoplus rugosus* Crawley, which is found in the south-western corner of the State, is the best known of the species in this group, and is probably the most abundant *Meranoplus* in the Perth area, being quite at home on suburban lawns. This small, orange species can be recognized immediately because of its anteriorly striate gaster and its rather square postpetiole with a steep anterior face. *Meranoplus* sp. JDM 922 (mid north) and *Meranoplus* sp. JDM 1101 (far north of the SWBP) have a very similar postpetiole to *M. rugosus*, and may be related to that species. However, the fenestrae occupy about one third of the area of the promesonotal shield, and the first gastral tergite is strongly striate-reticulate over much of its surface in *Meranoplus* sp. JDM 922 and both promesonotal shield and gaster are longitudinally striate in *Meranoplus* sp. JDM 1101. *Meranoplus rugosus* group sp. JDM 677, another species with much the same habitus as the two taxa mentioned above, is characterized by its very long, curved setae, and is known in the SWBP from Burakin. Elsewhere in WA it occurs at Ethel Creek, in the Pilbara. *Meranoplus similis* Viehmeyer shares gastral sculpture with both *M. rugosus* and *Meranoplus* sp. JDM 922. The anterior gastral angles are also flattened in this attractive orange ant, which can be found on the western coastal plain between at least Jurien Bay and Bunbury. This species also occurs in the Lake Eyre Basin in SA, from where it was described.

[4] *Meranoplus puryi* complex sp. JDM 968 and *Meranoplus* sp. JDM 74 may represent more than two species: see Discussion.

The *M. diversus* group was revised by Schödl (2007) prior to his death. The only SWBP member of the *M. diversus* group represented in the Curtin Ant Collection is *Meranoplus diversus* F. Smith. The one worker was collected at Durokoppin Nature Reserve in the north-eastern wheatbelt (on loan from the WA Museum). *Meranoplus mcarthuri* Schödl is known in the SWBP from one specimen collected at 'Morawa', on or just outside the north-eastern fringes of the Province (Schödl 2007). However, the main range of this ant lies well outside of the Province. Though not included in the species key, this taxon may be distinguished from M. *diversus*, which is concolorous orange-brown, by its distinctly bicoloured appearance, and the rugulose-reticulate posterior face of the petiolar node (posterior face of the node with strong, parallel striae in the former species). Meranoplus *dichrous* Forel, described from a queen, may also belong to the *M. diversus* group. However, the holotype was destroyed during World War II, and is not available for analysis.

The *Meranoplus fenestratus* radiation includes a number of ants that share a broadly incurved clypeus. The anterior margin of the clypeus in this group only extends a little way beyond the antennal lobes. The worker of *Meranoplus fenestratus* F. Smith has an almost smooth promesonotal shield. *Meranoplus oceanicus* F. Smith is closely related, but the dorsum of the promesonotal shield reveals distinct though slight reticulation. The two species are widespread in the SWBP, *M. oceanicus* also occurring in other states in southern Australia. (The type specimen for the latter taxon was described from Moreton Bay, Queensland.) *Meranoplus* sp. JDM 866 shares with *M. fenestratus* the smooth promesonotal shield, but the posterior angles of the shield are extended and distinctly acute. Possibly closely related to *Meranoplus fenestratus* is *Meranoplus ferrugineus* Crawley, along with several undescribed members of a complex that includes *M. ferrugineus*. *Meranoplus ferrugineus* and *Meranoplus ferrugineus* complex sp. JDM 267 are mainly separated on the appearance of the promesonotal shield (shiny in the former, with reduced flanges around the periphery of the shield compared to matt with more extensive fenestrae and peripheral flanging in the latter). Both ants occupy similar habitats in the Perth region and the south-west. Another member of the *ferrugineus* complex, *Meranoplus ferrugineus* sp. JDM 424, is very similar to its close allies, but has the posterior spines of the promesonotal shield directed posteriad rather than laterad. This ant prefers habitats in the mid-north and north-east of the Province, and does not seem to overlap with the other local members of the complex.

Workers from Ethel Creek, in the Pilbara, and Yalgoo that lack promesonotal fenestrae and flanges and have only rudimentary lateral spines have been tentatively assigned to *Meranoplus dimidiatus* F. Smith (though note Andersen 2000, who states that true *M. dimidiatus* is more-or-less confined to Australia's top end). The probable holotype of this species is in the British Museum of Natural History, but, based on Smith's description, in this species the posterior angles of the promesonotal shelf are blunt. However, two pins of specimens in the Curtin Ant Collection have acuminate spines instead of blunt angles, though otherwise their appearance agrees fairly closely with two separate specimens with the blunt angles apparently possessed by the type. Based on recent work on a huge assortment of ants from the Pilbara, held by DEC, these appear to represent two distinct species. *Meranoplus dimidiatus* complex sp. JDM 423, another species in the *M. dimidiatus* group, has a similar *facies* to the above, but possesses a small flange between two diminutive processes on the posterior margin of the promesonotal shield. This species appears to be widespread north and east of Perth.

Much of the *Meranoplus* fauna in the south-west appears to belong to the *M. puryi* group, and this fauna is almost intractable to morphological analysis for some species. Workers putatively belonging to this group possess a more-or-less uniform areolate sculpture on the promesonotal shield, and the lateral and posterior processes arising from the shield are generally much shorter than the propodeal spines. Fenestrae are usually small to vestigial, and flanging on the shield is also reduced, at least on its lateral margins. I have separated the very common *Meranoplus* sp. JDM 74, a tiny form, from *Meranoplus puryi* gp. sp. JDM 968, primarily on the basis of its size, but this is a far from satisfactory state of affairs. In fact, the two groups of ants exhibit no obvious diagnostic differences apart from size. *Meranoplus* sp. JDM 74 may be a species complex – the appearance of the promesonotal shield (rectangular with a posterior flange in some specimens and more square with protruding posterior processes in others) suggests the possibility of two or more cryptic species. Both of these ants are widely distributed throughout the SWBP, and indeed, the rest of the state. *Meranoplus* sp. JDM 673 and *Meranoplus* sp. JDM 1107 probably also belong to this group, being distinguished from the former species by their larger eyes. *Meranoplus* sp. JDM 673, mainly an ant of the wheatbelt, has distinctive, reniform eyes and prickly-looking, usually dark, erect setae on the head, mesosoma and gaster. Workers collected thus far range from dark brown to bicoloured brown or brownish-orange-and-light-yellow. *Meranoplus* sp. JDM 1107, more common in the north and north-east of the Province, has more flexuous, pale setae, a more rounded eye and is uniformly orange in colour.

Of several taxa that are not easily placed in groups, *Meranoplus* sp. JDM 491 is probably the most easily recognized. This is a brown species with a conspicuously thin and shiny petiolar node and postpetiole. The ant has only been collected from two bushland sites within the Perth metropolitan area and the adjacent Darling Range, respectively. In the attractively patterned *Meranoplus* sp. JDM 627, which has a wide distribution throughout drier areas of the State, the postpetiole viewed from above is in the form of an inverted triangle. *Meranoplus* sp. JDM 1071 has a similar postpetiole to *Meranoplus* sp. JDM 627, but possesses small processes on the posterior margin of the promesonotal shield (lacking in the former). This ant has been found at Boddington and also in the Pilbara. *Meranoplus* sp. JDM 967, in which the posterior angles of the promesonotal shield are represented by digitate spines, is known from a few workers collected on or near the south-east coast.

***Mesostruma***

Key from Shattuck 2000, modified.

1. Propodeum armed with long spines..... ..... ***M. spinosa* Shattuck**

   Propodeum armed with short spines or denticles, or with lamellae ..... **2**

2. Seen dorsally, humeral angles of promesonotum armed with short spines, or, at least, distinct denticles..... **3**

   Seen dorsally, humeral angles of promesonotum rounded ..... **4**

3. Propodeal lamellae well-developed; postpetiole with lateral flanges (Figure 596) ..... ..... ***M. laevigata* Brown**

   Propodeum with short denticles; postpetiole without lateral flanges (Figure 597) ..... .....***M. eccentrica* Taylor**

**Figure 596**

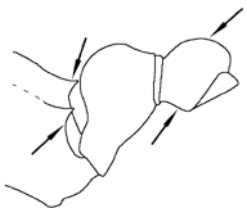

**Figure 597**

4. Dorsum of mesosoma with dense, almost confluent shallow punctures with cuticular sculpture between punctures (Figure 598) ..... .....***M. inornata* Shattuck**

   Dorsum of mesosoma with scattered, well-separated punctures; cuticle between punctures smooth and unsculptured (Figure 599) .....***M. loweryi* Taylor**

**Figure 598**

**Figure 599**

Among the Dacetini, *Mesostruma* is most readily confused with *Colobostruma*, but workers lack the flanges on the petiole seen in the latter. These attractive little ants are seldom collected, although several species appear to be reasonably common and have been found in bark traps in mixed Wandoo and Jarrah-Marri woodland in south-western Australia. Perhaps the best time to see them is in the evening, night or early morning when they can typically be found foraging on the lower trunks of eucalypts.

*Mesostruma spinosa* Shattuck differs from all other known species in that the propodeum carries long spines, and there are no propodeal lamellae. The ant is known from one specimen collected from Manjimup in the Karri (*eucalyptus diversicolor* F. Muell.) belt. *Mesostruma eccentrica* Taylor has been taken from bark traps on Wandoo trunks at Dryandra and has also been collected in litter at Westdale in the eastern Darling Range. This species is widely distributed throughout southern Australia, as is *Mesostruma laevigata* Brown, which has been collected from bark traps on Powderbark Wandoo trunks at Dryandra. *Mesostruma loweryi* Taylor has been found in bark traps on Wandoo trunks in the same locality, and also features in hand collected and/or pitfall trap material from Boddington and from Kings Park, near Perth CBD. The taxon is also known from Geraldton and

from South Australia. A fifth species, *Mesostruma inornata* Shattuck, has been recorded south-east of Cocklebiddy and at Queen Victoria Spring Nature Reserve, east of Kalgoorlie, and may occur in the far south-east of the Province.

### *Monomorium*

Key from Heterick (2001), modified. An additional species, *Monomorium kilianii*, has also been recorded from the south-west, but the record of this eastern Australian species is very dubious, and the ant is not included in this key.

1. Compound eyes absent (may occasionally be represented by minute fleck of pigment) ..... ***M. hildebrandti* gp. sp. JDM 438**

   Compound eyes present, moderate to large in size ..... **2**

2. Antenna 10-segmented ..... **3**

   Antenna 11 or 12-segmented ..... **4**

3. PF 2,3; number of mandibular teeth 5; propodeum armed with sharp denticles..... ***M. decuria* Heterick**

   PF 1,2; number of mandibular teeth 4; propodeum unarmed..... ***M. sydneyense* Forel (pt.)**

4. Antenna 11-segmented ..... **5**

   Antenna 12-segmented ..... **15**

5. Viewed in profile, eye distinctly oblique, often reaching to venter of head capsule, distance from mandible usually much less than length of eye (Figure 600)..... **6**

   Viewed in profile, eye situated along longitudinal axis of head capsule, distance from mandible at most only slightly less than length of eye (Figure 601)..... **7**

**Figure 600**

**Figure 601**

6. PF 2,2; head square (Figure 602)..... ..... ***M. eremophilum* Heterick**

   PF 1,2; head rectangular (Figure 603) ..... ..... ***M. nanum* Heterick**

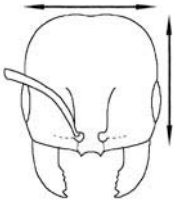

**Figure 602**

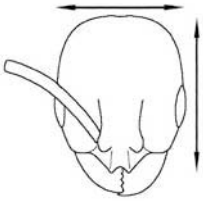

**Figure 603**

7. Propodeum distinctly cuboidal, laterally carinate, or with lamellae on propodeal lobes extending to or near propodeum; propodeal and mesopleural sculpture often shagreenate-punctate (Figure 604)..... **8**

   Propodeum more-or-less rounded, with small, inconspicuous propodeal lobes; propodeal and mesopleural sculpture never shagreenate-punctate, usually absent, if present, then confined to a few striae, particularly around the lower mesopleuron (Figure 605) ..... **14**

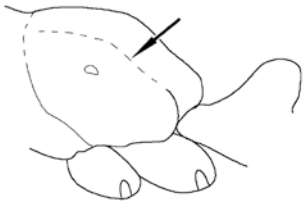

**Figure 604**

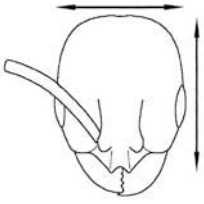

**Figure 605**

8. Mandible with three distinct teeth; eye small (approximately ≈ width of antennal scape); propodeum smooth and shining with only vestigial striae; propodeum with declivitous face long and oblique, carinate at sides and sometimes with small lamellae at propodeal angle (Figure 606); anterior clypeal margin rounded; long erect and suberect setae absent from mesosoma..... ***M. arenarium* Heterick**

Mandible usually with four teeth and denticles (basal tooth may be minute or an offset angle); if clypeal margin rounded then eye larger; propodeum shagreenate or otherwise sculptured (e.g. Figure 607) ..... **9**

9. Yellow species or yellowish with reddish-brown head and gaster; erect and suberect setae on head and mesosoma; propodeum cuboidal to slightly elongate; eye large (eye width ≥ 2 × greatest width of antennal scape) (Figure 607) .....***M. silaceum* Heterick**

Never with above combination of characters; if yellow with a cuboidal propodeum and large eye, then erect and suberect setae absent from head and mesosoma ..... **10**

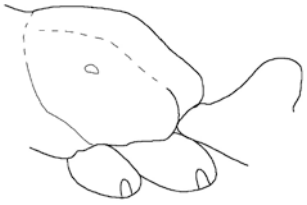

**Figure 606**

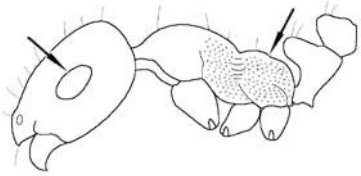

**Figure 607**

10. Mesonotal and mesopleural sectors of promesonotum distinctly microreticulate; in dorsal view, faint, longitudinal striae also often evident on mesonotal sector; eyes usually large (eye diameter > greatest antennal width) (Fig, 608); ant shades of reddish-orange to brown, alone or in combination ..... **11**

Mesonotal sector of promesonotum, at least, smooth and shining with microreticulate sculpture and faint, longitudinal striae always absent; if ant with strong microreticulation on mesopleural sector and on propodeum, then eyes usually moderate to small in non-yellow specimens (eye diameter ≤ greatest antennal width) (Figure 609: *M. sydneyense* Forel); colour various..... **12**

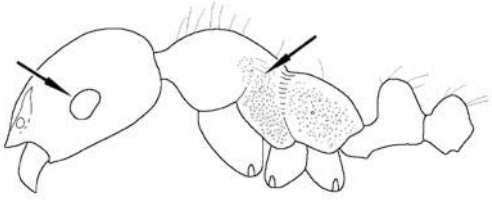

**Figure 608**

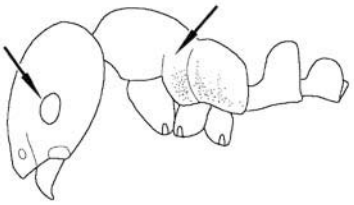

**Figure 609**

11. In profile, mesosoma an even arc, metanotal grove appearing as a slit between promesonotum (which is short) and propodeum; metanotal groove with few if any cross ribs; eye generally oval, smaller (eye width 1–1.5 × greatest width of antennal scape); erect setae generally absent on mesosoma (Figure 610) .... .....***M. aithoderum* Heterick**

In profile, promesonotum evenly rounded anteriad, more-or-less straight posteriad, metanotal groove broad but shallow, often with distinct lateral cross-ribs; promesonotum elongate; eye commonly reniform, larger (eye width 2× greatest width of antennal scape); erect setae often present on mesosoma in SWBP specimens (Figure 611) ..... .....***M. stictonotum* Heterick**

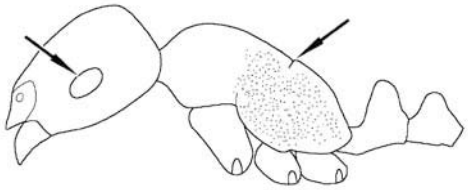

**Figure 610**

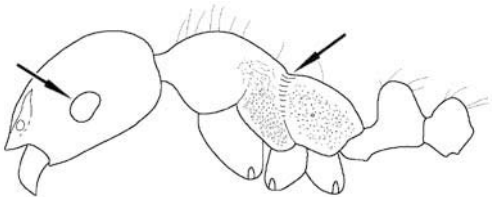

**Figure 611**

12. Eye moderate (eye width 1–1.5 × greatest width of antennal scape), oval (most workers) to slightly elongate (some bright yellow workers); viewed in profile, promesonotum flattened and truncated; colour very variable; erect and suberect setae absent from head, mesosoma and nodes in all bright yellow workers,usually also absent in non-yellow workers (see Figures 604, 609) ..... ***M. sydneyense* Forel (pt.)**

Eye large, (eye width ≥ 1.5 × greatest width of antennal scape), mostly elongate; viewed in profile, promesonotum often more elongate and rounded; colour always yellow (head may be slightly darker); erect or suberect setae usually present at least on petiole and postpetiole..... **13**

13. Eye very large (eye width ≥ 2 × greatest width of antennal scape), mesopleural sector of promesonotum and propodeum with strong microreticulate sculpture; erect and suberect setae (if present) restricted to nodes (Figure 612).....***M. micula*** **Heterick**

    Eye smaller (eye width ≈ 1.5 × greatest width of antennal scape); mesopleural sector of promesonotum and propodeum lacking strong sculpture, cuticle relatively smooth and shining; erect and suberect setae often present on head and mesosoma (workers in many northern populations with conspicuous, erect humeral setae, but other raised setae lacking on promesonotum) (Figure 613)..... ..... ***M. disetigerum*** **Heterick**

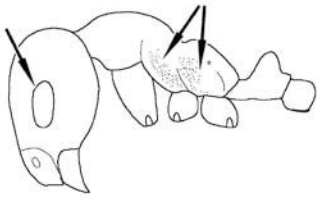

**Figure 612**

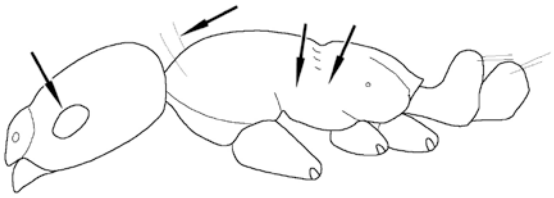

**Figure 613**

14. Yellowish-brown to dark brown in all SWBP populations (if yellowish-brown, then head and gaster darker); propodeum relatively short and usually smoothly rounded (Figure 614); eye compact and ovate..... ***M. fieldi*** **Forel**

    Uniformly yellow or yellow with first tergite of gaster also yellow, remaining tergites yellow-brown; propodeum usually relatively elongate (Figure 615); eye in larger specimens tending to large and elongate .....***M. laeve*** **Mayr**

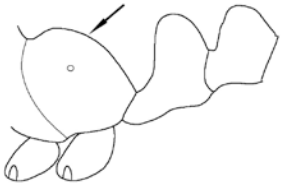

**Figure 614**

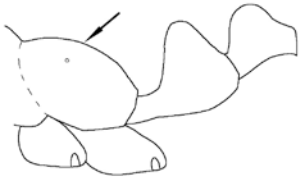

**Figure 615**

15. Number of mandibular teeth and denticles three.....***M. rothsteini*** **Forel**

    Number of mandibular teeth and denticles four to seven..... **16**

16. Eye much longer than wide, either distinctly elongate (Figure 616) coming to a point anteriad, or reniform (Figure 617); worker small (HW usually < 0.60 mm); brown or dark brown species ..... **17**

    Eye circular, subcircular, weakly elongate (not coming to a point anteriad), elliptical or ovoid (e.g. Figure 618); worker usually larger (HW mostly > 0.60 mm)..... **18**

17. Eye elongate, reaching almost to mandible (Figure 616); mesosoma, propodeum and petiole strongly microreticulate; pilosity on promesonotum and propodeum consisting of dense, short setae; colour uniform dark brown.....***M. anthracinum*** **Heterick**

    Eye reniform (Figure 617); microreticulation on body surface less marked, and confined to lower mesopleuron and propodeum, otherwise smooth and shining; pilosity consisting of sparse, erect and suberect setae; colour brown or tawny orange with dark brown gaster .....***M. megalops*** **Heterick**

**Figure 616**

**Figure 617**

**Figure 618**

18. Petiolar node long and low, barrel-shaped (Figure 619)..... **19**

Petiolar node not as above (usually cuboidal, conical, cuneate or tumular)..... **20**

19. Head capsule trapezoidal in full-face view, narrowest at vertex (Figure 620); frons longitudinally striate with combination of appressed setulae and erect and suberect setae; promesonotal sculpture in form of microreticulation, striolae and striae on mesopleuron, and striolae on posterodorsal surface; head orange, mesosoma, petiole and postpetiole dark brown to black, gaster bright yellow, legs brown ..... .....***M. flavonigrum*** **Heterick**

Head capsule rectangular in full-face view (Figure 621); frons longitudinally striate and reticulate with combination of incurved decumbent and subdecumbent setulae and erect and suberect setae; promesonotal sculpture in form of microreticulation and rugosity over entire promesonotum; otherwise coloured (usually a combination of a tawny or red head and mesosoma with some brown infuscation, and dark brown or black gaster).. .....***M. longinode*** **Heterick**

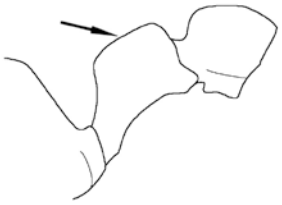

**Figure 619**

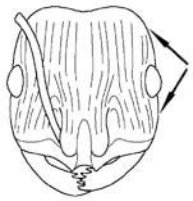

**Figure 620**

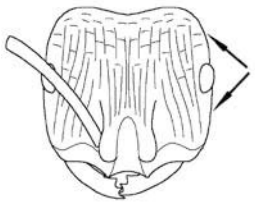

**Figure 621**

20. Anteromedial margin of clypeus a broadly U-shaped cleft between the median clypeal carinae, which are often produced as teeth, denticles or lobes (includes polymorphic species with disproportionately large, square heads in major caste; generally matt in appearance with rugose mesosoma) (Figure 622) ..... **21**

Anteromedial margin of clypeus either convex and protuberant, straight, slightly emarginate, or with shallow V-shaped groove (e.g. Figures 623, 624, 625); at most, median clypeal carinae (if present) produced as weak lobes or denticles (includes mainly dry and wet sclerophyll forest species, often smooth and shining in appearance)..... **32**

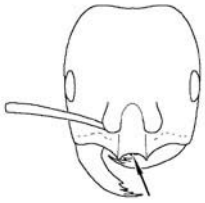

**Figure 622**

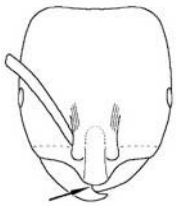

**Figure 623**

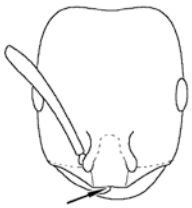

**Figure 624**

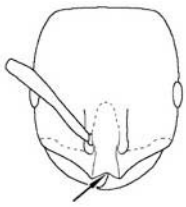

**Figure 625**

21. Petiolar node cuboidal or nearly so, about as high as wide (Figure 626)..... **22**

Petiolar node conical (Figure 627), cuneate (Figure 628) or tumular (Figure 629), usually tapered dorsally, but in profile always higher than wide ..... **25**

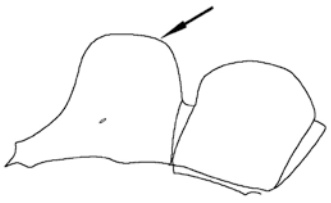

**Figure 626**

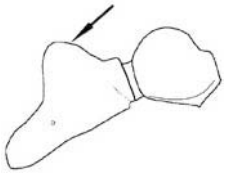

**Figure 627**

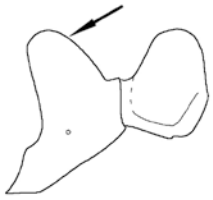

**Figure 628**

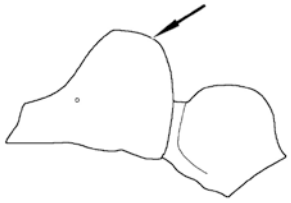

**Figure 629**

22. Propodeum armed with small denticles ..... .....***M. longiceps*** **Wheeler (pt.)**

    Propodeum unarmed ..... **23**

23. Frons and mesosoma shining and polished in appearance with scattered foveae and striolae; distinct lateral striae present on propodeum; median clypeal carinae raised and distinct, produced as blunt lobes (Figure 630); petiolar node rugose .....***M. xantheklemma*** **Heterick**

    Frons and mesosoma matt in appearance, with promesonotum, propodeum and petiole either rugose or granulose-reticulate; clypeal carinae developed as stout, incurved denticles or teeth (Figure 631) ..... **24**

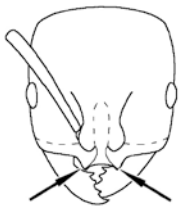

**Figure 630**

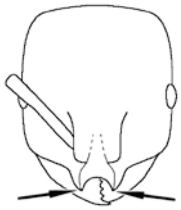

**Figure 631**

24. Frons longitudinally striate; promesonotum microreticulate and rugose; red or reddish-orange; posterior promesonotum, propodeum, petiole and postpetiole strongly infuscated with black.....***M. legulus*** **Heterick**

    Frons finely granulose-microreticulate and striolate; promesonotum finely granulose-microreticulate; concolorous reddish-orange, without infuscation ..... .....***M. bihamatum*** **Heterick**

25. Frons densely foveate and microreticulate (Figure 632a); propodeal declivity strongly delimited anteriad by bevelled surface with well-defined anterior border (Figure 632b)..... ..... **26**

    Frons not foveate, propodeal declivity not as above..... **27**

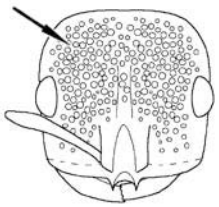

**Figure 632a**

**Figure 632b**

26. Head and mesosoma without erect or semi-erect setae; colour uniformly orange..... .....***M. elegantulum*** **Heterick**

    Head and mesosoma with a few erect and semi-erect setae (Figure 633); brownish to black head and gaster, tan mesosoma (Eneabba only) .....***M. falcatum*** **gp. sp. JDM 1178**

27. Head, mesosoma and gaster covered with decumbent setulae only, erect and suberect setae lacking; small (TL ≈ 2 mm)..... .....***M. pubescens*** **Heterick**

    Erect and suberect setae always present on body; larger (TL > 2 mm)..... **28**

28. Head capsule rectangular; usually five teeth and denticles, rarely four; monomorphic; colour tawny orange or red, often with some infuscation around propodeum, petiole and postpetiole, gaster orange, appendages brown .....***M. longiceps*** **Wheeler (pt.)**

Head capsule square and massive; always with four stout teeth; monomorphic, polymorphic or displaying monophasic allometry; colour variable ..... **29**

29. Monomorphic; colour predominantly orange or red ..... **30**

Polymorphic or displaying monophasic allometry, with considerable size range between largest and smallest workers; colour variable but black, brown, black-and-orange and black-and-red predominate ..... **31**

30. Anteromedial margin of clypeus with two broad, longitudinally striate lobes (Figure 634a); frons longitudinally striate with erect and suberect setae, setae short (≤ width of eye); propodeum rounded, transversely striate (Figure 634b); crimson to orange ..... ***M. striatifrons*** **Heterick**

Median clypeal carinae produced apically as pair of pronounced teeth; frons microreticulate and striolate with erect and suberect setae; propodeum smoothly rounded or angulate in profile or armed with small denticles or flanges, but without transverse striae; crimson to reddish orange with head, gaster and appendages darker (rare and localised in north of SWBP) ..... ***M. majeri*** **Heterick**

**Figure 633**

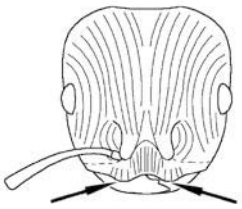

**Figure 634a**

**Figure 634b**

31. Smallest minor workers dissimilar in morphology and pilosity to media and major workers; major workers rather hirsute and rugose, minor workers with shorter setae and more angulate, microreticulate propodeum; typically among major and media workers head, gaster and appendages black, dark brown or brown, mesosoma, propodeum and waist segments orange to crimson; minor workers similar in colour, or uniformly brown or dark brown; median clypeal carinae produced as single pair of lobes or denticles in major and minor workers, occasionally feebly bilobate in media workers. (Possibly a complex of two or more species is represented here.)..... ***M. rufonigrum*** **Heterick**

Morphology of minor, media and major workers similar, colouration never as above in major and media workers (usually either concolorous orange, brown or black, or brown with yellow gaster); median clypeal carinae always produced as bifurcated lobes or denticles..... ***M. bicorne*** **Forel**

32. Viewed in profile, postpetiole a curved, horizontal cone, narrowest at its junction with petiole and widest at or near its junction with gaster (Figure 635) ..... ***M. crinitum*** **Heterick**

Viewed in profile, postpetiole strongly constricted both anteriad and posteriad, so that its greatest diameter is at its midpoint; postpetiolar shape round or square (Figure 636) ..... **33**

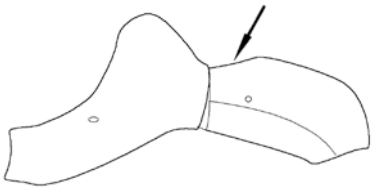

**Figure 635**

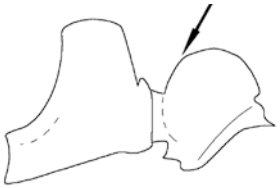

**Figure 636**

33. Subpetiolar process a broad flange ending in a spur anteriad; propodeal angles produced in the form of sharp spines (Figure 637); three larger teeth and four tiny denticles on inner mandibular edge..... ***M. sublamellatum*** **Heterick**

Subpetiolar process at most a tapering, narrow flange ending in a small, anteroventral protuberance or spur; propodeal angles

not produced as spines (e.g. Figure 638); maximum number of mandibular teeth and denticles five ..... **34**

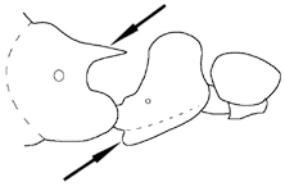

**Figure 637**

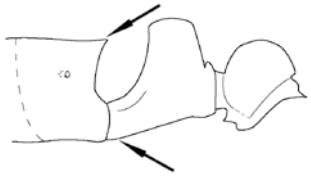

**Figure 638**

34. PF 1,2; small (HML 1.25–1.75 mm); four mandibular teeth and denticles; frons of head capsule and petiolar node unsculptured, smooth and shining, propodeal angles rounded ..... ***M. sordidum*** **Forel**

PF 2,2 or 2,3; size often larger, if small with four mandibular teeth and denticles, head and petiolar node distinctly sculptured or propodeal angles acute to denticulate ..... **35**

35. Dorsum of head and entire mesosoma finely reticulate-punctate (Figure 639); PF 2,2 (introduced orange or yellow species, only found in highly disturbed, predominantly urban environments in Australia)..... ..... ***M. pharaonis*** **(L.)**

Sculpture not as above, species generally smooth; PF predominantly 2,3. ..... **36**

36. Frons with strong reticulate or foveate sculpture; propodeal declivity strongly delimited anteriad by oblique, bevelled surface with well-defined anterior border (Figure 640); viewed dorsally, mesosoma uniformly densely sculptured with longitudinal striae, reticulations and occasional foveae (Figure 641) ..... ***M. lacunosum*** **Heterick**

Frons with reduced sculpture (not as above) or completely smooth and shining; propodeal declivity without distinct oblique, bevelled surface with well-defined anterior border; sculpture of mesosoma not as above ..... **37**

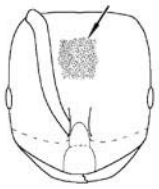

**Figure 639**

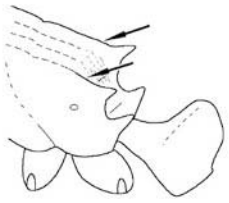

**Figure 640**

**Figure 641**

37. Basal tooth much broader than other pre-apical teeth (Figure 642); distinctly polymorphic, with large headed major workers having rather small eyes ..... ***M. euryodon*** **Heterick**

Basal tooth of same size or smaller than other pre-apical teeth; worker monomorphic or exhibiting monophasic allometry ..... **38**

38. Frons and promesonotum with many evenly-spaced short (nearly all ≤ width of eye) erect and suberect setae (Figure 643)..... ..... ***M. brachythrix*** **Heterick**

Pilosity consisting mainly of longer erect and suberect setae (> width of eye), setation less dense ..... **39**

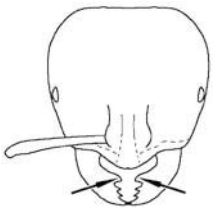

**Figure 642**

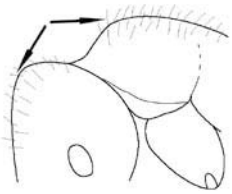

**Figure 643**

39. PF 2,2; mandible with four teeth and denticles; often only three visible; propodeum unarmed (introduced species in urban or otherwise disturbed habitats)..... ***M. destructor*** **(Jerdon)**

PF 2,3; four teeth always visible, five often present; propodeum usually angulate, propodeal angles often with denticles,

especially in larger workers (*M. centrale*, *M. leae*) ..... **40**

40. Anteromedial margin of clypeus often projecting as narrow ellipse or rectangle, sometimes slightly emarginate, but never forming a shallow groove (Figure 644); clypeal denticles or lobes absent; petiolar node usually cuneate or tumular, only rarely subcuboidal or cuboidal ..... ***M. leae*** **Forel**

Anteromedial margin of clypeus forming a shallow V-shaped groove between median clypeal carinae, which are developed as denticles (Figure 645); petiolar node cuboidal or subcuboidal ..... **41**

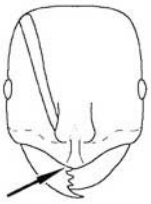

**Figure 644**

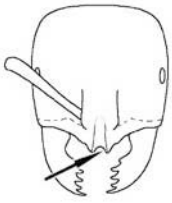

**Figure 645**

41. Eye moderate in size (eye width 0.5–1.5 x greatest width of antennal scape); head capsule nearly always darker than promesonotum in full-face view, but never lighter in colour; petiolar node higher than wide and tending to subcuboidal (Figure 646); number of mandibular teeth and denticles usually five (minute basal denticle may occasionally be lacking) ..... ***M. centrale*** **Forel**

Eye large (eye width > 1.5 x greatest width of antennal scape); head capsule lighter coloured than promesonotum in full-face view; petiolar node low and cuboidal in shape (Figure 647); four mandibular teeth and denticles (very rare) ..... ***M. durokoppinense*** **Heterick**

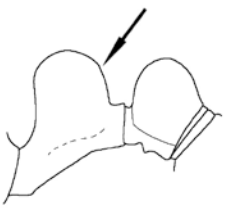

**Figure 646**

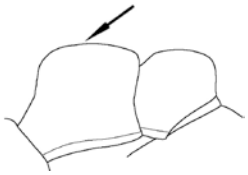

**Figure 647**

***Monomorium***

*Monomorium* ranks among the most important genera in the SWBP, along with speciose groups like *Iridomyrmex*, *Camponotus* and *Melophorus*. In terms of its impact on ordinary people, the genus probably rates above the others, since two major tramp species, the Singapore ant (*Monomorium destructor* (Jerdon)) and the Pharaoh's ant (*Monomorium pharaonis* (Linnaeus)) infest some sites in the Perth metropolitan area. Fortunately, these species have thus far not had the impact in Perth that they have had in other parts of the world. Nevertheless, *M. destructor* has caused some problems in towns in the Pilbara and Kimberley, not least because of its penchant for chewing through cabling. *Monomorium* species can be distinguished from other ants in the SWBP by a combination of an anteromedial clypeal seta, moderate-sized to large compound eyes (except for *Monomorium* and *hildebrandti* gp. sp. JDM 438), a three-segmented antennal club, and a postpetiole that is nearly always the same size or smaller than the petiolar node. As a group, the genus has very diverse habits, the small species in the *M. monomorium* species-group being mainly generalist predator-scavengers, while the larger forms include seed gatherers. Some of the larger species exhibit varying degrees of polymorphism, but *M. monomorium* group taxa are always monomorphic.

Next to *Camponotus*, *Monomorium*, with at least 40 spp. is the largest ant genus in the SWBP. Among the most abundant of all ants in Australia, particularly in urban areas, are the small members of the *M. monomorium* species-group. Many of these species are found across the entire Australian mainland. This group appears to be more derived in evolutionary terms than other Australian *Monomorium*, the reproductive castes lacking two of the significant wing cross veins. At least cross vein Cu-A is always present in other Australian *Monomorium*, and these veins are usually sclerotized. Members of the *M. monomorium* group are also taxonomically difficult in several cases, taxa like *Monomorium sydneyense* Forel and *Monomorium rothsteini* Forel revealing a high degree of variability in terms of morphology, pilosity and often colour. The taxonomic approach taken here (Heterick 2001) is a conservative one; see Andersen (2000) for a different approach.

*Monomorium sydneyense* Forel is possibly the most abundant ant in Australia, and can be found in

virtually all Australian habitats. The appearance of workers of what is currently known as *M. sydneyense* varies enormously, from uniformly dark chocolate with a shagreenate exoskeleton, through orange-and-brown to light yellow with a smooth, shiny appearance, along with many specimens of intermediate *facies*. The propodeum (and often, the promesonotum and mesopleuron) can be long and reticulate-punctate or shorter and relatively unsculptured. A minute, small-eyed pale form with a darker head is most common in the SWBP. In workers of coastal populations of this form the clypeal carinae are often extended beyond the clypeus as small spines, and the antennal count in at least some populations is 10. Since workers of these ants are all but morphologically indistinguishable from other workers with the normal count of 11 segments, molecular techniques are probably necessary to determine whether these populations represent a separate species. What appears to be a similar form with the same number of antennal segments has been identified in the Monarto region of South Australia. However, workers of the latter are darker in colour without extended clypeal carinae. Molecular analysis, currently being undertaken by Dr. Phil Lester (Victoria University of Wellington, NZ) on Australian *Monomorium*, may uncover the reason for the morphological variation in such taxa as *M. sydneyense*. Preliminary results suggest *M. sydneyense* may, in fact, be a complex of three or more sibling species. Apart from *M. sydneyense* itself and the small, pale form mentioned above, a consistently yellow ant (mentioned in Heterick 2001), common throughout temperate Australia, is a strong candidate for separate species status.

*Monomorium disetigerum* Heterick, *Monomorium micula* Heterick, and *Monomorium silaceum* Heterick are small, yellow species from drier regions that are often hard to distinguish from pale *M. sydneyense*. To look at just one described species, *Monomorium silaceum* populations in some areas of the north and north-east of the SWBP, and the Pilbara departs from the typical broad-headed, punctate yellow form. These variants have a brown head capsule, are smoother and less sculptured, and more gracile. *Monomorium aithoderum* Heterick, *Monomorium nanum* Heterick and *Monomorium stictonotum* Heterick are minute, nondescript orange or brownish species of very similar appearance that make up much of the *Monomorium* biomass in drier areas of southern Australia. Our understanding of this group of taxonomically difficult little ants may be assisted by Dr. Lester's work (see above); *M. nanum*, in particular, may be a species complex. An arid area taxon, *Monomorium eremophilum* Heterick, looks like a miniature *M. rothsteini*, but has 11-segmented antennae and the eye is elongate rather than ovate.

*Monomorium fieldi* Forel is a small, usually hairy, dark brown ant that is almost as ubiquitous as *M. sydneyense*. This is probably the most common species, apart from *M. sydneyense*, in Perth streets and gardens. The minute *Monomorium laeve nigrium* Forel was tentatively synomymized under *M. fieldi* by Heterick (2001), but shares important morphological characters with both *M. fieldi* and *M. sydneyense*, and may represent hybridisation between the two taxa. This form is most common on the east coast and in northern Australia, but is occasionally found in the SWBP. *Monomorium laeve* Mayr is a yellow ant whose workers range in appearance from very small and compact (mainly northern Australia) with small, oval eyes to small-medium and gracile with large, rather elongate eyes (mainly the wetter south-west). Many workers with intermediate features connect the two extremes. This species is very occasionally a minor pest, coming indoors after food (Clark 1924).

*Monomorium arenarium* Heterick, a small, orange ant whose queens have an unusual appearance, has been found in sandy areas at Swanbourne (Perth metropolitan area), Eneabba, Esperance and Nornalup in the SWBP, as well as in SA and Tas. *Monomorium rothsteini* Forel is ubiquitous throughout most of mainland Australia, being particularly abundant in semi-arid and arid areas where it is a significant seed harvester. Seeds of grasses and shrubs like saltbush (*Atriplex*) are commonly gathered, along with a small amount of animal matter (Briese and Macauley 1980). Workers of *M. rothsteini* vary widely in colour, and the clypeal margin is variously developed, leading some researchers such as Andersen (2000) to approach the taxon as a species complex, rather than a single species. Heterick (2001) presents the case that *M. rothsteini* is monophyletic. *Monomorium sordidum* Forel shares many morphological similarities with *M. rothsteini*, in both reproductive and worker castes. Moreover, the two taxa, along with *Monomorium megalops* Heterick, are the only Australian members of the *M. monomorium* group with 12-segmented antennae, the remaining members possessing 11-segmented antennae. *Monomorium sordidum* is yet another very common species in most Australian habitats. *Monomorium megalops* is identical to *M. sordidum*, apart from its large, reniform eye. The distribution of this species centres mainly on inland NSW and SA, but there is one record in the SWBP from Westonia, in the western goldfields. The exotic tramp species, *Monomorium floricola* (Jerdon), is another tiny ant with 12-segmented antennae found in tropical Australia. Although there is no official record of its presence in southern WA, there is some evidence that it may also have been able to establish colonies in Perth after entering via an infested caravan (M. Widmer, Agriculture Department of WA, pers. comm.).

*Monomorium hildebrandti* gp. sp. JDM 438 has until recently been confused with *Anillomyrma*, a genus that probably does not occur in Australia. The *hildebrandti* group of *Monomorium* has the Malagasy region as its stronghold (Heterick 2006), but several diminutive species from this clade have radiated or been introduced by human agency to various parts of the Pacific, including Australia. Possibly as many as half-a-dozen related species from the *hildebrandti* group are to be found on this continent, all of them characterized by small size, a depigmented cuticle and very reduced eyes or with eyes lacking altogether. Only one of these ants, *Monomorium australicum* Forel, has been described from Australian material, and most, including the local species, are undescribed. Workers can be distinguished from true *Anillomyrma* primarily by their palp formula (2,2 versus 2,1, which does not occur in any *Monomorium* species), and the appearance of the post-petiole. *Monomorium hildebrandti* gp. sp. JDM 438 can be distinguished from workers of nearly all Australian myrmicine genera by its eyeless condition. The only other myrmicine in the SWBP with which *Monomorium hildebrandti* gp. sp. JDM 438 could be confused is a *Solenopsis* species, *S. belisarius* Forel, but this ant has a two-segmented antennal club (three-segmented in the *Monomorium* species). This minute subterranean ant is found throughout the south-west of the State, including the Perth metropolitan area, and is sufficiently common for workers to appear frequently in pitfall trap samples. The biology of *Monomorium hildebrandti* gp. sp. JDM 438 is not known.

Many members of the remaining *Monomorium*, along with *M. rothsteini* and *M. sordidum*, were formerly included in the genus *Chelaner*, before it was synonymised under *Monomorium* by Bolton (1987). The *M. falcatum* group have such a distinctive *facies* that they are scarcely recognisable as *Monomorium*. Indeed, the very rare eastern states species *Monomorium falcatum* had the genus *Schizopelta* erected for it by McAreavey (1949), and *Monomorium elegantulum* Heterick appears *incognito* as 'Unnamed Genus #1' in Shattuck (1999)! The latter has occasionally been collected in drier inland regions in NSW and SA, as well as from the SWBP. The WA species in this group tend to be most common in sandplain and heathland environments. *Monomorium decuria* Heterick, confined to the south-west corner of this State, has a more localized distribution than most of the other members of the group. However, it is easily the most common, occurring in woodland up to the outskirts of towns and cities, including the Perth metropolitan area. Aside from members of some populations of putative *M. sydneyense*, this is the only Australian *Monomorium* with a 10-segmented antenna. Workers of *Monomorium lacunosum* Heterick depart from the usual predominantly glabrous appearance found in most other members of the group, in that the body surfaces are covered with many short, erect setae. The ant is apparently very rare, having been recorded in the SWBP on two occasions from Eneabba and once in Cape Arid National Park. Elsewhere in WA it has been found in Queen Victoria Spring Nature Reserve. There is also one record from SA. Just recently, an undescribed species in this group (*Monomorium falcatum* gp. sp. JDM 1178) has been recorded from near Eneabba. The workers are quite similar to those *M. decuria*, also found in the area, but have 12-segmented antennae and long, erect setae on the promesonotum.

Workers in the *M. bicorne* group exhibit polymorphism, the largest workers having disproportionately broad heads (not unlike some *Melophorus*, an unrelated formicine genus) and large clypeal teeth. Probably most species harvest seeds, but this is definitely known only for *Monomorium whitei* Wheeler (see Davison 1982, 1987), a species whose range may take in the extreme north-east of the SWBP. *Monomorium bicorne* Forel is a handsome dark brown to black-and-yellow species, which can be found throughout temperate Australia. East coast workers are essentially dark brown, black or black-and-brown, and were formerly placed in *Monomorium macareaveyi* (Ettershank) (synonymised Heterick 2001). Workers in the SWBP are black with yellow gasters. *Monomorium majeri* Heterick and *Monomorium striatifrons* Heterick are large, reddish species. *Monomorium majeri* has a very limited distribution east of Geraldton, but *M. striatifrons* is also found in the NT and SA. *Monomorium rufonigrum* Heterick is possibly a species complex, but may equally be a single species with alternative phenotypes depending on alleles possessed by the colonies. Some colonies contain polymorphic workers (major and media workers red-and-black or uniformly brownish, smallest minor workers uniformly brown or bicoloured light and dark brown), while others seem to contain monomorphic workers (uniformly red-and-black or uniformly brown). The head of the red-and-black workers is relatively broader than that of workers of the latter type of colony, but the morphology of the minor workers is very similar for both types of colony. The ant is widespread in the SWBP, and the red-and-black form has been collected in the Perth metropolitan area. Populations also occur in NSW and SA. *Monomorium anthracinum* Heterick, whose size is similar to many ants in the *M. monomorium* group, is an uncommon, elongate-eyed species. Most specimens have come from within the semi-arid areas of the SWBP, but the ant has also been collected from Bush Bay, in the Carnarvon district, just north of the Province. *Monomorium pubescens* Heterick is known only from the Perth region

(Mosman Park) and, more recently, from Eneabba. Workers of the latter species are very similar to minor workers within polymorphic populations of *M. rufonigrum*.

Members of the *M. kilianii* species-group, which constitutes an important part of the *Monomorium* fauna on Australia's east coast, have an elongate postpetiole. *Monomorium crinitum* Heterick was recorded many years ago from Mundaring, just east of Perth, but has not been seen in this State since. *Monomorium kilianii* Forel was recorded by J. Clark from Booanya, in the south-east of the State, and from Ludlow, on the south-west coast, but these ancient records must be regarded as doubtful, in view of the ant's known distribution in the generally more humid south-eastern corner of Australia.

Workers of the nine members of the *M. rubriceps* group found in the SWBP are all yellow, orange or red; some species also have brown infuscation of the mesosoma. *Monomorium leae* Forel is the most widespread and variable of these species, being found throughout Australia. Western Australia lacks the beautiful, bicoloured purplish brown-and-yellow race of the east coast rain forests and also the bright yellow form (formerly *Monomorium hemiphaeum* Clark). Western Australian *M. leae* are orange to reddish, and exhibit some polymorphism. Larger workers have distinct propodeal denticles, while the propodeum is more rounded in smaller workers (which resemble yellow *M. sydneyense*, but with a 12-segmented antenna). Locally, *M. leae* appears to be most abundant in more humid environments, e.g. near watercourses and around the boles of eucalypts in wetter parts of the south-west. *Monomorium centrale* Forel, which closely resembles M. *leae*, is also widespread, but most common in semi-arid and arid areas. *Monomorium durokoppinense* Heterick and *Monomorium xantheklemma* Heterick are two very rare, reddish-orange forms. Records of *Monomorium durokoppinense* are currently confined to a small area north of Kellerberrin in the WA wheatbelt, while *M. xantheklemma*, which is also found in the goldfields as well as the wheatbelt, has been recorded from the Clare Valley, in SA. *Monomorium bihamatum* Heterick and *Monomorium legulus* Heterick are very similar red species, the latter being distinguished chiefly by a darker band on the mesosoma. *Monomorium legulus* has not been recorded outside of WA, whereas *M. bihamatum* has also been recorded from NSW and SA. Both species harvest seeds of mallees (pers. obs. and label data). In Australian mainland states *Monomorium longiceps* Wheeler is a relatively common and widespread red or red-and-brown ant that has been collected from both ground and vegetation. Some populations can still be found in relictual bushland in the Perth metropolitan area and on Rottnest Is. The broad basal tooth on its mandible and its strongly polymorphic workers distinguish the widespread but rare *Monomorium euryodon* Heterick. *Monomorium brachythrix* Heterick, the workers of which are covered in very short, erect setae, appears to be confined to the sand-plains north and north-east of Perth.

The *M. longinode* group, whose members have a characteristic barrel-shaped petiolar node, are represented in the SWBP by *Monomorium longinode* Heterick and *Monomorium flavonigrum* Heterick. The former species is quite common in sandy soils in the south-west corner of the State, including relictual woodland in the Perth metropolitan area. *Monomorium flavonigrum* has a very limited known range in and around the Geraldton region, in the mid-north. Specimens in the Curtin Ant Collection come from Canna and the Kalbarri NP.

The bizarre *Monomorium sublamellatum* Heterick has three large and four minute teeth on each mandible, sharp propodeal spines (similar to those possessed by the eastern states species *Monomorium sculpturatum* Clark), and a large, ventrally carinate, subpetiolar process that ends in a spur anteriad. The phylogenetic affinities of this species are unknown (Heterick 2003). This small (TL < 2.5 mm) ant was collected many years ago from a litter berlesate from North Twin Peaks Island in the Recherche Archipelago. The holotype (a worker) belongs to the WA Museum. An additional worker specimen of this taxon has been collected near Wungong Dam, just south of Perth.

### *Orectognathus*

*One species,* Orectognathus clarki *Brown.*

*Orectognathus* is the largest member of the Dacetini encountered in the SWBP. Workers can easily be identified by their five-segmented antenna, with the third segment much more elongate than the remaining segments of the flagellum. As with *Epopostruma*, *Strumigenys* and the ponerines *Anochetus* and *Odontomachus*, the mandibles are of the trap-jaw variety, long and thin. They capture soft-bodied arthropods (Shattuck 1999).

Only one species of *Orectognathus* has been recorded from the SWBP. *Orectognathus clarki* Brown, originally described from southern Vic., had previously been recorded from high rainfall areas near the south coast, notably the Porongorup and Stirling Ranges. Recently, a worker was collected by vegetation vacuuming in the Worsley mining area south-east of Perth. This constitutes a first record for Jarrah-Marri woodland in the Darling Range.

### *Pheidole*

*Major workers*

(n.b. The major worker for *Pheidole* JDM 871 is not known.)

1. Viewed in profile, junction of postpetiole with gaster narrow (Figure 648) ..... ***P. megacephala* (Fabricius)**

   Viewed in profile, junction of postpetiole with gaster broad (Figure 649) ..... **2**

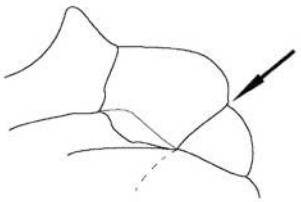

**Figure 648**

**Figure 649**

2. Viewed from above, vertex of head smooth and shining (Figure 650)..... **3**

   Viewed from above, vertex of head reticulate (Figure 651) or striate (Figure 652)..... **7**

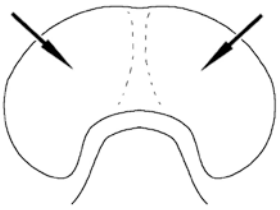

**Figure 650**

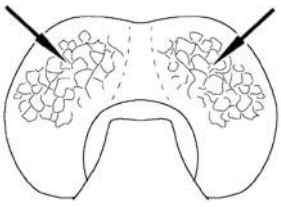

**Figure 651**

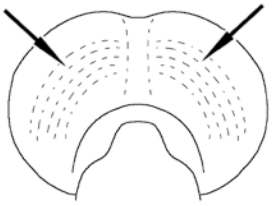

**Figure 652**

3. Mesosoma almost devoid of sculpture, smooth and shining..... ***Pheidole* sp. JDM 874**

   Mesosoma sculptured, with striae, at least, on promesonotum..... **4**

4. Larger species (HW ≥ 2 mm) ..... **5**

   Smaller species (HW < 2 mm) ..... **6**

5. Viewed from front, mandible quadrate, inner to outer surface (i.e. top to bottom) being about same length as angle to edge (i.e. from left to right) (Figure 653)..... ***P. hartmeyeri* Forel**

   Viewed from front, mandible relatively elongate, distance from inner to outer surface being much less than distance from angle to edge (Figure 654) ..... ***Pheidole* sp. JDM 558**

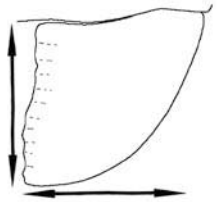

**Figure 653**

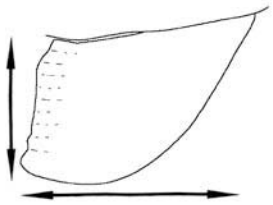

**Figure 654**

6. Medium-sized species (HW ≈ 1.5 mm) (mainly coastal)..... ***P. ampla* Forel**

   Small species (HW ≈ 1 mm) (found in N, NW) ... ..... ***Pheidole* sp. JDM 338**

7. Occipital lobes with strong, deep, reticulate sculpture (Figure 655) ..... ..... ***Pheidole* sp. JDM 164**

   Occipital lobes striate, often weakly so (e.g. Figure 656)..... **8**

8. Viewed from front, longitudinal striae on head reaching to vertex (Figure 657) ..... ..... ***Pheidole teneriffana* Forel**

   Viewed from front, longitudinal striae diverging strongly left and right near occipital lobes to become more-or-less horizontal (Figure 658) .. ..... **9**

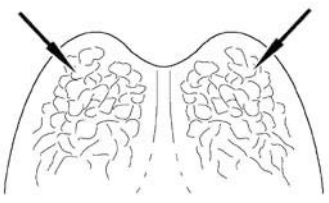

**Figure 655**

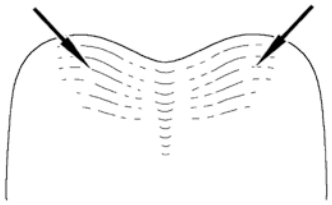

**Figure 656**

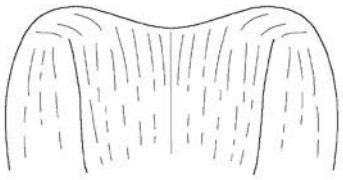

**Figure 657**

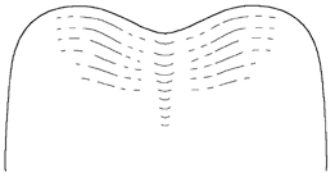

**Figure 658**

9. Antennal scrobe long, reaching to at least midpoint of head; head elongate, about 1.5–2 times as long as wide (Figure 659) (size of major very variable, according to locality)..... ***Pheidole* sp. near *variabilis* Mayr (JDM 177)**

   Antennal scrobe short, reaching to about midpoint of eye; head only slightly longer than wide (Figure 660) ..... **10**

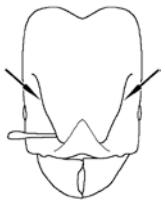

**Figure 659**

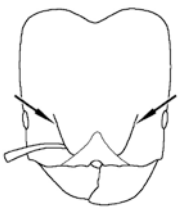

**Figure 660**

10. Eye oblique, distinctly attenuated anteriad (Figure 661a); anterolateral and anteromedial teeth on underside of head well-developed (Figure 661b).....***P. ampla perthensis* Crawley**

    Eye variable in shape but not distinctly attenuated anteriad (e.g. Figure 662a); anterolateral and anteromedial teeth on underside of head vestigial (Figure 662b) ..... .....***Pheidole* sp. JDM 1138**

**Figure 661a**

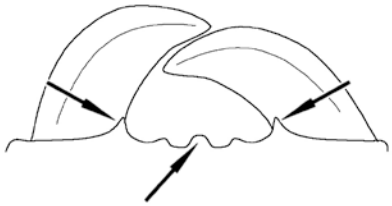

**Figure 661b**

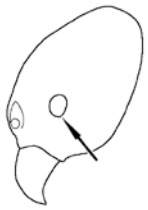

**Figure 662a**

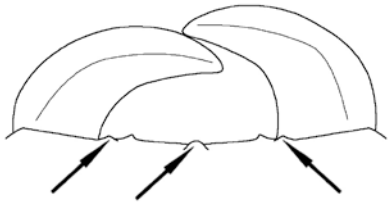

**Figure 662b**

*Minor workers*

1. Propodeum unarmed or with vestigial denticles .....***Pheidole* sp. JDM 874**

   Propodeum armed with distinct teeth or spines ..... **2**

2. Postpetiole large and rather elongate, distinctly constricted towards its junction with gaster (Figure 663) ..... **3**

Postpetiole small and compact (about as high as long), not constricted towards its junction with gaster (Figure 664) ..... **4**

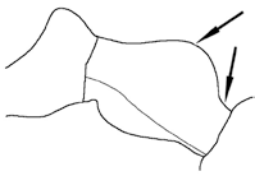

**Figure 663**

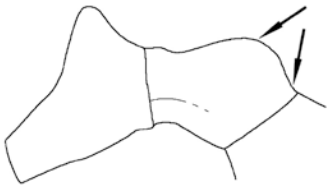

**Figure 664**

3. Promesonotum in profile forming a smooth curve (Figure 665) ..... ***P. megacephala* (Fabricius)**

   Promesonotum with protuberance in mesonotal region (Figure 666) ..... ***Pheidole teneriffana* Forel**

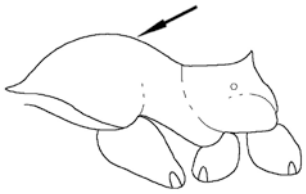

**Figure 665**

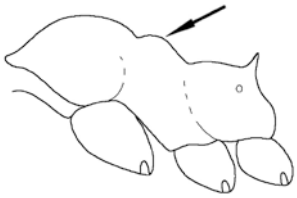

**Figure 666**

4. Eye markedly elongate anteriad, separated from mandibular insertion by much less than its own length (Figure 667) ..... ***Pheidole* sp. JDM 164**

   Eye more-or-less ovate, only slightly elongate anteriad, separated from mandibular insertion by at least its own length (Figure 668) ..... **5**

**Figure 667**

**Figure 668**

5. Sculpture of vertex of head and dorsum of promesonotum with distinct, large reticulations, otherwise smooth and shining.. ..... ***Pheidole* sp. JDM 558**

   Sculpture of vertex of head usually longitudinally striate, striate-shagreenate or lacking; dorsum of promesonotum lacking large reticulations ..... **6**

6. Bright yellow species; frons of head capsule smooth and shining and longitudinal striae virtually absent past level of eye and frons not shagreenate ..... ***Pheidole* sp. JDM 338**

   Species usually darker with fine but distinct longitudinal striae; if light in colour then frons of head capsule shagreenate ..... **7**

7. Colour dark chocolate; promesonotum completely shagreenate without shining patches or obvious striae ..... ***Pheidole* sp. JDM 871**

   Either colour lighter, or promesonotum with striae or shining patches ..... **8**

8. Small species (HW ≈ 0.5 mm) ..... ***Pheidole* sp. near *variabilis* Mayr (JDM 177)**

   Larger species (HW ≥ 0.8 mm) ..... **9**

9. Mesosoma yellowish, head and gaster light brown ..... ***P. ampla* Forel**

   Species brown, reddish brown with darker head and gaster, or chocolate ..... **10**

10. Scapes very long, exceeding vertex of head by about a third of their length, extensive shagreenate sculpture on mesosoma (Figure 669) ..... ***P. hartmeyeri* Forel**

    Scapes much shorter, barely exceeding vertex of head; shagreenate sculpture less extensive on mesosoma, especially promesonotum (Figure 670) ..... **11**

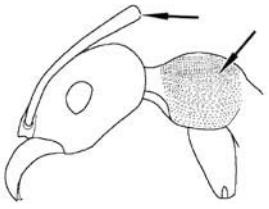

**Figure 669**

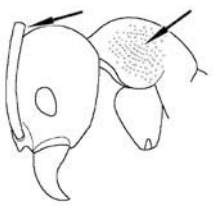

**Figure 670**

11. Eye oblique, smaller (eye width 0.25 < length of side of head capsule) (Figure 671).....
.....***P. ampla perthensis* Crawley**

Eye positioned along midline of head capsule, larger (eye width ≈ 1/3 length of side of head capsule) (Figure 672)...***Pheidole* sp. JDM 1138**

**Figure 671**

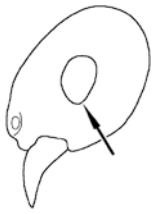

**Figure 672**

***Pheidole***

A combination of a 12-segmented antenna, a three-segmented club, and the propodeum compressed to well below the level of the anterior promesonotum serve to distinguish *Pheidole* from other myrmicines. Generically, these ants are called 'big-headed ants', but the term can be confusing since it is also applied specifically to the pest species *Pheidole megacephala* (Fabricius), particularly outside of Australia. The worker caste is dimorphic, major workers having huge heads. Despite the fact that *Pheidole* species are generally very common throughout Australia, in the SWBP they can be surprisingly scarce in some tracts of native vegetation (e.g. on parts of the sand-plain near Eneabba). On other sites, several species may be found foraging together. Possibly, their virtual absence in some locations reflects the lack of suitable seeds, these ants taking a lot of vegetable matter as well as being general predators and scavengers (Briese and Macauley 1981). The author notes that one large arid and semi-arid area species, *Pheidole hartmeyeri* Forel, typically surrounds its nest with seed husks, mainly those of saltbush (*Atriplex*).

The SWBP does not have a speciose *Pheidole* fauna. Just 13 species are currently identified for the Province, while the status of two other described species has yet to be clarified. Of the 13 species known to occur in the SWBP, three are introduced. The most significant of these is the notorious coastal brown or big-headed ant (*Pheidole megacephala* (Fabricius)). Though identified from stray specimens (possibly in cargo) much earlier, the pest first made its presence known as a colonist in South Perth in 1942 (May and Heterick 2000). The ant now occupies much of the metropolitan area, and is probably assisting, along with the Argentine Ant (*Linepithema humile* (Mayr)), with the ongoing demise of Perth's native ant fauna (Heterick *et al.* 2002). This pest can also be seen in many cities and towns throughout WA. *Pheidole teneriffana* Forel, another African tramp species, also found in the southern USA and the UK, as well as the Caribbean, and the Mediterranean, is currently only confirmed for the Fremantle area, but ants of similar appearance have been seen in Claremont (a Perth suburb) and the wheatbelt town of York. Unlike the case with most nests of *P. megacephala*, this species has diurnally active workers. *Pheidole teneriffana* has not previously been reported from Australia. *Pheidole* sp. JDM 874 is also believed to have been introduced to the Perth metropolitan area and to Adelaide. The provenance of *Pheidole* sp. JDM 874 is possibly southeast Asia, or even tropical Australia, where similar species occur.

*Pheidole ampla perthensis* Crawley is the native species most commonly seen in the south-west corner of the State. The minor workers of this and related forms are difficult to determine with accuracy, many having a relatively uniform morphology. The major workers, however, appear to have more taxonomically useful characters. One of these characters is the morphology of small teeth or denticles to be found on the anteroventral margin of the head capsule (Ogata and Yamane 2003). However, in the case of *P. ampla perthensis*, it is the horizontal ridges near the margin of the vertex in majors that serve to distinguish the ant from a lighter-coloured species, *Pheidole* sp. JDM 75, in which the head capsule is smooth. (The latter ant probably represents *Pheidole ampla* Forel, which was described from material collected on East Wallaby Is. in the Houtman Abrolhos. In support of this notion, worker 'topotypes' in the MCZ collected by Wheeler from the same locality as the type material of *P. ampla* and identified as such are morphologically inseparable from *Pheidole* sp. JDM 75.) *Pheidole ampla perthensis* is quite widespread in the SWBP. Minor workers of *Pheidole ampla perthensis* are very variable in sculpture, those from inland regions having a much smoother, shinier promesonotum compared with ants from mesic coastal or southern, forested areas. In the latter, the promesonotum is duller with varying degrees of microreticulation, along with small striae. Intermediate forms connect the two extremes.

Minor workers near this species from the Westonia region have rather larger and more protruding eyes, and two major workers appear to lack the small anteroventral teeth on the underside

of the head capsule found in *P. ampla perthensis*. More material is needed to determine whether these ants are another species in the complex or just a variant of *P. ampla perthensis*. For the present, the Curtin holdings of this ant have been assigned provisional separate status as *Pheidole* sp. JDM 1138.

*Pheidole bos* Forel was described from a worker collected in Fremantle. *Pheidole* sp. JDM 164 agrees with the description of *P. bos*, but as I have not inspected type specimens of the latter, the identity of the former must remain problematic for the present. *Pheidole* sp. JDM 164 is a generally small species, common throughout the SWBP. Major workers have a rugose vertex, and minor workers have an elongate eye. *Pheidole* sp. near *variabilis* Mayr is also common in the SWBP. Minor workers of this species are minute, with ovate eyes. The major worker, which can vary considerably in size, has a distinctly elongate head capsule. *Pheidole* sp. JDM 338 is a small, yellow, northern species.

*Pheidole hartmeyeri* Forel is the largest *Pheidole* species found in the SWBP. The major workers are medium-sized ants with large, elongate mandibles. In another large, semi-arid species, *Pheidole* sp. JDM 558, the major mandible is more compact and square in shape. The sculpture of the head capsule serves to distinguish the minor workers of both species, this being reticulate in *Pheidole* sp. JDM 558, and shagreenate in *P. hartmeyeri*. *Pheidole* sp. JDM 871 and *Pheidole* sp. JDM 873 are unremarkable small brown ants. In both cases the major worker is unknown. *Pheidole* sp. JDM 871 has been collected at Kadji Lake in the northern wheatbelt, and, outside of the SWBP, near Kalgoorlie and in the Pilbara (Ethel Creek and other locations). *Pheidole* sp. JDM 873 is known from one specimen collected near Balladonia, just north of the SWBP.

***Podomyrma***

1. First gastral tergite with paired white maculae... .....***P. adelaidae*** **(F. Smith)**

   First gastral tergite of uniform colour..... **2**

2. Propodeum unarmed ..... **3**

   Propodeum armed with spines or teeth at its posterior angles..... **6**

3. Mesosoma punctate, punctures well separated and deep; erect setae on body surfaces very sparse, lacking on gaster... ***P. clarki*** **(Crawley)**

   Mesosoma longitudinally striate or striate-reticulate; erect setae abundant and well-distributed on body surfaces, including gaster..... **4**

4. Frons of head capsule with a few longitudinal striae, with large unsculptured space between them (Figure 673) ..... .....***P. macrophthalma*** **Viehmeyer (pt.)**

   Frons of head capsule with many close, parallel, longitudinal striae (e.g. Figure 674) ..... **5**

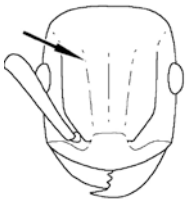

**Figure 673**

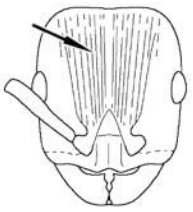

**Figure 674**

5. Humeri of promesonotum smoothly rounded (Figure 675); promesonotum longitudinally striate ..... ***P. elongata*** **Forel**

   Humeri of promesonotum each armed with a small denticle (Figure 676); promesonotum striate-reticulate .....***P. chasei*** **Forel**

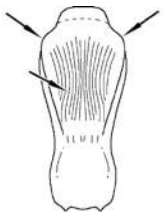

**Figure 675**

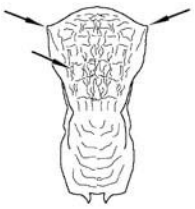

**Figure 676**

6. Node with a dorsal transverse ridge only, spines or denticles lacking (Figure 677)..... **7**

   Node armed with paired spines directed dorsally or laterally (Figure 678)..... **8**

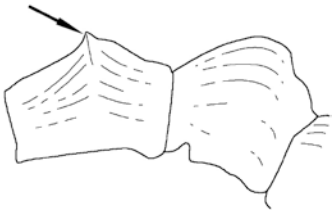

**Figure 677**

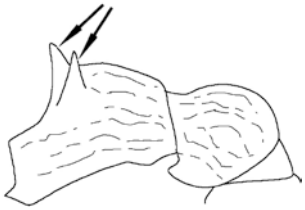

**Figure 678**

7. Top of vertex and dorsum of promesonotal sector areolate (Figure 679) ..... ..... ***P. christae*** **(Forel) (pt.)**

   Top of vertex and dorsum of promesonotal sector mainly smooth and shining with a few longitudinal striae (Figure 680) ..... .....***P. macrophthalma*** **Viehmeyer (pt.)**

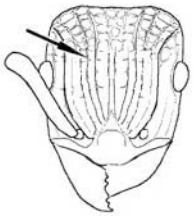

**Figure 679**

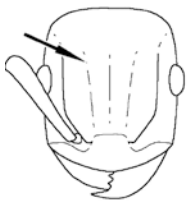

**Figure 680**

8. First gastral tergite with many erect setae; promesonotum deeply foveate-striate; viewed from behind, paired denticles on node directed obliquely upward at angle of 45°>... **9**

   First gastral tergite with at most a pair of erect setae; promesonotal sculpture not as above; viewed from behind, paired denticles on node directed laterally at angle of <30° ..... **10**

9. Each side of dorsum of promesonotum (just posteriad of mesonotal suture) armed with a small, sharp tooth directed vertically (Figure 681) .....***P. libra*** **(Forel)**

   Dorsum of promesonotum unarmed (Figure 682) ..... ***P. christae*** **(Forel) (pt.)**

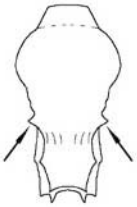

**Figure 681**

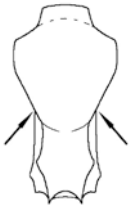

**Figure 682**

10. Head longitudinally striate (Figure 683); dorsum of promesonotum matt, dull ..... .....***P. ferruginea*** **(Clark)**

    Head with transverse striae interconnecting with longitudinal striae, forming a semi-reticulate pattern (Figure 684); dorsum of promesonotum almost smooth, shining ..... ..... ***Podomyrma*** **sp. JDM 997**

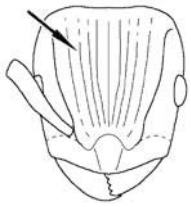

**Figure 683**

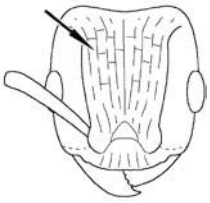

**Figure 684**

The genus *Podomyrma* is one of the few genera of SWBP ants that is principally arboreal. Many of the group are attractive medium-sized ants with rather long, low petioles, which are sometimes armed with small spines or denticles. The swollen tibiae, the 11-segmented antenna and usually the form of the petiole distinguish this genus from similar-looking myrmicines. Of the local myrmicine fauna, only *Adlerzia* and some *Monomorium* possess the same number of antennal segments. However, neither of these has the swollen tibiae of *Podomyrma*. *Podomyrma* nest in tree holes, existing beetle tunnels or in bark layers at the bases of trees. They

are probably primarily predators, but at least one species is known to tend Hemiptera (Gullan and Stewart 1996).

Nine species of *Podomyrma* can be found in the SWBP. Of these *Podomyrma adelaidae* (F. Smith) is the best known, and is widespread throughout temperate Australia and also the Kimberley region. A pair of white markings on the basal gastral tergite renders this ant unmistakeable. *Podomyrma adelaidae* workers can typically be seen foraging on the trunks of eucalypts, particularly smooth-barked eucalypts. The propodeum is unarmed in *Podomyrma clarki* (Crawley), *Podomyrma elongata* Forel and *Podomyrma chasei* Forel. All of these ants can be found in the vicinity of Perth. The largely glabrous *Podomyrma clarki* is probably the rarest of the trio, but has been recorded from coastal woodland in the Fremantle district, in Bold Park and from Eneabba. *Podomyrma chasei* resembles *P. adelaidae* but lacks the pair of white maculae. The promesonotum is longitudinally striate in *Podomyrma elongata*, which is also found on the east coast of Australia.

*Podomyrma macrophthalma* Viehmeyer is a very small *Crematogaster*-like species usually lacking spines or denticles on the node. This ant is occasionally seen in suburban Perth on trees or wooden fence-lines, and is also known from NSW. One specimen, taken by DEC researchers from the Nuyts Wilderness Area, near Walpole, and referred tentatively to this species, is slightly aberrant and has small, lateral teeth on the node. The propodeal angles in this ant are unarmed (normally small denticles are present). *Podomyrma libra* (Forel) is an attractive orange ant with a pair of semi-erect denticles on the petiolar node and small, upright teeth near the promesonotal suture. The ant has been recovered from bark debris at the base of eucalypts and on Wandoo trunks in drier woodlands of the SWBP. The very similar *Podomyrma christae* (Forel) lacks the promesonotal teeth. One example of *P. christae* recently recovered from a pitfall trap from Eneabba lacks teeth on the node, but is in all other respects identical to typical workers of this species. The denticles on the petiolar node are directed more on a horizontal plane in *Podomyrma ferruginea* (Clark) and *Podomyrma* sp. JDM 997. The former has been collected on powder-bark Wandoo trunks at Dryandra, and is occasionally found in the Perth region. The latter has been collected from marri in the Darling Range behind Perth, and also in a pitfall-trap at Mt Barker, on the south coast.

### *Rogeria*

1. In dorsal view, dorsum of node and post-petiole approximately the same size, at most, postpetiole fractionally broader than node (Figure 685); smaller species (HW ≈ 0.5 mm) (widespread) ..... ***R. flavigaster*** **(Clark)**

In dorsal view, dorsum of postpetiole much larger than that of node, postpetiole distinctly broader than node (Figure 686); larger species (HW ≈ 1 mm) (localized, Swan Coastal Plain northwards) ..... ***Rogeria*** **sp. JDM 369**

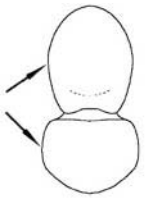

**Figure 685**

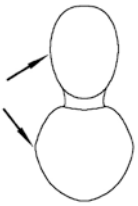

**Figure 686**

Superficially these ants could be mistaken for *Tetramorium* or the *Monomorium longinode* species-group. However, they lack the apical or preapical appendage on the sting and the clypeal ridge before the antennal insertions found in *Tetramorium*, and the anteromedial clypeal setae of *Monomorium*. Members of the *Monomorium longinode* group also lack the propodeal spines found in this group. Apart from the fact that the two species recognized here are terrestrial foragers, nothing more is known of their biology.

The single described species, *Rogeria flavigaster* (Clark), has had a chequered taxonomic history. Originally the species was placed in *Xiphomyrmex*, now a synonym of *Tetramorium*, but was transferred to *Chelaner* by Bolton (1976). In 1987, *Chelaner* became a junior synonym of *Monomorium* (Bolton 1987). The taxon was removed out of the genus *Monomorium* by Heterick (2001), and treated as *incertae sedis*. The species is here provisionally placed under *Rogeria*. The reason for my decision is as follows: based on the worker characters, the taxon can be considered as belonging to Tribe Stenammini according to Bolton's diagnosis for the group (Bolton 2003). Furthermore, the worker antennomere and dental counts, and palp and spur formulae also agree with the corresponding data for *Rogeria* in Appendix 2 from the same work. However, more careful analysis is required, including examination of the reproductives, for this placement to be confirmed. *Rogeria flavigaster* is quite common in woodlands throughout temperate Australia, and can be found

in newly developed suburbs in Perth, although it appears unable to persist over time in built up areas. The second species is rather larger than *R. flavigaster* and also differs in the proportions of the petiolar node and postpetiole. The latter ant appears to have a limited range in woodland and heathland north of Perth to about Geraldton.

***Solenopsis***

1. Eye absent or represented by a minute, pigmented speck (Figure 687)..... ..... ***S. belisarius*** **Forel**

   Eye small but distinct (Figure 688) ..... .....***S. clarki*** **Crawley**

**Figure 687**

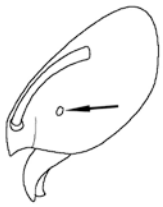

**Figure 688**

Endemic Australian *Solenopsis* species all belong to the subgenus *Diplorhoptrum* (Andersen 2000), commonly known as 'thief ants'. These are characteristically very small to minute yellow, small-eyed ants that are known to be lestobiotic, i.e. they steal the prey or brood of other ants or termites. The 10-segmented antenna with a two-segmented club will immediately separate these small ants from *Monomorium* species, with which they are easily confused by the novice, and the median clypeal seta distinguishes them from *Carebara* minor workers.

Two species of *Solenopsis* occur in the SWBP. *Solenopsis clarki* Crawley is widespread in the SWBP, and may extend much further north (what appears to be the same species also occurs in the Kimberley region). This species shows monophasic allometric differences between smaller minor workers and larger major workers. The two sub-castes possess a similar morphology but the major worker is larger and darker in colour with a broader head capsule. Stray workers or nests of *Solenopsis clarki* are often found when galleries in the nests of other ant species are excavated. Nests can also be found under rocks and pieces of wood or bark. *Solenopsis belisarius* Crawley has vestigial eyes and strongly resembles *Monomorium hildebrandti* group sp. JDM 438. This ant appears to be restricted to the mid-north, collections centring on and around the Geraldton and Carnarvon regions.

Officers of the WA Department of Agriculture have recently intercepted an introduced member of a quite different subgenus, to which belong the Neotropical fire ants, in Perth markets. This is *Solenopsis geminata* (Fabricius), a potential threat to the environment and to agriculture should it become established in the SWBP. The ant has colonised parts of northern Australia, and may occur in the north of this State.

***Strumigenys***

1. Setae on promesonotum thickened and inwardly curved, like those on head capsule (Figure 689) .....***S. quinquedentata*** **Crawley**

   Setae on promesonotum normal, erect, unlike thickened, curved setae on head capsule (Figure 690) .....***S. perplexa*** **(F. Smith)**

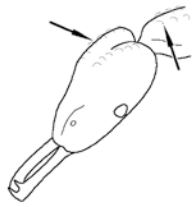

**Figure 689**

**Figure 690**

Ants of the two *Strumigenys* species found in the SWBP are the most common of the Dacetini occurring here. The four or six-segmented antenna, and the thin and elongate mandibles serve to categorize the genus. In the two SWBP species, spongiform cuticle surrounds the petiole, postpetiole and the lower part of the gaster. *Strumigenys* species are either specialist predators of Collembola, or take a range of small arthropods (Shattuck 1999). The genus has recently been revised by Bolton (2000).

*Strumigenys quinquedentata* Crawley has flat, spatulate setae on the mesosoma, and is quite common in the SW corner of the State, occasionally being found in gardens in suburban Perth. In sandy soils, several entrance holes may be found close together with a moderate amount of excavated

soil surrounding each of them. The emerging ants move slowly and deliberately. Though not officially listed for WA by Bolton (2000) or Taylor and Brown (1985), *Strumigenys perplexa* (Smith) has much the same range as *S. quinquedentata* in the SWBP. This species has simple, erect setae on the dorsum of the mesosoma.

*Tetramorium*

1. Antenna 12-segmented (introduced spp.)..... **2**

   Antenna 11-segmented (native spp) ..... **3**

2. Anterior margin of clypeus entire (Figure 691); smaller species (TL ≈ 2 – 2.5 mm)..... .....***T. simillimum*** **(F. Smith)**

   Anterior margin of clypeus notched (Figure 692); larger species (TL ≈ 3.5 – 4.5 mm) ..... .....***T. bicarinatum*** **(Nylander)**

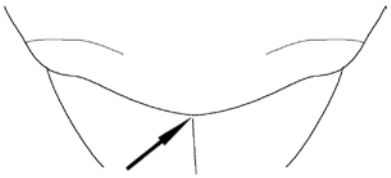

**Figure 691**

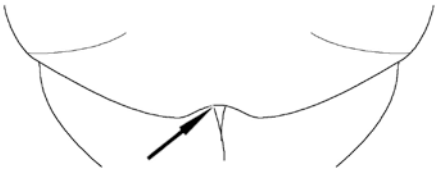

**Figure 692**

3. Dorsum of petiole and postpetiole smooth and shining, almost devoid of sculpture (black species).....***Tetramorium*** **sp. JDM 522**

   At least one of the nodes with distinct sculpture (species with some colour)..... **4**

4. Propodeum unarmed or with vestigial denticles at posterior angles..... .....***Tetramorium*** **sp. JDM 515**

   Propodeum armed with moderately stout spines..... **5**

5. In profile, mesosoma smoothly curved, without a hint of a metanotal groove (Figure 693a); dorsum of petiolar node large and triangular in cross section (Figure 693b)..... .....***Tetramorium*** **sp. JDM 1007**

   In profile, promesonotum gradually declining towards propodeum, not smoothly rounded (Figure 694); metanotal groove usually indicated by shallow depression or lateral indentations; dorsum of petiolar node smaller and rectangular in cross-section (e.g. Figure 695) ..... **6**

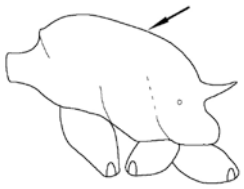

**Figure 693a**

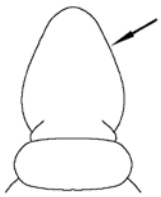

**Figure 693b**

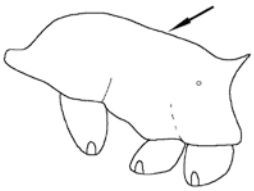

**Figure 694**

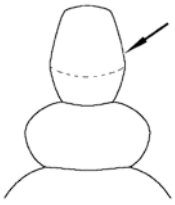

**Figure 695**

6. Antennal scrobes distinctly continuing to or close to vertex of head, sculpture within scrobes often reduced to fine punctation with longitudinal rugulae absent or vestigial (Figure 696) ..... **7**

   Antennal scrobes not continuing beyond eye, often indistinct; sculpture within scrobes mostly similar to rest of vertex with longitudinal rugulae distinct (Figure 697)... **10**

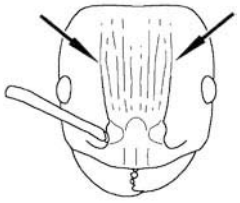

**Figure 696**

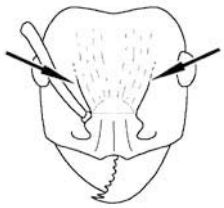

**Figure 697**

7. Eye very large (ocular diameter > 0.3 x HW); eye situated behind midpoint of head (Figure 698) ..... ***T. megalops*** **Bolton**

   Eye smaller (ocular diameter < 0.3 x HW); eye situated at or close to midlength of head capsule (Figure 699) ..... **8**

**Figure 698**

**Figure 699**

8. Brown species .....***Tetramorium*** **sp. JDM 884**

   Concolorous orange, or orange with darker head capsule ..... **9**

9. Clypeus not transversely concave or with median notch; viewed from above, dorsum of node trapezoid in shape (Figure 700), the anterior margin shorter than the posterior margin, and the dorsal surface distinctly longer than broad; base of gaster usually sculptured with fine, parallel, longitudinal striolae or finely microreticulate..... .....***T. striolatum*** **Viehmeyer**

   Clypeus transversely concave or with median notch; viewed from above, dorsum of node square, about as wide as long (Figure 701); base of gaster either smooth and shining or with faint, superficial microreticulation..... .....***T. viehmeyeri*** **Forel**

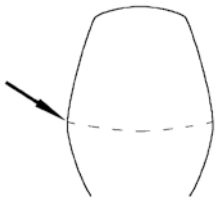

**Figure 700**

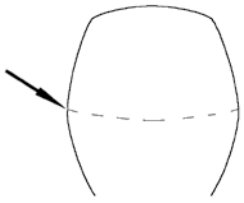

**Figure 701**

10. Postpetiolar dorsum smooth and shining; head, mesosoma and nodes reddish-orange, gaster and appendages yellow ..... .....***Tetramorium*** **sp. JDM 1072**

    Postpetiolar dorsum sculptured; often bicoloured black- or brown-and-yellow, or reddish-brown-and-orange, in light coloured forms coxae nearly always darker than mesosoma (possibly two or more species involved here).. .....***T. impressum*** **(Viehmeyer)**

The local *Tetramorium* species are difficult to separate, most of the taxa in the SWBP belonging to the *T. striolatum* species-group (*sensu* Bolton 1977). All of the local native species have 11-segmented antennae. Two introduced species found in the Province can immediately be recognized by their 12-segmented antennae. Workers of the genus *Tetramorium* may be confused with large, orange or reddish *Monomorium* in the *Chelaner* group of taxa, but have an apical or preapical appendage on the sting, which is lacking in *Monomorium*. They also have the clypeal region just below the antennal sockets raised into a sharp ridge. *Tetramorium* are general scavengers, predators, and, in the case of some species, seed collectors (Briese and Macauley 1981). *Tetramorium impressum* (Viehmeyer) is common in newly rehabilitated sand mines (pers. obs.; also mentioned but not named in Bisevac and Majer 1999) where it may collect seeds of grasses or herbs. This species is much less abundant in sites representing later successional stages.

Some 10 taxa are tentatively recognized in the SWBP, but the taxonomic limits of *Tetramorium striolatum* Viehmeyer and its close allies are difficult to determine, so the final species count may be slightly different. Of those species that can be recognized without difficulty, the two exotic taxa, *Tetramorium simillimum* (F. Smith) and *Tetramorium bicarinatum* (Nylander) are common in Perth gardens, and have a wide distribution throughout Australia. (The range for both species given by

Brown and Taylor (1985) is probably understated; e.g. I have seen *T. bicarinatum* in Port Augusta, SA, although this State is not listed by the former authors.) Unlike some other exotic myrmicines in Australia, these two species do not seem to adversely affect the native ant fauna.

*Tetramorium* sp. JDM 1007 cannot be mistaken for any other *Tetramorium* in the SWBP: it appears to belong to the tropical *T. tortuosum* species-group, and is known from a handful of records from the Shark Bay region. One related species occurs in the north Kimberley and another (DEC material) has been collected in the Pilbara. Of the remainder of the *Tetramorium* species, all are from the *T. striolatum* species-group. The jet-black species *Tetramorium* sp. JDM 522 is known only from undisturbed heathland in a mining lease at Eneabba and from one series from Kensington bushland, in Perth. At Eneabba, even the oldest rehabilitated sites nearby do not support the ant. *Tetramorium* sp. JDM 515, also known from Eneabba as well as Nanga Stn., characteristically lacks strong teeth or denticles on the propodeal angles.

The remaining taxa are somewhat more difficult to distinguish. *Tetramorium megalops* Bolton, with large eyes, and *Tetramorium viehmeyeri* Forel, with a supposedly distinctive clypeal sculpture, are two semi-arid species. Type specimens of *T. megalops*, which I have seen in the MCZ, are not remarkable compared with other *Tetramorium* and the largish eye, though not the broad node, is shared with *T. viehmeyeri*. The type material for *T. megalops* was collected to the north of the SWBP, and the species may not occur in that Province, but is included in the key in the event that some populations may be found on the fringes of the Mallee Botanical District of the SWBP.

*Tetramorium viehmeyeri*, to my mind, is somewhat problematic. The holotype female may well have been destroyed in WW II (Taylor and Brown 1985). I have only seen the (unfortunately headless!) dealated queen holotype of *Tetramorium viehmeyeri venustus* Wheeler (WAM). This taxon was synonymised with *T. viehmeyeri* by Bolton (1977). However, three worker specimens on the same pin from the Mt Magnet area (in the ANIC Collection), identified by R. W. Taylor as *T. viehmeyeri*, do not show the supposedly characteristic clypeal feature very well (i.e. one worker does, two do not). I suspect the structure of the clypeus may be variable. However, in the event that the acquisition of more material may illuminate this problem, I am retaining the distinctive nature of the clypeus in the key as a diagnostic feature for the species. In other respects, what I think is likely to be *T. viehmeyeri* has dark red workers with lighter-coloured gasters. The workers are larger than those of *T. striolatum* and, when seen in profile, have a narrower petiolar node that is as higher than wide. Nominal *T. viehmeyeri* in the Curtin Ant Collection have mostly been collected in the Newman area in the Pilbara, but several specimens of this species have been collected at Westonia within the SWBP.

The synonymy of the supposed subspecies *Tetramorium viehmeyeri venustus* with the type species is questionable, not least because of the different phytogeographic region represented (the Swan Coastal Plain in the South-West Botanical Province versus the semi-arid Murchison in the Eremaean Botanical Province). No workers belonging to this subspecies ever appear to have been collected, *T. viehmeyeri venustus* having been described from a single, dealated queen. This ant is possibly something else, the most probable candidate being *T. impressum* (queens and workers of which also share the narrow petiole and often an anteromedial clypeal notch with *T. viehmeyeri*, the bicoloured appearance of many *T. impressum* specimens also agreeing with Wheeler's (1934) description). Since the whereabouts of the type specimen of *Tetramorium viehmeyeri venustus* are now known, this type can be compared with indubitable queen material of *Tetramorium viehmeyeri*, should the identity of such material be established.

*Tetramorium* sp. JDM 884, in common with *T. viehmeyeri* and *T. striolatum*, also possesses distinct, though shallow, antennal scrobes that continue to near the vertex of the head capsule. Within the scrobe, the sculpture of this species and *T. striolatum* is usually reduced (less so in large specimens of *T. striolatum*). Tetramorium sp. JDM 884, however, is uniformly brown (*T. striolatum* is orange or reddish-orange). *Tetramorium striolatum* here includes reddish specimens with a finely striolate basal sector of the first gastral tergite, and relatively massive petiolar nodes. Some doubt is here expressed that these are conspecific with other specimens that are orange, with, at most, basally shagreenate gasters and with less massive petiolar nodes.

Workers of *Tetramorium impressum* (Viehmeyer) and *Tetramorium* sp. JDM 1072 do not possess a distinct antennal scrobe beyond the level of the eye. *Tetramorium impressum* probably should be regarded as a species complex. Workers with black foreparts, yellow gaster and deeply impressed striae may well be genetically distinct from those that are reddish and more finely striate. However, the sculpture and shape of the node are identical in the two groups. Both forms also key out at *T. impressum* using Bolton's (1977) taxonomic key to Australian *Tetramorium* species. All are widespread throughout the SWBP. *Tetramorium* sp. JDM 1072 has a smooth postpetiolar dorsum, and is known only from Mt Gibson Station in the far NE of the SWBP.

## APPENDIX 1

**Ant species and morphospecies recorded from the SWBP (species not in Curtin Ant Collection shown in bold; introduced species indicated by *; square brackets indicate likely synonymy)**

### DOLICHODERINAE

***Anonychomyrma***

*Anonychomyrma itinerans perthensis* (Forel)
*Anonychomyrma nitidiceps* (André)
*Anonychomyrma* sp. JDM 835

***Arnoldius***

*Arnoldius* sp. JDM 170
*Arnoldius* sp. JDM 433

***Doleromyrma***

*Doleromyrma darwiniana fida* (Forel)
*Doleromyrma rottnestensis* (Wheeler) comb. nov.
(= *Tapinoma rottnestense* Wheeler)

***Dolichoderus***

*Dolichoderus angusticornis* Clark
*Dolichoderus clusor* Forel
*Dolichoderus formosus* Clark
*Dolichoderus glauerti* Wheeler
***Dolichoderus nigricornis*** Clark
*Dolichoderus occidentalis* Clark
*Dolichoderus reflexus* Clark
*Dolichoderus ypsilon* Forel
*Dolichoderus ypsilon niger* Forel
*Dolichoderus ypsilon rufotibialis* Forel
*Dolichoderus* sp. JDM 513
*Dolichoderus* sp. JDM 1106

***Froggattella***

*Froggattella kirbii* Lowne
*Froggattella latispina* Wheeler

***Iridomyrmex***

*Iridomyrmex agilis* Forel
*Iridomyrmex agilis* gp. sp. JDM 85
*Iridomyrmex bicknelli* Emery
*Iridomyrmex bicknelli brunneus* Forel
[=*Iridomyrmex gracilis minor* Forel]
*Iridomyrmex calvus* gp. sp. JDM 1069
*Iridomyrmex chasei* Forel
[= *Iridomyrmex chasei yalgooensis* Forel]
*Iridomyrmex chasei concolor* Forel
*Iridomyrmex conifer* Forel
*Iridomyrmex discors* Forel
*Iridomyrmex dromus* Clark
*Iridomyrmex exsanguis* Forel
*Iridomyrmex gracilis spurcus* Wheeler
*Iridomyrmex greensladei* Shattuck
*Iridomyrmex hartmeyeri* Forel
*Iridomyrmex hartmeyeri* gp. sp. JDM 849
*Iridomyrmex hesperus* Shattuck
*Iridomyrmex innocens* Forel
(= *Iridomyrmex argutus* Shattuck syn. nov.)
(= *Iridomyrmex occiduus* Shattuck syn. nov.)
*Iridomyrmex lividus* Shattuck
*Iridomyrmex mattiroloi continentis* Forel
*Iridomyrmex mattiroloi splendens* Clark
[= *Iridomyrmex vicinus* Clark]
*Iridomyrmex mattiroloi* complex sp. JDM 845
*Iridomyrmex notialis* Shattuck
*Iridomyrmex prismatis* Shattuck
*Iridomyrmex reburrus* Shattuck
*Iridomyrmex rufoniger domesticus* Forel
*Iridomyrmex rufoniger suchieri* Forel (2 pops.)
*Iridomyrmex* near *rufoniger suchieri* (sp. JDM 314)
***Iridomyrmex setoconus*** Shattuck and McMillan
*Iridomyrmex turbineus* Shattuck
*Iridomyrmex viridiaeneus* Viehmeyer
*Iridomyrmex* sp. JDM 133
*Iridomyrmex* sp. JDM 846

***Linepithema***

*Linepithema humile* (Mayr)*

***Nebothriomyrmex***

*Nebothriomyrmex majeri* Dubovikov

***Ochetellus***

*Ochetellus glaber* gp. sp. JDM 19
*Ochetellus* sp. JDM 851

***Papyrius***

*Papyrius nitidus* (Mayr)
*Papyrius* sp. JDM 666

***Tapinoma***

*Tapinoma melanocephalum* (Fabricius)*
*Tapinoma* sp. JDM 78
*Tapinoma* sp. JDM 981

***Technomyrmex***

*Technomyrmex jocosus* Forel

**FORMICINAE**

***Acropyga***

*Acropyga myops* Forel

***Acropyga pallida*** (Donisthorpe)

***Calomyrmex***

*Calomyrmex glauerti* Clark

*Calomyrmex* ANIC 1 sp. JDM 190

***Camponotus***

*Camponotus arcuatus* complex sp. JDM 694

*Camponotus armstrongi* McAreavey

*Camponotus capito ebenithorax* Forel

*Camponotus capito ebenithorax* Forel ("black soma")

*Camponotus ceriseipes* Clark

*Camponotus ceriseipes* complex sp. JDM 105

*Camponotus chalceus* Crawley

*Camponotus cinereus amperei* Forel

*Camponotus cinereus notterae* Forel

*Camponotus clarior* Forel

*Camponotus claripes* Mayr

*Camponotus claripes marcens* Forel

*Camponotus claripes minimus* Crawley

*Camponotus claripes nudimalis* Forel

*Camponotus claripes* complex sp. JDM 430

*Camponotus claripes* complex sp. JDM 767

*Camponotus claripes* complex sp. JDM 779

*Camponotus claripes* gp. sp. JDM 63

*Camponotus claripes* gp. sp. JDM 288

*Camponotus claripes* gp. sp. JDM 1073

*Camponotus cowlei* Froggatt

*Camponotus darlingtoni* Wheeler

*Camponotus discors* Forel

*Camponotus discors* complex sp. JDM 772

*Camponotus discors* complex sp. JDM 1104

*Camponotus donnellani* Shattuck and McArthur

*Camponotus dromas* Santschi

*Camponotus dryandrae* McArthur and Adams

*Camponotus ephippium* (F. Smith)

*Camponotus* near *ephippium* (sp. JDM 431)

*Camponotus ephippium* complex sp. JDM 775

*Camponotus evae zeuxis* Forel

*Camponotus gasseri* (Forel)

*Camponotus gibbinotus* Forel

*Camponotus gouldianus* Forel

*Camponotus hartogi* Forel

*Camponotus innexus* Forel

*Camponotus johnclarki* Taylor

*Camponotus longideclivis* McArthur and Adams

*Camponotus longifacies* McArthur

*Camponotus lownei* Forel

*Camponotus lownei* complex sp. JDM 616

*Camponotus lownei* complex sp. JDM 761

*Camponotus macrocephalus* gp. sp. JDM 927

*Camponotus michaelseni* Forel

[= *C. tumidus* Crawley]

[= *M. walkeri bardus* Forel]

*Camponotus molossus* Forel

*Camponotus nigriceps* (F. Smith)

*Camponotus nigroaeneus* gp. sp. JDM 1031

*Camponotus oetkeri* Forel

*Camponotus oetkeri voltai* Forel

[= *C. rudis* McArthur]

*Camponotus pawseyi* McArthur

***Camponotus perjurus*** Shattuck and McArthur

*Camponotus pitjantjatarae* McArthur

*Camponotus postcornutus* Clark

*Camponotus prosseri* Shattuck and McArthur

*Camponotus prostans* Forel

*Camponotus rufus* Crawley

*Camponotus scotti* McArthur

*Camponotus scratius* Forel

*Camponotus simpsoni* McArthur

*Camponotus sponsorum* Forel

*Camponotus terebrans* (Lowne)

*Camponotus tricoloratus* Clark

*Camponotus tristis* Clark

*Camponotus versicolor* Clark

*Camponotus walkeri* Forel

*Camponotus whitei* Wheeler

*Camponotus wiederkehri* Forel

*Camponotus wiederkehri* gp. sp. JDM 924

*Camponotus wiederkehri* gp. sp. JDM 925

*Camponotus* sp. JDM 26

*Camponotus* sp. JDM 695

*Camponotus* sp. JDM 771

*Camponotus* sp. JDM 1038

***Melophorus***

*Melophorus* near *aeneovirens* (sp. JDM 545)

*Melophorus bruneus* complex sp. JDM 520

*Melophorus bruneus* complex sp. JDM 600

*Melophorus insularis* Wheeler

*Melophorus ludius sulla* Forel
*Melophorus majeri* Agosti
*Melophorus mjobergi* Forel
*Melophorus mjobergi* complex sp. JDM 1121
*Melophorus potteri* McAreavey
*Melophorus potteri* group sp. JDM 1032
*Melophorus potteri* group sp. JDM 1082
*Melophorus turneri* Forel
*Melophorus turneri perthensis* Wheeler
*Melophorus turneri* complex sp. JDM 791
*Melophorus wheeleri* Forel
*Melophorus wheeleri* complex sp. JDM 783
*Melophorus wheeleri* complex sp. JDM 1077
*Melophorus* ANIC 3 (sp. JDM 59)
*Melophorus* sp. JDM 176
*Melophorus* sp. JDM 199
*Melophorus* sp. JDM 230
*Melophorus* sp. JDM 470
*Melophorus* sp. JDM 500
*Melophorus* sp. JDM 613
*Melophorus* sp. JDM 784
*Melophorus* sp. JDM 786
*Melophorus* sp. JDM 787
*Melophorus* sp. JDM 788
*Melophorus* sp. JDM 1063
*Melophorus* sp. JDM 1070
*Melophorus* sp. JDM 1102
*Melophorus* sp. JDM 1105
*Melophorus* sp. JDM 1180

***Myrmecorhynchus***
*Myrmecorhynchus emeryi* André

***Notoncus***
*Notoncus* cf. *capitatus* Forel
*Notoncus enormis* Szabó
*Notoncus gilberti* Forel
*Notoncus hickmani* Clark
*Notoncus* sp. JDM 487

***Opisthopsis***
*Opisthopsis rufithorax* Emery

***Paratrechina***
*Paratrechina braueri glabrior* (Forel)
*Paratrechina longicornis* (Latreille)*
*Paratrechina minutula* (Forel)
*Paratrechina minutula* gp. sp. JDM 916
*Paratrechina* ANIC sp. 3

***Plagiolepis***
*Plagiolepis lucidula* Wheeler
*Plagiolepis squamulosa* Wheeler
*Plagiolepis* sp. JDM 189

***Polyrhachis***
*Polyrhachis* (*Campomyrma*) *femorata* F. Smith
*Polyrhachis* (*Campomyrma*) *gravis* Clark
*Polyrhachis* (*Campomyrma*) cf. *hirsuta* Mayr
*Polyrhachis* (*Campomyrma*) *leae* Forel
*Polyrhachis* (*Campomyrma*) *macropa* Wheeler
*Polyrhachis* (*Campomyrma*) *ops* Forel
*Polyrhachis* (*Campomyrma*) *phryne* Forel
*Polyrhachis* (*Campomyrma*) *pyrrhus* Forel
*Polyrhachis* (*Campomyrma*) *schwiedlandi* Forel
*Polyrhachis* (*Campomyrma*) *sidnica* complex sp. JDM 390
*Polyrhachis* (*Campomyrma*) *sidnica* complex sp. JDM 671
*Polyrhachis* (*Campomyrma*) sp. JDM 118
*Polyrhachis* (*Campomyrma*) sp. JDM 670
*Polyrhachis* (*Campomyrma*) sp. JDM 802
*Polyrhachis* (*Campomyrma*) sp. JDM 805
*Polyrhachis* (*Campomyrma*) sp. JDM 1010
*Polyrhachis* (*Chariomyrma*) *'aurea'* sp. A
*Polyrhachis* (*Hagiomyrma*) *ammonoeides* Roger

***Prolasius***
*Prolasius antennatus* McAreavey
*Prolasius hemiflavus* Clark
*Prolasius reticulatus* McAreavey
[= *P. wheeleri* McAreavey]
*Prolasius* sp. JDM 109
*Prolasius* sp. JDM 551
*Prolasius* sp. JDM 957
***Prolasius*** sp. JDM 1044 (loan)
*Prolasius* sp. JDM 1120

***Stigmacros***
*Stigmacros aemula* Forel
*Stigmacros anthracina* McAreavey
*Stigmacros brachytera* McAreavey
*Stigmacros elegans* McAreavey
***Stigmacros flava*** McAreavey
*Stigmacros epinotalis* McAreavey
*Stigmacros glauerti* McAreavey
[? = *Stigmacros brooksi* McAreavey]
[? = *Stigmacros castanea* McAreavey]
[? = *Stigmacros clarki* McAreavey]
[? = *Stigmacros rectangularis* McAreavey]

*Stigmacros inermis* McAreavey
*Stigmacros occidentalis* (Crawley)
*Stigmacros pilosella* (Viehmeyer)
*Stigmacros pusilla* McAreavey
*Stigmacros reticulata* Clark
*Stigmacros spinosa* McAreavey
*Stigmacros stanleyi* McAreavey
*Stigmacros termitoxena* Wheeler
*Stigmacros* (*Cyrtostigmacros*) sp. JDM 1067
*Stigmacros* sp. JDM 115
*Stigmacros* sp. JDM 188
*Stigmacros* sp. JDM 341
*Stigmacros* sp. JDM 396
*Stigmacros* sp. JDM 443
*Stigmacros* sp. JDM 622
*Stigmacros* sp. JDM 829
*Stigmacros* sp. JDM 831
*Stigmacros* sp. JDM 832
***Stigmacros*** sp. JDM 1045 (loan)
***Stigmacros*** sp. JDM 1046 (loan)
*Stigmacros* sp. JDM 1050
*Stigmacros* sp. JDM 1135

**MYRMECIINAE**

***Myrmecia***
***Myrmecia acuta*** Ogata and Taylor
*Myrmecia analis* Mayr
*Myrmecia arnoldi* Clark
*Myrmecia callima* (Clark)
*Myrmecia chasei* Forel
*Myrmecia clarki* Crawley
*Myrmecia dispar* (Clark)
*Myrmecia desertorum* Wheeler
*Myrmecia elegans* (Clark)
*Myrmecia erecta* Ogata and Taylor
*Myrmecia forceps* Roger
*Myrmecia fulgida* Clark
*Myrmecia fuscipes* Clark
*Myrmecia gratiosa* Clark
***Myrmecia inquilina*** Douglas and Brown
*Myrmecia ludlowi* Crawley
*Myrmecia mandibularis* F. Smith
*Myrmecia michaelseni* Forel
***Myrmecia nigriceps*** Mayr
*Myrmecia nigriscapa* Roger
*Myrmecia occidentalis* (Clark)
***Myrmecia pavida*** Clark
*Myrmecia picta* F. Smith
*Myrmecia pilosula* group
***Myrmecia picticeps*** Clark
*Myrmecia regularis* Crawley
*Myrmecia rubripes* Clark
*Myrmecia rugosa* Wheeler
*Myrmecia swalei* Crawley
*Myrmecia tepperi* Emery
***Myrmecia testaceipes*** (Clark)
*Myrmecia urens* complex sp. JDM 1
*Myrmecia urens* complex sp. JDM 71
*Myrmecia urens* complex sp. JDM 728
*Myrmecia varians* Mayr
*Myrmecia vindex* F. Smith

***Nothomyrmecia***
*Nothomyrmecia macrops* Clark

**PSEUDOMYRMECINAE**

***Tetraponera***
*Tetraponera punctulata* F. Smith

**CERAPACHYINAE**

***Cerapachys***
***Cerapachys bicolor*** (Clark)
***Cerapachys brevicollis*** (Clark)
*Cerapachys brevis* (Clark)
*Cerapachys clarki* (Crawley)
*Cerapachys edentatus* (Forel)
*Cerapachys elegans* (Wheeler)
*Cerapachys fervidus* (Wheeler)
*Cerapachys flammeus* (Clark)
*Cerapachys gilesi* (Clark)
*Cerapachys greavesi* (Clark)
*Cerapachys incontentus* Brown
*Cerapachys latus* Brown
*Cerapachys longitarsus* (Mayr)*
*Cerapachys nigriventris* (Clark)
***Cerapachys picipes*** (Clark)
*Cerapachys princeps* (Clark)
*Cerapachys punctatissimus* (Clark)
*Cerapachys ruficornis* (Clark)
*Cerapachys simmonsae* (Clark)
*Cerapachys sjostedti* Forel
*Cerapachys varians* (Clark)
*Cerapachys* sp. JDM 574
*Cerapachys* sp. JDM 745
*Cerapachys* sp. JDM 746
*Cerapachys* sp. JDM 941

*Cerapachys* sp. JDM 1040
*Cerapachys* sp. JDM 1103

***Sphinctomyrmex***
*Sphinctomyrmex emeryi* Forel
*Sphinctomyrmex imbecilis* Forel
*Sphinctomyrmex occidentalis* (Clark)

**LEPTANILLINAE**

***Leptanilla*** (males in Collection)
***Leptanilla swani*** Wheeler (worker)

**AMBLYOPONINAE**

***Amblyopone***
***Amblyopone aberrans*** Wheeler
*Amblyopone australis* Erichson
*Amblyopone clarki* Wheeler
***Amblyopone glauerti*** (Clark)
***Amblyopone michaelseni*** Forel

**PONERINAE**

***Anochetus***
*Anochetus armstrongi* McAreavey

***Hypoponera***
*Hypoponera congrua* (Wheeler)
*Hypoponera eduardi* (Forel)*

***Leptogenys***
*Leptogenys clarki* Wheeler
*Leptogenys darlingtoni* Wheeler
*Leptogenys neutralis* Forel

***Myopias***
*Myopias tasmaniensis* Wheeler

***Odontomachus***
*Odontomachus ruficeps* Smith

***Pachycondyla***
*Pachycondyla* (*Bothro.*) *denticulata* gp. sp. JDM 730
*Pachycondyla* (*Bothroponera*) *regularis* Forel
*Pachycondyla* (*Brachyponer*a) *lutea* (Mayr)
*Pachycondyla* (*Trachy.*) *rufonigra* (Clark)
(= *P. clarki* (Wheeler) syn. rev.)

***Platythyrea***
*Platythyrea brunnipes* (Clark)
*Platythyrea dentinodis* (Clark)
*Platythyrea micans* (Clark)
*Platythyrea parallela* (F. Smith)
*Platythyrea turneri* Forel

***Ponera***
*Ponera* sp. JDM 1122

**ECTATOMMINAE**

***Rhytidoponera***
*Rhytidoponera anceps* Emery
***Rhytidoponera anceps*** group sp. ANIC 44
*Rhytidoponera crassinoda* (Forel)
*Rhytidoponera dubia* gp. sp. JDM 904
*Rhytidoponera flavicornis* Clark
*Rhytidoponera foveolata* Crawley
*Rhytidoponera inornata* Crawley
*Rhytidoponera levior* Crawley
*Rhytidoponera mayri* (Emery)
*Rhytidoponera metallica* (F. Smith)
*Rhytidoponera metallica* gp. sp. JDM 1097
*Rhytidoponera metallica* gp. sp. JDM 1098
*Rhytidoponera micans* Clark
*Rhytidoponera micans* gp. sp. JDM 576
*Rhytidoponera punctigera* Crawley
*Rhytidoponera rufonigra* Clark
*Rhytidoponera taurus* (Forel)
*Rhytidoponera tyloxys* Brown and Douglas
*Rhytidoponera violacea* (Forel)
*Rhytidoponera* sp. JDM 736

**HETEROPONERINAE**

***Heteroponera***
*Heteroponera imbellis* (Emery)
*Heteroponera* sp. JDM 92
*Heteroponera* sp. JDM 732

**PROCERATIINAE**

***Discothyrea***
*Discothyrea crassicornis* Clark
*Discothyrea turtoni* Clark

**MYRMICINAE**

***Adlerzia***
*Adlerzia froggatti* (Forel)

***Anisopheidole***
*Anisopheidole antipodum* (F. Smith)

***Aphaenogaster***
*Aphaenogaster poultoni* Crawley

*Aphaenogaster* sp. JDM 854

***Cardiocondyla***
*Cardiocondyla 'nuda'* (Mayr)*

***Carebara***
*Carebara* sp. JDM 440

***Colobostruma***
***Colobostruma australis*** Brown
*Colobostruma cerornata* Brown
*Colobostruma elliotti* (Clark)
***Colobostruma froggatti*** (Forel)
*Colobostruma mellea* Shattuck
*Colobostruma nancyae* Brown
***Colobostruma papulata*** Brown

***Crematogaster***
*Crematogaster cornigera* gp. sp. JDM 126
*Crematogaster dispar* Forel
*Crematogaster frivola* Forel
(= *Crematogaster perthensis* Crawley syn. nov.)
[=*Crematogaster frivola sculpticeps* Forel]
*Crematogaster laeviceps chasei* Forel
*Crematogaster laeviceps* gp. sp. JDM 858
*Crematogaster queenslandica gilberti* Forel
*Crematogaster queenslandica* gp. sp. JDM 428
*Crematogaster queenslandica* gp. sp. JDM 1099
*Crematogaster* sp. JDM 859

***Epopostruma***
*Epopostruma frosti* (Brown)
*Epopostruma inornata* Shattuck
*Epopostruma kangarooensis* Shattuck
***Epopostruma lattini*** Shattuck
***Epopostruma mercurii*** Shattuck
*Epopostruma natalae* Shattuck
*Epopostruma quadrispinosa* (Forel)
*Epopostruma sowestensis* Shattuck

***Mayriella***
***Mayriella occidua*** Shattuck

***Meranoplus***
*Meranoplus dimidiatus* F. Smith
*Meranoplus dimidiatus* complex sp. JDM 423
*Meranoplus diversus* F. Smith
*Meranoplus fenestratus* F. Smith
*Meranoplus ferrugineus* Crawley
*Meranoplus ferrugineus* complex sp. JDM 267
*Meranoplus ferrugineus* complex sp. JDM 424
***Meranoplus mcarthuri*** Schödl (?in SWBP)
*Meranoplus oceanicus* F. Smith
*Meranoplus puryi* complex sp. JDM 968
*Meranoplus rugosus* Crawley
*Meranoplus rugosus* gp. sp. JDM 677
*Meranoplus similis* Viehmeyer
*Meranoplus* sp. JDM 74
*Meranoplus* sp. JDM 491
*Meranoplus* sp. JDM 627
*Meranoplus* sp. JDM 673
*Meranoplus* sp. JDM 866
*Meranoplus* sp. JDM 922
*Meranoplus* sp. JDM 967
*Meranoplus* sp. JDM 1071
*Meranoplus* sp. JDM 1101
*Meranoplus* sp. JDM 1107

***Mesostruma***
*Mesostruma eccentrica* Taylor
*Mesostruma laevigata* Brown
*Mesostruma loweryi* Taylor
*Mesostruma spinosa* Shattuck

***Monomorium***
*Monomorium aithoderum* Heterick
*Monomorium anthracinum* Heterick
*Monomorium arenarium* Heterick
*Monomorium bicorne* Forel
*Monomorium bihamatum* Heterick
*Monomorium brachythrix* Heterick
*Monomorium centrale* Forel
***Monomorium crinitum*** Heterick
*Monomorium decuria* Heterick
*Monomorium destructor* (Jerdon)*
*Monomorium disetigerum* Heterick
***Monomorium durokoppinense*** Heterick
*Monomorium elegantulum* Heterick
*Monomorium eremophilum* Heterick
*Monomorium euryodon* Heterick
*Monomorium falcatum* gp. sp. JDM 1178
*Monomorium fieldi* Forel
*Monomorium flavonigrum* Heterick
*Monomorium hildebrandti* gp. sp. JDM 438
*Monomorium lacunosum* Heterick
*Monomorium laeve* Mayr
*Monomorium leae* Forel
*Monomorium legulus* Heterick
*Monomorium longiceps* Wheeler

*Monomorium longinode* Heterick
***Monomorium majeri*** Heterick
*Monomorium megalops* Heterick
*Monomorium micula* Heterick
*Monomorium nanum* Heterick
*Monomorium pharaonis* (Linnaeus)*
*Monomorium pubescens* Heterick
*Monomorium rothsteini* Forel
*Monomorium rufonigrum* Heterick
*Monomorium silaceum* Heterick
*Monomorium sordidum* Forel
*Monomorium stictonotum* Heterick
*Monomorium striatifrons* Heterick
***Monomorium sublamellatum*** Heterick (WAM)
*Monomorium sydneyense* Forel
*Monomorium xantheklemma* Heterick

***Orectognathus***
*Orectognathus clarki* Brown

***Pheidole***
*Pheidole ampla* Forel
*Pheidole ampla perthensis* Crawley
*Pheidole hartmeyeri* Forel
*Pheidole megacephala* (Fabricius)*
*Pheidole teneriffana* Forel*
*Pheidole* sp. near *variabilis* (sp. JDM 177)
*Pheidole* sp. JDM 164
*Pheidole* sp. JDM 338
*Pheidole* sp. JDM 558
*Pheidole* sp. JDM 871
*Pheidole* sp. JDM 873
*Pheidole* sp. JDM 874*
*Pheidole* sp. JDM 1138

***Podomyrma***
*Podomyrma adelaidae* (F. Smith)
*Podomyrma chasei* Forel
*Podomyrma christae* (Forel)
*Podomyrma clarki* (Crawley)
*Podomyrma elongata* Forel
*Podomyrma ferruginea* (Clark)
*Podomyrma libra* (Forel)
*Podomyrma macrophthalma* Viehmeyer
*Podomyrma* sp. JDM 997

***Rogeria***
*Rogeria flavigaster* (Clark)
*Rogeria* sp. JDM 639

***Solenopsis***
*Solenopsis belisarius* Forel
*Solenopsis clarki* Crawley

***Strumigenys***
*Strumigenys perplexa* (F. Smith)
*Strumigenys quinquedentata* Crawley

***Tetramorium***
*Tetramorium bicarinatum* (Nylander)*
*Tetramorium impressum* (Viehmeyer)
*Tetramorium simillimum* (F. Smith)*
*Tetramorium striolatum* Viehmeyer
*Tetramorium viehmeyeri* Forel
*Tetramorium* sp. JDM 515
*Tetramorium* sp. JDM 522
*Tetramorium* sp. JDM 884
*Tetramorium* sp. JDM 1007
*Tetramorium* sp. JDM 1072

**Total 498 (incl. 32 spp. not in JDM Coll.)**

**STATUS UNCERTAIN**

***Arnoldius***
*Arnoldius flavus* (Crawley)
*Arnoldius scissor* (Crawley)

***Camponotus***
*Camponotus insipidus* Forel

***Iridomyrmex***
*Iridomyrmex bicknelli splendidus* Forel
*Iridomyrmex gracilis fusciventris* Forel

***Pheidole***
*Pheidole bos* Forel

## APPENDIX 2

### Ant species and morphospecies recorded from the SWBP placed by botanical district.

**(n.b. Many species occur in more than one botanical district.)**

| | Botanical Division | | | | | | |
|---|---|---|---|---|---|---|---|
| **Taxon** | **AW** | **ESP** | **GS** | **JF** | **MAL** | **SWA** | **WA** |
| *Anonychomyrma itinerans perthensis* (Forel) | | √ | √ | √ | | √ | √ |
| *Anonychomyrma nitidiceps* (André) | | √ | | √ | | √ | √ |
| *Anonychomyrma* sp. JDM 835 | | | | √ | | √ | |
| *Arnoldius* sp. JDM 170 | | √ | √ | √ | | | |
| *Arnoldius* sp. JDM 433 | | √ | | √ | √ | | |
| *Doleromyrma darwiniana fida* (Forel) | √ | √ | √ | √ | √ | √ | √ |
| *Doleromyrma rottnestensis* (Wheeler) | | √ | √ | √ | | √ | |
| *Dolichoderus angusticornis* Clark | √ | √ | | | | | |
| *Dolichoderus clusor* Forel | √ | | √ | | | √ | |
| *Dolichoderus formosus* Clark | √ | √ | √ | √ | √ | | |
| *Dolichoderus glauerti* Wheeler | √ | | | √ | | √ | |
| ***Dolichoderus nigricornis* Clark** | √ | | | | | | |
| *Dolichoderus occidentalis* Clark | | | | √ | | | |
| *Dolichoderus reflexus* Clark | | | √ | | | | |
| *Dolichoderus ypsilon* Forel | √ | √ | √ | √ | | √ | |
| *Dolichoderus ypsilon niger* Forel | | | √ | √ | | √ | |
| *Dolichoderus ypsilon rufotibialis* Forel | | √ | | √ | | | √ |
| *Dolichoderus* sp. JDM 513 | | | √ | | √ | √ | |
| *Dolichoderus* sp. JDM 1106 | | √ | √ | | | | |
| *Froggattella kirbii* Lowne | √ | | | | √ | | |
| *Froggattella latispina* Wheeler | | √ | | | | | |
| *Iridomyrmex agilis* Forel | √ | | | | √ | | |
| *Iridomyrmex agilis* gp. sp. JDM 85 | | √ | √ | √ | | √ | |
| *Iridomyrmex bicknelli* Emery | √ | √ | √ | √ | √ | √ | √ |
| *Iridomyrmex bicknelli brunneus* Forel | √ | | √ | √ | √ | √ | |
| *Iridomyrmex calvus* gp. sp. JDM 1069 | | | √ | √ | √ | | |
| *Iridomyrmex chasei* Forel | √ | √ | √ | √ | √ | √ | |
| *Iridomyrmex chasei concolor* Forel | √ | | √ | √ | √ | √ | |
| *Iridomyrmex conifer* Forel | √ | √ | √ | √ | | √ | √ |
| *Iridomyrmex discors* Forel | √ | √ | √ | √ | √ | √ | √ |
| *Iridomyrmex dromus* Clark | √ | √ | √ | √ | √ | √ | |
| *Iridomyrmex exsanguis* Forel | | √ | √ | | | √ | |
| *Iridomyrmex gracilis spurcus* Wheeler | √ | | | | | | |
| *Iridomyrmex greensladei* Shattuck | √ | √ | √ | √ | √ | √ | |
| Ir*idomyrmex hartmeyeri* Forel | √ | | | | √ | | |
| *Iridomyrmex hartmeyeri* gp. sp. JDM 849 | √ | √ | √ | √ | √ | | |
| *Iridomyrmex hesperus* Shattuck | | | | | √ | | √ |
| *Iridomyrmex innocens* Forel | | √ | | √ | | | √ |
| *Iridomyrmex lividus* Shattuck | | √ | | | √ | | |

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|---|---|---|---|---|---|---|---|
| *Iridomyrmex mattiroloi continentis* Forel | √ | | √ | | √ | | |
| *Iridomyrmex mattiroloi splendens* Clark | √ | √ | √ | √ | √ | √ | √ |
| *Iridomyrmex mattiroloi* complex sp. JDM 845 | | √ | | √ | | √ | √ |
| *Iridomyrmex notialis* Shattuck | | √ | | √ | | √ | √ |
| *Iridomyrmex prismatis* Shattuck | | √ | | | | | |
| *Iridomyrmex reburrus* Shattuck | | | | | √ | | |
| *Iridomyrmex rufoniger domesticus* Forel | √ | | | | | | |
| *Iridomyrmex rufoniger suchieri* Forel (pop. 1) | √ | √ | √ | √ | √ | √ | |
| *Iridomyrmex rufoniger suchieri* Forel (pop. 2) | √ | √ | | √ | | √ | √ |
| *Iridomyrmex near rufoniger suchieri* Forel | √ | | | | | | |
| ***Iridomyrmex setoconus* Shattuck and McMillan** | | √ | | | | | |
| *Iridomyrmex turbineus* Shattuck | √ | √ | √ | √ | | | √ |
| *Iridomyrmex viridiaeneus* Viehmeyer | √ | | | | √ | | |
| *Iridomyrmex* sp. JDM 133 | | | √ | | | | |
| *Iridomyrmex* sp. JDM 846 | √ | √ | √ | √ | √ | | |
| *Linepithema humile* (Mayr)* | | | | √ | | √ | √ |
| *Nebothriomyrmex majeri* Dubovikov | | √ | | √ | | √ | |
| *Ochetellus glaber* gp. sp. JDM 19 | | √ | √ | √ | √ | √ | √ |
| *Ochetellus* sp. JDM 851 | √ | √ | √ | | √ | | |
| *Papyrius nitidus* (Mayr) | √ | √ | | √ | √ | √ | |
| *Papyrius* sp. JDM 666 | √ | | | √ | | | |
| *Tapinoma melanocephalum* (Fabricius)* | | | | | | √ | |
| *Tapinoma* sp. JDM 78 | √ | √ | √ | √ | √ | √ | √ |
| *Tapinoma* sp. JDM 981 | √ | | | √ | | | |
| *Technomyrmex jocosus* Forel | | | | √ | | √ | √ |
| *Acropyga myops* Forel | √ | | | √ | | | |
| *Acropyga pallida* (Donisthorpe) | | | | | | | √ |
| *Calomyrmex glauerti* Clark | √ | | √ | | | | |
| *Calomyrmex* ANIC 1 sp. JDM 190 | √ | | √ | | √ | √ | |
| *Camponotus arcuatus* complex sp. JDM 694 | | | √ | | | | |
| *Camponotus armstrongi* McAreavey | √ | | | | √ | | |
| *Camponotus capito ebenithorax* Forel | √ | √ | √ | √ | √ | √ | |
| *Camponotus capito ebenithorax* Forel (“black soma”) | √ | | | | √ | | |
| *Camponotus cerisipes* Clark | | √ | | | √ | √ | √ |
| *Camponotus ceriseipes* complex sp. JDM 105 | | √ | | | | √ | √ |
| *Camponotus chalceus* Crawley | √ | √ | √ | √ | √ | √ | |
| *Camponotus cinereus amperei* Forel | √ | | | | √ | | |
| *Camponotus cinereus notterae* Forel | √ | | | √ | | | |
| *Camponotus clarior* Forel | | | √ | | | | |
| *Camponotus claripes* Mayr | √ | √ | √ | √ | √ | √ | |
| *Camponotus claripes marcens* Forel | | | | √ | | √ | |
| *Camponotus claripes minimus* Crawley | √ | √ | √ | √ | √ | √ | √ |
| *Camponotus claripes nudimalis* Forel | | | | √ | | √ | √ |
| *Camponotus claripes* complex sp. JDM 430 | | | | √ | | | |
| *Camponotus claripes* complex sp. JDM 767 | | | | √ | | | |
| *Camponotus claripes* complex sp. JDM 779 | √ | | | √ | | | |

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|---|---|---|---|---|---|---|---|
| *Camponotus claripes* gp. sp. JDM 63 | | √ | √ | √ | | √ | |
| *Camponotus claripes* gp. sp. JDM 288 | √ | | | √ | | | |
| *Camponotus claripes* gp. sp. JDM 1073 | | | | √ | | | |
| *Camponotus cowlei* Froggatt | √ | √ | √ | √ | | √ | |
| *Camponotus darlingtoni* Wheeler | | √ | √ | √ | | √ | |
| *Camponotus discors* Forel | | √ | | | | | |
| *Camponotus discors* complex sp. JDM 772 | | | √ | | | √ | |
| *Camponotus discors* complex sp. JDM 1104 | √ | | √ | | | | |
| *Camponotus donnellani* Shattuck and McArthur | | | | | √ | | |
| *Camponotus dromas* Santschi | √ | | √ | √ | | √ | |
| *Camponotus dryandrae* McArthur and Adams | √ | √ | √ | √ | √ | √ | |
| *Camponotus ephippium* (F. Smith) | | √ | √ | | √ | | |
| *Camponotus* near *ephippium* sp. JDM 431 | √ | | | | | | |
| *Camponotus ephippium* complex sp. JDM 775 | √ | | | √ | | | |
| *Camponotus evae zeuxis* Forel | √ | √ | √ | | √ | √ | |
| *Camponotus gasseri* (Forel) | √ | √ | √ | √ | √ | √ | √ |
| *Camponotus gibbinotus* Forel | √ | √ | √ | √ | √ | √ | |
| *Camponotus gouldianus* Forel | | √ | | | √ | | |
| *Camponotus hartogi* Forel | | √ | | | | | |
| *Camponotus innexus* Forel | | √ | | | √ | √ | √ |
| *Camponotus johnclarki* Taylor | | | | √ | √ | √ | |
| *Camponotus longideclivis* McArthur and Adams | | √ | | | √ | | |
| *Camponotus longifacies* McArthur | √ | | | | | √ | |
| *Camponotus lownei* Forel | √ | √ | √ | | √ | √ | |
| *Camponotus lownei* complex sp. JDM 616 | √ | | | | | | |
| *Camponotus lownei* complex sp. JDM 761 | √ | | √ | √ | | √ | |
| *Camponotus macrocephalus* gp. sp. JDM 927 | | | √ | | | √ | |
| *Camponotus michaelseni* Forel | √ | | | √ | | | |
| *Camponotus molossus* Forel | | | | √ | | √ | |
| *Camponotus nigriceps* (F. Smith) | √ | √ | √ | √ | √ | √ | √ |
| *Camponotus nigroaeneus* gp. sp. JDM 1031 | | | | √ | | | |
| *Camponotus oetkeri* Forel | √ | √ | √ | √ | √ | | |
| *Camponotus oetkeri voltai* Forel | | √ | | √ | | | |
| *Camponotus pawseyi* McArthur | √ | √ | | √ | √ | √ | |
| ***Camponotus perjurus* Shattuck and McArthur** | | √ | | | √ | | |
| *Camponotus pitjantjatarae* McArthur | √ | | √ | | | | |
| *Camponotus postcornutus* Clark | √ | √ | √ | √ | √ | | |
| *Camponotus prosseri* Shattuck and McArthur | √ | √ | | √ | √ | √ | |
| *Camponotus prostans* Forel | √ | √ | | √ | √ | √ | √ |
| *Camponotus rufus* Crawley | | | √ | √ | | √ | |
| *Camponotus scotti* McArthur | | | | √ | | | |
| *Camponotus scratius* Forel | | √ | √ | | √ | √ | |
| *Camponotus simpsoni* McArthur | | √ | | √ | √ | √ | |
| *Camponotus sponsorum* Forel | √ | | √ | √ | √ | √ | |
| *Camponotus terebrans* (Lowne) | √ | √ | √ | √ | √ | √ | √ |
| *Camponotus tricaloratus* Clark | √ | | √ | √ | | | |

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|---|---|---|---|---|---|---|---|
| *Camponotus tristis* Clark | √ | √ | √ | √ | √ | √ | |
| *Camponotus versicolor* Clark | √ | | | | √ | | |
| *Camponotus walkeri* Forel | | | √ | | | √ | |
| *Camponotus whitei* Wheeler | √ | √ | √ | √ | | √ | |
| *Camponotus wiederkehri* Forel | √ | √ | √ | | | | |
| *Camponotus wiederkehri* gp. sp. JDM 924 | | | √ | | | | |
| *Camponotus wiederkehri* gp. sp. JDM 925 | | | √ | | | | |
| *Camponotus* sp. JDM 26 | √ | √ | √ | √ | √ | √ | |
| *Camponotus* sp. JDM 695 | √ | | | | | | |
| *Camponotus* sp. JDM 771 | √ | | | | | | |
| *Camponotus* sp. JDM 1038 | √ | | | | | | |
| *Melophorus nr. aeneovirens* (Lowne) sp. JDM 545 | √ | | √ | √ | | | |
| *Melophorus bruneus* complex sp. JDM 520 | √ | | | | | √ | |
| *Melophorus bruneus* complex sp. JDM 600 | √ | | | | | | |
| *Melophorus insularis* Wheeler | √ | √ | √ | √ | √ | √ | √ |
| *Melophorus ludius sulla* Forel | √ | | √ | | √ | | |
| M*elophorus majeri* Agosti | | √ | √ | | | | |
| *Melophorus mjobergi* Forel | √ | | √ | √ | √ | √ | |
| *Melophorus mjobergi* complex sp. JDM 1121 | √ | | | | | | |
| *Melophorus potteri* McAreavey | √ | | √ | √ | | | |
| *Melophorus potteri* group sp. JDM 1032 | √ | | | | | | |
| *Melophorus potteri* group sp. JDM 1082 | √ | | | | | | |
| *Melophorus turneri* Forel | √ | √ | √ | √ | √ | √ | |
| *Melophorus turneri perthensis* Wheeler | √ | | √ | √ | √ | √ | |
| *Melophorus turneri* complex sp. JDM 791 | √ | | √ | | | | |
| *Melophorus wheeleri* Forel | √ | | | | | | |
| *Melophorus wheeleri* complex sp. JDM 783 | | | √ | | | √ | |
| *Melophorus wheeleri* complex sp. JDM 1077 | √ | | | | | | |
| *Melophorus* ANIC 3 (sp. JDM 59) | √ | | √ | √ | √ | √ | √ |
| *Melophorus* sp. JDM 176 | √ | √ | √ | √ | √ | √ | |
| *Melophorus* sp. JDM 199 | √ | | √ | | | | |
| *Melophorus* sp. JDM 230 | | | | | | √ | |
| *Melophorus* sp. JDM 470 | | | √ | | | | |
| *Melophorus* sp. JDM 500 | | | √ | | | √ | |
| *Melophorus* sp. JDM 613 | | | | √ | | | |
| *Melophorus* sp. JDM 784 | √ | | √ | √ | | | |
| *Melophorus* sp. JDM 786 | √ | | | | √ | | |
| *Melophorus* sp. JDM 787 | √ | | | | | | |
| *Melophorus* sp. JDM 788 | √ | | √ | | | | |
| *Melophorus* sp. JDM 1063 | | | √ | | | | |
| *Melophorus* sp. JDM 1070 | √ | | √ | | | | |
| *Melophorus* sp. JDM 1102 | | | √ | | | | |
| *Melophorus* sp. JDM 1105 | | | √ | | | | |
| *Melophorus* sp. JDM 1180 | | | √ | | | | |
| *Myrmecorhynchus emeryi* André | √ | | | √ | √ | | √ |
| *Notoncus cf. capitatus* Forel | √ | | | | | √ | |

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|---|---|---|---|---|---|---|---|
| *Notoncus enormis* Szabó | √ | | | | | | |
| *Notoncus gilberti* Forel | √ | | √ | √ | | √ | |
| *Notoncus hickmani* Clark | √ | | √ | √ | | √ | √ |
| *Notoncus* sp. JDM 487 | | | | | | √ | |
| *Opisthopsis rufithorax* Emery | √ | | √ | | √ | √ | |
| *Paratrechina braueri glabrior* (Forel) | | | | | | √ | |
| *Paratrechina longicornis* (Latreille)* | | | | | | √ | |
| *Paratrechina minutula* (Forel) | | | | | | √ | |
| *Paratrechina minutula* gp. sp. JDM 916 | √ | | √ | √ | | √ | |
| *Paratrechina* ANIC sp. 3* | √ | | | | | √ | |
| *Plagiolepis lucidula* Wheeler | | | | | | √ | √ |
| *Plagiolepis squamulosa* Wheeler | | | √ | √ | √ | √ | √ |
| *Plagiolepis* sp. JDM 189 | | √ | √ | √ | | √ | √ |
| *Polyrhachis (Campomyrma) femorata* F. Smith | | | | √ | | √ | √ |
| *Polyrhachis (Campomyrma) gravis* Clark | √ | √ | √ | | | | |
| *Polyrhachis (Campomyrma) hirsuta* Mayr | | | | √ | | | |
| *Polyrhachis (Campomyrma) leae* Forel | √ | √ | √ | √ | | √ | |
| *Polyrhachis (Campomyrma) macropa* Wheeler | √ | | √ | | | | |
| *Polyrhachis (Campomyrma) ops* Forel | | | ?√ | √ | | | √ |
| *Polyrhachis (Campomyrma) phryne* Forel | √ | √ | | √ | √ | √ | |
| *Polyrhachis (Campomyrma) pyrrhus* Forel | √ | | | | | | |
| *Polyrhachis (Campomyrma) schwiedlandi* Forel | √ | | | √ | | | |
| *Polyrhachis (Campomyrma) sidnica* complex sp. JDM 390 | | | | √ | | | |
| *Polyrhachis (Campomyrma) sidnica* complex sp. JDM 671 | √ | √ | | √ | √ | | |
| *Polyrhachis (Campomyrma)* sp. JDM 118 | √ | √ | √ | √ | | √ | |
| *Polyrhachis (Campomyrma)* sp. JDM 670 | √ | | | | | | |
| *Polyrhachis (Campomyrma)* sp. JDM 802 | | | | √ | | | |
| *Polyrhachis (Campomyrma)* sp. JDM 805 | | | √ | | | | |
| *Polyrhachis (Campomyrma)* sp. JDM 1010 | | | √ | | | | |
| *Polyrhachis (Chariomyrma) 'aurea'* sp. A | √ | | | | | | |
| *Polyrhachis (Hagiomyrma) ammonoeides* Roger | | | √ | | | | |
| *Prolasius antennatus* McAreavey | | | | √ | | √ | √ |
| *Prolasius hemiflavus* Clark | | | | √ | | | √ |
| *Prolasius reticulatus* McAreavey | √ | √ | | √ | | √ | √ |
| *Prolasius* sp. JDM 109 | | | | √ | | | √ |
| *Prolasius* sp. JDM 551 | √ | √ | | | √ | | |
| *Prolasius* sp. JDM 957 | | | | √ | | | |
| ***Prolasius* sp. JDM 1044** (loan) | | | | | | | |
| *Prolasius* sp. JDM 1120 | | | | √ | | √ | √ |
| *Stigmacros aemula* Forel | | √ | √ | √ | | √ | |
| *Stigmacros anthracina* McAreavey | | | | √ | | | |
| *Stigmacros brachytera* McAreavey | √ | √ | | √ | | | |
| *Stigmacros elegans* McAreavey | √ | | | | | √ | |
| ***Stigmacros flava* McAreavey** | | | | √ | | | |
| *Stigmacros epinotalis* McAreavey | | | | √ | √ | √ | √ |
| *Stigmacros glauerti* McAreavey | | | | √ | | √ | √ |

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|---|---|---|---|---|---|---|---|
| *Stigmacros inermis* McAreavey | √ | | | √ | | | |
| *Stigmacros occidentalis* (Crawley) | | | | √ | | √ | √ |
| *Stigmacros pilosella* (Viehmeyer) | √ | | | | | | |
| *Stigmacros reticulata* Clark | | | √ | | | √ | |
| *Stigmacros spinosa* McAreavey | | | √ | | | | |
| *Stigmacros stanleyi* McAreavey | √ | | | √ | | | |
| *Stigmacros termitoxena* Wheeler | √ | | √ | | √ | | |
| *Stigmacros (Cyrtostigmacros)* sp. JDM 1067 | | | √ | | | √ | |
| *Stigmacros* sp. JDM 115 | | | | √ | | √ | |
| *Stigmacros* sp. JDM 188 | | | | √ | | | |
| *Stigmacros* sp. JDM 341 | √ | | √ | √ | | √ | |
| *Stigmacros* sp. JDM 396 | √ | | | √ | | | |
| *Stigmacros* sp. JDM 443 | √ | | | √ | | | |
| *Stigmacros* sp. JDM 622 | √ | | | √ | | | |
| *Stigmacros* sp. JDM 829 | √ | | √ | | | | |
| *Stigmacros* sp. JDM 831 | | | | √ | | √ | |
| *Stigmacros* sp. JDM 832 | | | | √ | | | |
| *Stigmacros* sp. JDM 1015 | √ | | | | | | |
| ***Stigmacros* sp. JDM 1045** (loan) | √ | | | | | | |
| ***Stigmacros* sp. JDM 1046** (loan) | √ | | | | | | |
| *Stigmacros* sp. JDM 1050 | | | | √ | | √ | √ |
| *Stigmacros* sp. JDM 1135 | √ | | | | | | |
| ***Myrmecia acuta* Ogata and Taylor** | | √ | | | | | |
| *Myrmecia analis* Mayr | | √ | | √ | | √ | √ |
| *Myrmecia arnoldi* Clark | | √ | | | √ | | |
| *Myrmecia callima* (Clark) | √ | | | | | | |
| *Myrmecia chasei* Forel | | √ | | √ | | √ | |
| *Myrmecia clarki* Crawley | | | | √ | | √ | √ |
| *Myrmecia dispar* (Clark) | | √ | √ | | √ | | |
| *Myrmecia desertorum* Wheeler | √ | | | √ | | √ | |
| *Myrmecia elegans* (Clark) | √ | √ | | √ | √ | | |
| *Myrmecia erecta* Ogata and Taylor | | | | √ | √ | | |
| *Myrmecia forceps* Roger | √ | √ | | | | | |
| *Myrmecia fulgida* Clark | √ | | | | √ | | |
| *Myrmecia fuscipes* Clark | √ | √ | | | √ | | |
| *Myrmecia gratiosa* Clark | √ | √ | √ | √ | √ | √ | |
| ***Myrmecia inquilina* Douglas and Brown** | √ | | | | | | |
| *Myrmecia ludlowi* Crawley | | | | √ | | √ | √ |
| *Myrmecia mandibularis* F. Smith | | √ | | √ | | √ | √ |
| *Myrmecia michaelseni* Forel | | √ | | √ | | √ | √ |
| ***Myrmecia nigriceps* Mayr** | √ | | | | √ | √ | |
| *Myrmecia nigriscapa* Roger | | | | √ | | √ | |
| *Myrmecia occidentalis* (Clark) | √ | √ | √ | | √ | √ | |
| ***Myrmecia pavida* Clark** | √ | √ | | √ | √ | | |
| *Myrmecia picta* F. Smith | √ | | | √ | | | |
| *Myrmecia pilosula* group | | √ | | √ | √ | | √ |

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|---|---|---|---|---|---|---|---|
| ***Myrmecia picticeps* Clark** | | | | √ | | | |
| *Myrmecia regularis* Crawley | | | | √ | | | √ |
| *Myrmecia rubripes* Clark | √ | √ | | | | √ | |
| *Myrmecia rugosa* Wheeler | | | | √ | | √ | √ |
| *Myrmecia swalei* Crawley | | √ | | √ | | √ | |
| *Myrmecia tepperi* Emery | √ | | | √ | | | |
| ***Myrmecia testaceipes* (Clark)** | | | | √ | | | |
| *Myrmecia urens* complex sp. JDM 1 | √ | | √ | √ | | √ | √ |
| *Myrmecia urens* complex sp. JDM 71 | | √ | | | √ | √ | |
| *Myrmecia urens* complex sp. JDM 728 | | | | | | √ | |
| *Myrmecia varians* Mayr | √ | | √ | | | | |
| *Myrmecia vindex* F. Smith | √ | √ | √ | √ | √ | √ | √ |
| *Nothomyrmecia macrops* Clark | | √ | | | | | |
| *Tetraponera punctulata* F. Smith | √ | | √ | √ | | | |
| ***Cerapachys bicolor* (Clark)** | | | | √ | | | |
| ***Cerapachys brevicollis* (Clark)** | | | | √ | | √ | |
| *Cerapachys brevis* (Clark) | √ | | | √ | √ | | |
| *Cerapachys clarki* (Crawley) | | | √ | √ | | √ | |
| *Cerapachys edentatus* (Forel) | √ | | | √ | | √ | |
| *Cerapachys elegans* (Wheeler) | √ | | | | | | |
| *Cerapachys fervidus* (Wheeler) | √ | | √ | √ | | √ | |
| *Cerapachys flammeus* (Clark) | | | | √ | | √ | |
| *Cerapachys gilesi* (Clark) | | | | √ | | √ | √ |
| *Cerapachys greavesi* (Clark) | √ | | √ | | | | |
| *Cerapachys incontentus* Brown | √ | | | √ | | | |
| *Cerapachys latus* Brown | | | √ | √ | | | |
| *Cerapachys longitarsus* (Mayr)* | | | | | | √ | |
| *Cerapachys nigriventris* (Clark) | √ | | | √ | | √ | |
| ***Cerapachys picipes* (Clark)** | √ | | | | | | |
| *Cerapachys princeps* (Clark) | √ | | √ | √ | | √ | |
| *Cerapachys punctatissimus* (Clark) | | | | √ | | | |
| *Cerapachys ruficornis* (Clark) | √ | | | √ | | | |
| *Cerapachys simmonsae* (Clark) | √ | | | √ | | | √ |
| *Cerapachys sjostedti* Forel | | | √ | | | | |
| *Cerapachys varians* (Clark) | | | √ | √ | | | |
| *Cerapachys* sp. JDM 574 | √ | | | | | | |
| *Cerapachys* sp. JDM 745 | √ | | | | | | |
| *Cerapachys* sp. JDM 746 | | √ | | | √ | | |
| *Cerapachys* sp. JDM 941 | | | | √ | | | |
| *Cerapachys* sp. JDM 1040 | | | | √ | | | |
| *Cerapachys* sp. JDM 1103 | | | √ | | | | |
| *Sphinctomyrmex emeryi* Forel | | | √ | | | | |
| *Sphinctomyrmex imbecilis* Forel | | | | √ | | | |
| *Sphinctomyrmex occidentalis* (Clark) | | | | √ | | | |
| ***Leptanilla swani* Wheeler (worker)** | | | | √ | | | |
| ***Amblyopone aberrans* Wheeler** | | | | √ | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Amblyopone australis* Erichson | | | | √ | | | √ |
| *Amblyopone clarki* Wheeler | | | √ | | | √ | |
| ***Amblyopone glauerti* (Clark)** | | | √ | √ | √ | | |
| ***Amblyopone michaelseni* Forel** | | | | √ | | | |
| *Anochetus armstrongi* McAreavey | √ | | √ | √ | | | |
| *Hypoponera congrua* (Wheeler) | | | | √ | | √ | √ |
| *Hypoponera eduardi* (Forel)* | | | | √ | | √ | √ |
| *Leptogenys clarki* Wheeler | | | √ | | | | |
| *Leptogenys darlingtoni* Wheeler | √ | | √ | | | | |
| *Leptogenys neutralis* Forel | | | | √ | | | √ |
| *Myopias tasmaniensis* Wheeler | | | | | | | √ |
| *Odontomachus ruficeps* Smith | √ | | √ | √ | | | |
| *Pachycondyla (Bothroponera) denticulata* gp. sp. JDM 730 | | | √ | | | | |
| *Pachycondyla (Bothroponera) regularis* Forel | √ | | √ | | | | |
| *Pachycondyla (Brachyponera) lutea* (Mayr) | √ | √ | √ | √ | | √ | √ |
| *Pachycondyla (Trachymesopus) rufonigra* (Clark) | | √ | √ | √ | | √ | √ |
| *Platythyrea brunnipes* (Clark) | | | | | | √ | |
| *Platythyrea dentinodis* (Clark) | √ | | | √ | | | |
| *Platythyrea micans* (Clark) | | | | √ | | | |
| *Platythyrea parallela* (F. Smith) | | | | √ | | | |
| *Platythyrea turneri* Forel | | | | √ | | √ | √ |
| *Ponera* sp. JDM 1122 | | | | √ | | | |
| *Rhytidoponera anceps* Emery | | √ | | | √ | | |
| *Rhytidponera anceps* group sp. ANIC 44 | | | | √ | | | √ |
| *Rhytidoponera crassinoda* (Forel) | | | √ | | √ | | |
| *Rhytidoponera flavicornis* Clark | √ | | √ | | | | |
| *Rhytidoponera foveolata* Crawley | √ | | | √ | | √ | |
| *Rhytidoponera inornata* Crawley | | √ | | √ | | √ | √ |
| *Rhytidoponera levior* Crawley | | | √ | | √ | √ | |
| *Rhytidoponera mayri* (Emery) | √ | | √ | | | | |
| *Rhytidoponera metallica* (F. Smith) | √ | √ | √ | √ | √ | √ | |
| *Rhytidoponera metallica* gp. sp. JDM 1097 | | | √ | | | | |
| *Rhytidoponera metallica* gp. sp. JDM 1098 | | | √ | | | | |
| *Rhytidoponera micans* Clark | √ | | √ | | | | |
| *Rhytidoponera micans* gp. sp. JDM 576 | √ | | | | | | |
| *Rhytidoponera punctigera* Crawley | | | | √ | | √ | √ |
| *Rhytidoponera rufonigra* Clark | | √ | | √ | | √ | |
| *Rhytidoponera taurus* (Forel) | | | √ | | | | |
| *Rhytidoponera tyloxys* Brown and Douglas | | | √ | | | | |
| *Rhytidoponera violacea* (Forel) | √ | √ | √ | √ | √ | √ | |
| *Rhytidoponera* sp. JDM 736 | | | √ | | | | |
| *Heteroponera imbellis* (Emery) | √ | | | √ | | √ | |
| *Heteroponera* sp. JDM 92 | | | | √ | | | |
| *Heteroponera* sp. JDM 732 | | | | √ | | √ | |
| *Discothyrea crassicornis* Clark | | | | √ | | | √ |
| *Discothyrea turtoni* Clark | | | | √ | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Adlerzia froggatti* (Forel) | √ | | √ | √ | | √ | |
| *Anisopheidole antipodum* (F. Smith) | √ | | √ | √ | √ | √ | √ |
| *Aphaenogaster poultoni* Crawley | √ | √ | √ | √ | √ | √ | |
| *Aphaenogaster* sp. JDM 854 | √ | | | | | | |
| *Cardiocondyla 'nuda'* (Mayr)* | √ | √ | √ | √ | | √ | |
| *Carebara* sp. JDM 440 | | | | √ | | | |
| ***Colobostruma australis* Brown** | | √ | | | | | |
| *Colobostruma cerornata* Brown | √ | √ | √ | | | | |
| *Colobostruma elliotti* (Clark) | | | √ | | | √ | |
| ***Colobostruma froggatti* (Forel)** | | | √ | | | | √ |
| *Colobostruma mellea* Shattuck | √ | | √ | √ | | | |
| *Colobostruma nancyae* Brown | √ | √ | | √ | √ | √ | |
| ***Colobostruma papulata* Brown** | | √ | | | | | |
| *Crematogaster dispar* Forel | √ | | √ | √ | | √ | √ |
| *Crematogaster frivola* Forel | √ | √ | √ | | √ | √ | |
| *Crematogaster laeviceps chasei* Forel | √ | √ | | √ | √ | √ | |
| *Crematogaster laeviceps* gp. sp. JDM 858 | √ | | | | | | |
| *Crematogaster queenslandica gilberti* Forel | | √ | | √ | | | |
| *Crematogaster queenslandica* gp. sp. JDM 428 | √ | √ | √ | √ | √ | √ | |
| *Crematogaster queenslandica* gp. sp. JDM 1099 | √ | | √ | | | | |
| *Crematogaster* sp. JDM 126 | √ | | √ | √ | √ | √ | |
| *Crematogaster* sp. JDM 859 | √ | | √ | | √ | | |
| *Epopostruma frosti* (Brown) | √ | | | √ | √ | | |
| *Epopostruma inornata* Shattuck | | | | √ | | √ | |
| *Epopostruma kangarooensis* Shattuck | √ | | | √ | | | |
| ***Epopostruma lattini* Shattuck** | | | √ | | | | |
| ***Epopostruma mercurii* Shattuck** | | | | √ | | √ | |
| *Epopostruma natalae* Shattuck | | | | √ | | | |
| *Epopostruma quadrispinosa* (Forel) | √ | | | √ | | | |
| *Epopostruma sowestensis* Shattuck | | | | √ | | | |
| ***Mayriella occidua* Shattuck** | | | | | | | √ |
| *Meranoplus dimidiatus* F. Smith | √ | | √ | | | | |
| *Meranoplus dimidiatus* complex sp. JDM 423 | √ | | √ | √ | √ | √ | |
| *Meranoplus diversus* F. Smith | | | √ | | | | |
| *Meranoplus fenestratus* F. Smith | √ | | √ | √ | | | |
| *Meranoplus ferrugineus* Crawley | √ | | | √ | | √ | √ |
| *Meranoplus ferrugineus* complex sp. JDM 267 | √ | | | √ | | √ | √ |
| *Meranoplus ferrugineus* complex sp. JDM 424 | √ | | √ | | | | |
| ***Meranoplus mcarthuri* Schödl** | √? | | | | | | |
| *Meranoplus oceanicus* F. Smith | | √ | √ | √ | √ | | |
| *Meranoplus rugosus* Crawley | √ | | √ | √ | | √ | √ |
| *Meranoplus rugosus* gp. sp. JDM 677 | √ | | | | | | |
| *Meranoplus puryi* complex sp. JDM 968 | √ | | √ | √ | | √ | |
| *Meranoplus similis* Viehmeyer | | | √ | | | √ | |
| *Meranoplus* sp. JDM 74 | √ | √ | √ | √ | √ | √ | √ |
| *Meranoplus* sp. JDM 491 | | | | √ | | √ | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Meranoplus* sp. JDM 627 | √ | | | | √ | | |
| *Meranoplus* sp. JDM 673 | √ | | √ | | | | |
| *Meranoplus* sp. JDM 866 | | | √ | √ | | √ | |
| *Meranoplus* sp. JDM 922 | | | √ | | | | |
| *Meranoplus* sp. JDM 967 | | √ | | | | | |
| *Meranoplus* sp. JDM 1071 | | | √ | √ | | | |
| *Meranoplus* sp. JDM 1101 | | | √ | | | | |
| *Meranoplus* sp. JDM 1107 | √ | | √ | √ | | | |
| *Mesostruma eccentrica* Taylor | √ | √ | √ | √ | √ | | |
| *Mesostruma laevigata* Brown | √ | | | √ | √ | √ | |
| *Mesostruma loweryi* Taylor | | | √ | √ | | | |
| *Mesostruma spinosa* Shattuck | | | | | | | √ |
| *Monomorium aithoderum* Heterick | √ | √ | √ | √ | √ | √ | |
| *Monomorium anthracinum* Heterick | √ | | | | √ | | |
| *Monomorium arenarium* Heterick | | √ | √ | | | √ | √ |
| *Monomorium bicorne* Forel | √ | | √ | √ | | | |
| *Monomorium bihamatum* Heterick | √ | √ | | | | √ | |
| *Monomorium brachythrix* Heterick | √ | | √ | | | √ | |
| *Monomorium centrale* Forel | √ | | | √ | | | |
| ***Monomorium crinitum* Heterick** | | | | √ | | | |
| *Monomorium decuria* Heterick | | √ | √ | √ | | √ | √ |
| *Monomorium destructor* (Jerdon)* | | | | | | √ | |
| *Monomorium disetigerum* Heterick | √ | | | | | | |
| *Monomorium durokoppinense* Heterick | √ | | | | | | |
| *Monomorium elegantulum* Heterick | √ | | | | | | |
| *Monomorium eremophilum* Heterick | √ | | √ | | | | |
| *Monomorium euryodon* Heterick | √ | √ | | | | | |
| *Monomorium falcatum* gp. sp. JDM 1178 | | | √ | | | | |
| *Monomorium fieldi* Forel | √ | √ | √ | √ | √ | √ | |
| *Monomorium flavonigrum* Heterick | √ | | √ | | | | |
| *Monomorium hildebrandti* group sp. JDM 438 | | | | √ | | √ | √ |
| *Monomorium lacunosum* Heterick | | √ | √ | | | | |
| *Monomorium laeve* Mayr | √ | | √ | √ | | √ | |
| *Monomorium leae* Forel | √ | √ | √ | √ | | √ | √ |
| *Monomorium legulus* Heterick | √ | | √ | | √ | | |
| *Monomorium longiceps* Wheeler | √ | √ | √ | √ | √ | √ | |
| *Monomorium longinode* Heterick | √ | √ | | √ | √ | √ | |
| ***Monomorium majeri* Heterick** | √ | | √ | | | | |
| *Monomorium megalops* Heterick | √ | | | | | | |
| *Monomorium micula* Heterick | √ | | | √ | | | |
| *Monomorium nanum* Heterick | √ | | √ | | | | |
| *Monomorium pharaonis* (Linnaeus)* | | | | | | √ | |
| *Monomorium pubescens* Heterick | | | √ | | | √ | |
| *Monomorium rothsteini* Forel | √ | √ | √ | √ | √ | √ | |
| *Monomorium rufonigrum* Heterick | √ | | √ | | | √ | |
| *Monomorium silaceum* Heterick | √ | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Monomorium sordidum* Forel | √ | √ | √ | √ | √ | √ | |
| *Monomorium stictonotum* Heterick | √ | | | √ | √ | | |
| *Monomorium striatifrons* Heterick | √ | | √ | √ | | | |
| *Monomorium sublamellatum* Heterick (WAM) | √ | | | √ | | | |
| *Monomorium sydneyense* Forel | √ | √ | √ | √ | √ | √ | √ |
| *Monomorium xantheklemma* Heterick | √ | | | | | | |
| *Orectognathus clarki* Brown | √ | | | √ | | | |
| *Pheidole ampla* Forel | √ | | √ | | | √ | |
| *Pheidole ampla perthensis* Crawley | √ | √ | √ | √ | √ | √ | √ |
| *Pheidole hartmeyeri* Forel | √ | | √ | | | √ | |
| *Pheidole megacephala* (Fabricius)* | √ | √ | √ | √ | | √ | |
| *Pheidole teneriffana* Forel* | | | | | | √ | |
| *Pheidole* sp. *near variabilis* Mayr (JDM 177) | √ | √ | √ | √ | √ | √ | √ |
| *Pheidole* sp. JDM 164 | √ | √ | √ | √ | | √ | |
| *Pheidole* sp. JDM 338 | √ | | | | | | |
| *Pheidole* sp. JDM 558 | √ | √ | | | √ | | |
| *Pheidole* sp. JDM 871 | √ | | | | | | |
| *Pheidole* sp. JDM 873 | | | | | √ | | |
| *Pheidole* sp. JDM 874* | | | | | | √ | |
| *Pheidole* sp. JDM 1138 | √ | | | | | | |
| *Podomyrma adelaidae* (F. Smith) | √ | √ | √ | √ | √ | √ | |
| *Podomyrma chasei* Forel | | | | √ | | √ | √ |
| *Podomyrma christae* (Forel) | | | √ | √ | | √ | |
| *Podomyrma clarki* (Crawley) | | | √ | | | √ | |
| *Podomyrma elongata* Forel | | | | √ | | | |
| *Podomyrma ferruginea* (Clark) | | | | √ | | | |
| *Podomyrma libra* (Forel) | √ | | √ | | | | |
| *Podomyrma macrophthalma* Viehmeyer | | | | √ | | √ | √ |
| *Podomyrma* sp. JDM 997 | | | | √ | | | √ |
| *Rogeria flavigaster* (Clark) | √ | | | √ | √ | √ | √ |
| *Rogeria* sp. JDM 639 | | | √ | | | √ | |
| *Solenopsis belisarius* Forel | √ | | √ | | | | |
| *Solenopsis clarki* Crawley | √ | √ | √ | √ | | √ | √ |
| *Strumigenys perplexa* (F. Smith) | | | | √ | | √ | √ |
| *Strumigenys quinquedentata* Crawley | | | √ | √ | | √ | √ |
| *Tetramorium bicarinatum* (Nylander)* | | | | | | √ | |
| *Tetramorium impressum* (Viehmeyer) | √ | √ | √ | √ | | √ | |
| *Tetramorium simillimum* (F. Smith)* | | | | | | √ | |
| *Tetramorium striolatum* Viehmeyer | √ | | √ | √ | √ | √ | √ |
| *Tetramorium viehmeyeri* Forel | √ | | | | | √ | |
| *Tetramorium* sp. JDM 515 | | | √ | | | | |
| *Tetramorium* sp. JDM 522 | | | √ | | | | |
| *Tetramorium* sp. JDM 884 | | | √ | | | √ | |
| *Tetramorium* sp. JDM 1007 | | | √ | | | | |
| *Tetramorium* sp. JDM 1072 | √ | | √ | | | | |
| **Total** | **268** | **156** | **228** | **273** | **130** | **218** | **93** |

## GLOSSARY OF TERMS USED IN THIS WORK

**Acidipore** – orifice of the formic acid system, formed from the hypopygium, found only in subfamily Formicinae. The acidipore usually appears as a tiny nozzle, surrounded by a circlet of small setae, but sometimes the circlet is absent and the nozzle is concealed.

**Acuminate** – tapering to a slender point

**Alate** – possessing wings and capable of flight

**Algorithm** – (in computer parlance) a step-by-step procedure for solving a problem

**Anepisternum** – see Mesopleuron

**Anteocular** – situated in front of the eye(s)

**Anteriad** – directed or facing towards the front

**Anteromedial** – at the middle or midpoint of the anterior margin (e.g. of the clypeus)

**Anteroventral** – at the anterior end of the ventral surface

**Apomorphy** – an observable trait or character of an organism that is derived (or believed to be derived, since the actual ancestry of most organisms can only be inferred)

**Appressed** – lying flat

**Areolate** – covered with small depressions or cavities

**Bauplan** – a German concept referring to the structural essence (including architectural range and limits) of a design, often now applied to groups of organisms by taxonomists

**Berlesate** – the organisms collected through use of a Berlese Funnel, a device that extracts creatures from litter. (The litter is placed on top of a sieve, and the heat of a light source drives the animals in the litter to the base of the litter mass, at which time they fall through the sieve and into a preservative-filled container.)

**Bicarinate** – having paired carinae (i.e. ridges or keel-like crests)

**Bidentate** – possessing two teeth

**Bifid** – divided into two equal parts by a median cleft

**Bilobate** – divided into two lobes

**Carina (pl. carinae)** – a ridge or keel-like crest

**Cladistic analysis** – a type of analysis that examines groups of organisms related to one another by shared traits not found in their common ancestor. The various taxa involved are placed in a branching hierarchy that is visually represented in a tree-like form. Branching occurs when a new trait emerges. However, the separate units at the end of each branch, termed clades, can all be traced back to one common ancestor. This method of analysis was pioneered by Willi Hennig.

**Cladogram** – the tree diagram produced for the purpose of cladistic analysis. This is constructed by the manipulation of a set of organisms and their respective character traits. The construction of the tree is now almost always performed by computer.

**Clypeus** – a plate or sclerite fused to the lower frontal sector of the cranium of an insect. The mandibles meet just below the anterior margin of the clypeus, and the posterior clypeal margin often projects between the antennal sockets. In ants, the clypeus frequently has the superficial appearance of an upper 'lip', but it can be very reduced in some taxa. Structures (e.g. spines, teeth or ridges) on the anterior clypeal margin can prove a valuable diagnostic tool for taxonomic purposes.

**Concolorous** – all of the one colour

**Confluent** – flowing or coming together (here especially referring to lack of strongly demarcated boundaries between separate plates or sclerites)

**Conspecific** – belonging to the same species

**Cornicle** – literally 'little horn'; a short, blunt horn or rounded protuberance

**Coxa (pl. coxae)** – the first segment of the leg, i.e. the one that articulates with the mesosoma

**Crepuscular** – active in the twilight, i.e. just before daybreak or just after sunset

**Cuneate** – shaped like a wedge

**Cuticle** – the outermost layer of an animal's integument

**Dealate** – lacking wings (which have been shed)

**Declivitous** – pertaining to a downward slope; descending

**Decumbent** – projecting out from a surface at an angle and then bent back towards that surface

**Denticle** – a small tooth

**Dimorphic** – occurring in two morphologically distinct forms (in ants: with reference to worker subcastes – see monomorphic)

**Distal** – pertaining to the end of an extremity (i.e. in contrast to proximal)

**DNA** – shorthand for deoxyribonucleic acid, the genetic material of inheritance found in the nucleus of cellular organisms

**Dorsum** – a dorsal surface

**Edentate** – lacking teeth

**Elliptical** – having the shape of a flattened circle

**Emarginate** – having a shallow notch

**Ergatogyne** – a fertile female ant that is wingless and intermediate between a queen and a worker

**Extralimital** – occurring outside of the region of reference

**Facies** – (Lat.) general appearance

**Femur (pl. femora)** – the third segment of the leg, counting from the part (the coxa) that articulates with the mesosoma

**Flagellum (pl. flagella) (= Funiculus)** – the smaller segments of the antenna, excluding the scape, which together constitute the flexible part of the antenna. The flagellum may be of even diameter throughout or the terminal segments may be enlarged to form a club. Queen and worker ants in the SWBP have a minimum of three funicular segments (in some species of *Colobostruma*) and a maximum of 11 segments. Males may have as many as 12 funicular segments.

**Foramen** – an opening or perforation: here the opening in the head capsule that permits the entry of the aorta, foregut, neck muscles and ventral nerve cord into the mesosoma

***Formenkreis*** – a Germanic systematics concept predating Darwin: more recently applied to a group of related species that occupy mutually exclusive geographic areas

**Foveate** – covered with small pits or foveae

**Frass** – debris produced by insects. Ant frass may include wood shavings or plant fibres, cuticle from other arthropods and excrement.

**Frons** – the anterior or uppermost part of the head of an insect

**Frontal carinae** – A pair of longitudinal ridges on the front of the head of an ant. They are variably developed in different species, and often cover or partially cover the antennal sockets.

**Funiculus** – see Flagellum

**Gaster** – the part of the abdomen behind the one or two abbreviated waist segments. Morphologically, the gaster represents abdominal segments 3–7 (waist of a single segment) or segments 4–7 (waist of two segments).

**Gena (pl. genae)** – area of the front of the head between the posterior margin of the clypeus and the anterior margin of the eye, and delimited medially by the antennal socket

**Genotype** – the specific genetic make-up of an individual organism

**Glabrous** – 'having no hairs' (in ants, usually meaning having no standing setae, although small, appressed setae are generally present)

**Gracile** – of slender and delicate appearance

**Granulose** – having a surface covered with granular protuberances

**Habitus** – (Lat.) the physical characteristics of an organism

**Holotype** – the single specimen or illustration of a specimen used as the basis for the name of a species

**Humeral angles** – the anterior, lateral margins of the pronotum or promesonotum

**Hypopygium** – The sternite (upper plate) of abdominal segment 7, which is the terminal visible segment of the gaster

***Incertae sedis*** – Lat. (lit.) 'of uncertain standing'. Of uncertain taxonomic position

**Infraspecific** – within species

**Integument** – the outer covering (e.g. skin, cuticle, membrane) of an organism

**Insolated** – exposed to sunlight

**Karyotype** – the complete set of all the chromosomes of the cell of an organism

**Katepisternum** – see Mesopleuron

**Kwongan** – An ecoregion consisting of heathland, confined to South-western Australia. The Kwongan is valued chiefly for its rich endemic flora.

**Labial palp** – One of a pair of sensory palps located on the labium underneath the head of an insect. In ants the number of segments in each palp ranges from 1 to 6.

**Labrum** – A plate or sclerite that is hinged to the back of the clypeus. Usually it is folded back and down to cover the edges of the maxillae and labium when the mouthparts are not in use. In most ants the labrum is a bilobed plate that is invisible to normal view (i.e. dorsal or full-face), but it can project forward or be modified into prominent lobes in some taxa.

**Lamellate** – possessing a thin membrane or lamella

**Lamina** – a thin plate or scale

**Laterad** – directed or facing towards the side

**Lestobiotic** – refers to the habit of some small ant species of nesting in the walls of a colony of another ant species with the design of robbing the latter of brood or food stores

**Lignicolous** – dwelling in wood

**Macula** – in entomological terms, a pigmented blotch or large spot

**Matt** – dull; reflecting very little light

**Maxillary palp** – One of a pair of sensory palps located on the maxilla. In insects, each maxillary palp is to be found on the outside of a labial palp. In ants the number of maxillary palp segments ranges from 1 to 4.

**Mentum** – one of two parts of the labium. The presence or absence of standing J-shaped setae on the mentum in some ant species may be useful for diagnosing the species.

**Mesad** – directed or facing towards the middle

**Mesonotum** – the upper plate or tergite that constitutes part of the mesothorax in ants

**Mesopleuron** – this is the large side plate, or pleuron, that constitutes part of the mesothorax; it is hinged to the mesonotum. In ants, it may be entire or it may be divided by a groove into an upper sector (the anepisternum) and a lower sector (the katepisternum).

**Mesosoma** – the second whole segment after the head. In ants, this consists of the thorax and the first segment of the abdomen (the propodeum), which is fused to the thorax

**Metanotal groove** – In most ants, a transverse groove or impression representing a vestigial metanotum on the dorsal mesosoma: this feature may be absent

**Metapleural gland** – an exocrine gland whose orifice is found on the lower rear corner of the mesosoma, just above the hind pair of coxae. The gland is often visible under the cuticle, and the appearance of the orifice itself may have diagnostic value, even at the subfamily level. The orifice usually has guard setae around it.

**Metapleuron** – the side plate or pleuron belonging to the metathorax that is found below the propodeum and is fused with it.

**Metathoracic** – pertaining to the metathorax, the final member of the three body segments of the thorax. In ants the metathorax is fused posteriorly with the propodeum.

**Micropunctate** – covered with many very small punctures

**Microreticulate** – covered with a very fine network of ridges (striolae)

**Mitochondria** – an organelle found outside the nucleus in most eukaryotes, it produces energy for the cell through cellular respiration. Mitochondrial DNA, inherited only from the mother, is now commonly used to establish phylogenies for many organisms, including ants

**Monograph** – a treatise on a single subject

**Monomorphic** – occurring in one morphologically

distinct form (in ants: with reference to worker subcastes – see dimorphic)

**Monophasic allometry** – a type of polymorphism in which the variability in size of worker body parts is non-isometric. Typically, there is also a variation in size between the largest and smallest workers, but both are connected morphologically by intermediates.

**Monotypic** – including only a single representative (e.g. a genus with one species)

**Morphology** – study of the form and structure of an organism

**Morphospecies** – a species defined on the basis of its morphology: in current practice the term often has the notion of a preliminary placement of an organism in a named or unnamed category by a person with little or no taxonomic training.

**Mutualism** – a relationship between two species of organisms that benefits both

**Node** – a raised swelling; here applied to the dorsal petiolar protuberance found in most ant species. The term may also refer more generally to the whole petiole itself.

**Nomenclature** – In Biology, a standardized and internationally recognized system of names applied to different groups of plants and animals

**Occipital** – here pertaining to the back part of the head capsule or cranium of an insect

**Ocellus** – a small, simple, unfaceted eye

**Ochraceous** – ochre coloured

**Ovoid** – egg-shaped, i.e. with one end more narrowly rounded than the other

**Palp formula** – the number of segments in the maxillary palp and the number of segments in the labial palp, expressed as a standardized formula and separated by a comma (i.e. number, number)

**Paratype** – A specimen not designated as a type of a particular species, but listed as a representative of that species in the original type description.

**Pectinate** – comb-like

**Peduncle** – The usually narrow anterior sector of the petiole that articulates with the propodeum at its anterior end and links with the petiolar node at its posterior end. This narrow sector is lacking in many taxa. (n.b. When the peduncle is present, the petiole is said to be *pedunculate*, when it is absent, the petiole is *sessile*.)

**Petiole** – the second abdominal segment, which follows the propodeum. It is usually reduced in size and is always isolated.

**Phylogeny** – the evolutionary development and history of a taxon

**Phytogeographic** – pertaining to the geographic distribution of plants.

**Phytogeographic province** – a region containing a distinct flora characterised by a high degree of floristic affinity and endemism.

**Pilosity** – in reference to ants and other insects: the longer, standing setae that stand out above the shorter, finer hairs constituting the pubescence

**Planar** – level; on the same plane

**Polymorphic** – occurring in multiple morphologically distinct forms (in ants, this frequently refers to the presence of more than two worker subcastes; i.e. major and minor workers are connected by one or more media workers).

**Posteriad** – directed or facing towards the rear

**Postpetiole** – the third abdominal segment. Strictly speaking, the term is only applied when this segment is reduced in size and separated from the petiole anteriorly and the gaster anteriorly.

**Pretarsal claws** – The pair of terminal claws that is found on the apical tarsal segment. The claws may form a simple curve or have an internal tooth (a preapical tooth) or set of even-sized teeth (the pectinate condition).

**Promesonotal shelf** – a flattened shelf formed by the promesonotum in some myrmicine genera (most characteristically seen in the genus *Meranoplus*)

**Promesonotum** – the fused pronotum and mesonotum considered as a whole. This condition is found in several Australian ant subfamilies. In other subfamilies the pronotum and promesonotum are separated by a suture and are able to move independently.

**Pronotum** – the first segment of the thorax

**Propodeal lobes** – a pair of lobes arising from the base of the propodeum. These lobes are often rounded, but may terminate in an angle or a spinous projection.

**Propodeum** – the first dorsal plate or tergite of the abdominal segment, which is fused to the thorax and forms part of the mesosoma. The posterior angles of the propodeum are often furnished with spines, teeth or lamellae. The propodeum normally has a dorsal and a declivitous (or descending) face at the base of which there is often a pair of lobes (the propodeal lobes).

**Proximal** – with reference to a limb or other extremity; nearest to the point of attachment to the body (i.e. in contrast to distal)

**Pubescence** – in reference to ants and other insects: short, fine hairs, usually appressed, that typically form a second layer beneath the pilosity (standing, coarser hairs)

**Punctate** – dotted with small depressions

**Pygidium** – the tergite or dorsal plate of abdominal segment 7. This is the second visible gastral tergite.

**Quadrate** – square or approximately square in appearance

**Relictual** – reduced to a residual population or cluster of organisms, although once widespread

**Reniform** – kidney-shaped

**Replete** – in ants: an individual worker whose crop is distended with liquid food so that the abdominal segments are pulled apart and the intersegmental membranes stretched tight. Such individuals have greatly enlarged gasters, and act as food reservoirs for their colony, regurgitating food on demand to their fellow workers.

**Reticulate** – covered with a network of ridges (striae or striolae)

**Riparian** – located on the banks of a stream or river

**RNA** – shorthand for ribonucleic acid, an information encoded strand of nucleotides similar to DNA, but

with a slightly different chemical structure. The information from a gene is transferred from a strand of DNA by the construction (called transcription) of a complementary strand of RNA. Ribonucleic acid, which comes in several forms, can be found in various parts of the cell and also its nucleus, and like DNA, is currently used in constructing phylogenies of organisms.

**Ruga, -ae –** a fold, crease or wrinkle; here, in the cuticle or outer covering of an ant's body

**Rugose –** consisting of multiple, approximately parallel wrinkles or rugae

**Rugula, -ae –** small folds or wrinkles

**Scape –** in ants, the normally elongate basal segment of the antenna

**Sclerite –** a plate, composed of chitin, which forms part of the exoskeleton of an insect. Sclerites are usually separated from one another by a suture or a membranous area.

**Sclerophyll –** a type of vegetation characterised by the possession of small, tough, evergreen leaves designed to reduce water loss in a dry climate

**Sclerotized –** hardened, especially by the formation of sclerotin (an insoluble, tanned protein that stiffens the chitin in insect cuticle)

**Scrobe –** in ants, a groove or impression that runs above or below the eye, designed to accommodate all or part of the antenna when the latter is folded back. Usually referred to as the antennal scrobe.

**Seta (plural setae) –** a hairlike bristle that is socketed basally

**Setula (pl setulae) –** a short, fine seta

**Shagreenate –** refers to a surface that has a fine, irregular roughness

**Sinuate –** curved in and out

**Soma –** the entire body of an organism

**Spongiform –** like a sponge; in ants, referring specifically to masses of external cuticular tissue found around the petiole and postpetiole in some groups of myrmicines

**Squamiform –** having the form of a scale; in ants, usually refers to the shape of the node

**Sternite –** the lower plate or sclerite of a segment

**Striate –** referring to a body surface covered with impressed lines or grooves (striae)

**Striolate –** referring to a body surface covered with small or weak striae

**Sulcus –** a deep, narrow furrow or groove

**Synapomorphy –** an observable trait or character shared by a group of organisms (see apomorphy)

**Syntype –** Multiple specimens used collectively as the basis for the name of a species. In current practice it is customary though not mandatory to choose a single specimen (e.g. the holotype, lectotype or neotype) as the name-bearing type.

**Tarsus (plural tarsi) –** a collective term for the apical segments of the leg of an insect. In ants, there are five such segments. The segment of the tarsus that articulates with the tibia is the first tarsal segment. The fifth tarsal segment carries the pretarsal claws.

**Taxon (pl. taxa) –** a taxonomic category or group

**Taxonomy –** The classification of organisms in an ordered system that indicates their natural relationships.

**Tergite –** the upper plate or sclerite of a segment

**Thermophilic –** heat-loving, i.e. active in the hottest part of the day

**Tibia –** the fourth segment of the leg, intermediate between the tarsus and the femur

**Torulus –** a small, annular sclerite that surrounds the antennal socket. The torulus may be independent from or fused to the frontal lobe, a character useful for separating out some ant subfamilies

**Tree diagram –** a figure that branches from a single root

**Tridentate –** possessing three teeth

**Truncate –** with the appearance of being abruptly shortened

**Tumular –** mound-shaped

**Venter –** the underside of a structure or organ

**Vertex –** the top of the head; in insects, the upper surface of the head between the eyes and the occiput. It includes the frons.

## REFERENCES


Agosti, D. (1997). Two new enigmatic *Melophorus* species (Hymenoptera: Formicidae) from Australia. *Journal of the New York Entomological Society* 105: 161–169.

Andersen, A.N. (1990). The use of ants to evaluate change in Australian terrestrial ecosystems: a review and a recipe. *Proceedings of the Ecological Society of Australia* 16: 347–357.

Andersen, A.N. (1991a). *The ants of southern Australia. A guide to the Bassian fauna*. Melbourne: CSIRO Publications. vii + 70 pp.

Andersen, A.N. (1991b). Parallels between ants and plants: implications for community ecology. pp. 539–558 In C.R. Huxley, and D.F. Cutler (eds), *Ant-Plant Interactions*. Oxford University Press, Oxford. xviii + 601 pp.

Andersen, A.N. (1995). A classification of Australian ant communities, based on functional groups which parallel plant life-forms in relation to stress and disturbance. *Journal of Biogeography* 22: 15–29.

Andersen, A.N. (2000). *The Ants of Northern Australia: a guide to the monsoonal fauna*. CSIRO Publishing, Collingwood, VIC. v + 106pp.

Andersen A.N. (2002). Common names for Australian ants (Hymenoptera: Formicidae). *Australian Journal of Entomology* 41: 285–293.

Ashton, D.H. (1979). Seed harvesting by ants in forests of *Eucalyptus regnans* F. Muell. in central Victoria: Effect on natural regeneration. *Australian Journal of Ecology* 4: 265–277.

Beale, J.P. (1998). Temporal and spatial distribution of the rare, myrmecophagous Illidge's ant-blue butterfly, *Acrodipsas illidgei* (Lycaenidae) (Waterhouse and Lyell). *Journal of the Lepidopterists Society* 52: 139–150.

Beard, J.S., Chapman, A.R. and Gioia, P. (2000). Species richness and endemism in the western Australian flora. *Journal of Biogeography* 27: 1257–1268.

Bisevac, L. and Majer, J.D. (1999). Comparative study of ant communities of rehabilitated mineral sand mines and heathland, Western Australia. *Restoration Ecology* 7: 117–126.

Bolton, B. (1976). The ant tribe Tetramoriini (Hymenoptera: Formicidae). Constituent genera, review of smaller genera and revision of *Triglyphothrix* Forel. *Bulletin of the British Museum of Natural History (Entomology)* 34: 283–379.

Bolton, B. (1977). The ant tribe Tetramoriini (Hymenoptera: Formicidae). The genus *Tetramorium* Mayr in the Oriental and Indo-Australian regions, and in Australia. *Bulletin of the British Museum (Natural History) Entomology* 36: 67–151.

Bolton, B. (1987). A review of the *Solenopsis* genus-group and revision of Afrotropical *Monomorium* Mayr (Hymenoptera: Formicidae). *Bulletin of the British Museum (Natural History) Entomology* 54: 263–452.

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

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

Bolton, B. (2000). The ant tribe Dacetini. *Memoirs of the American Entomological Institute* 65: 1–1028.

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

Braby, M.F. (2000). *Butterflies of Australia, their identification, biology and distribution*. CSIRO, Melbourne. 2 vols. 1008 pp.

Briese, D.T., and Macauley, B.J. (1980). Temporal structure of an ant community in semi-arid Australia. *Australian Journal of Ecology* 5: 121–134.

Briese, D.T. and Macauley, B.J. (1981). Food collection within an ant community in semi-arid Australia, with special reference to seed harvesters. *Australian Journal of Ecology* 6: 1–19.

Brown, W.L. (Jr.). (1956). Some synonymies in the ant genus *Camponotus*. *Psyche (Cambridge)* 63: 38–40.

Brown, W.L., (Jr.) (1958). Predation of arthropod eggs by the ant genera *Proceratium* and *Discothyrea*. *Psyche (Camb.)* 64: 115.

Brown, W.L., (Jr.). (1959). Some new species of dacetine ants. *Breviora* 108: 1–11.

Brown, W.L., (Jr.). (1973). A comparison of the Hylean and Congo-West African rain forest ant faunas. pp. 161–185. *In:* B.J. Meggers, E.S. Ayensu and W.D. Duckworth (eds), *Tropical forest ecosystems in Africa and South America: a comparative review*. Smithsonian Institution Press, Washington, D.C.

Brown, W.L. (Jr.). (1975). Contributions toward a reclassification of the Formicidae. V. Ponerinae, tribes Platythyreini, Cerapachyini, Cylindromyrmecini, Acanthostichini, and Aenictogitonini. *Search Agriculture* 5: 1–116.

Clark, J. (1924). Ants as a domestic pest. *Journal of the Department of Agriculture, Western Australia* (2)1: 191–192.

Clark, J. (1936). A revision of Australian species of *Rhytidoponera* Mayr (Formicidae). *Memoirs of the National Museum of Victoria* 9: 14–89, pls 3–6.

Clark, J. (1938). The Sir Joseph Banks Islands. Reports of the McCoy Society for Field Investigation and Research. Part 10. Formicidae (Hymenoptera). *Proceedings of the Royal Society of Victoria* 50: 356–382.

Coyne, J.A. and Orr, H.A. (2004). *Speciation*. Sinauer Associates, Sunderland, Massachusetts. 545 pp., 45 illustr.

Cracraft, J. (1983). Species Concepts and Speciation Analysis. *In* R. Johnston, (ed), *Current Ornithology*. Plenum Press, New York. pp. 159–187.

Crawley, W.C. (1922). New ants from Australia. *Annals and Magazine of Natural History* (9) 10: 16–36.

Davis, J.I. and Nixon, K.C. (1992). Populations, genetic variation, and species concepts. *Bioscience* 41: 421–435.

Davison, E.A. (1982). Seed utilization by harvester ants. pp. 1–6 *In* R.C. Buckley (ed), *Ant-Plant Interactions in Australia*. W. Junk, the Hague.

Davison, E.A. (1987). Respiration and energy flow in two Australian species of desert harvester ants, *Chelaner rothsteini* and *Chelaner whitei*. *Journal of Arid Environments* 12: 61–82.

Donisthorpe, H. (1944). A new species of *Bothriomyrmex* Emery (Hym. Formicidae), and some notes on the genus. *Proceedings of the Royal Entomological Society of London*. *Series B*: 13: 101–103.

Dubovikov, D.A. (2004). *Nebothriomyrmex majeri* gen. et sp. n., a new genus and species of ants (Hymenoptera, Formicidae, Dolichoderinae) from Australia. *Entomologicheskoe obozrenie* 83: 487–489.

Ereshefsky, M., ed. (1992). *Units of Evolution: Essays on the Nature of Species*. MIT Press, Cambridge, MA/ London.

Fernandez, F. (2004). The American species of the myrmicine ant genus *Carebara* Westwood (Hymenoptera: Formicidae). *Caldasia* 26: 191–238.

Fiedler, K. (2001). Ants that associate with Lycaeninae butterfly larvae: diversity, ecology and biogeography. *Diversity and Distributions* 7: 45–60.

Field, R.P. (1997). The *Ogyris idmo* complex (Lepidoptera: Lycaenidae) as flagship species for conservation in southern Australia. *Memoirs of the Museum of Victoria* 56: 389–392.

Forel, A. (1893). Nouvelles fourmis d'Australie et des Canaries. *Annales de la Société Entomologique de Belgique* 36: 454–466.

Forel, A. (1907). Formicidae. *In:* W. Michaelsen, and R. Hartmeyer (eds), *Die Fauna Sudwest-Australiens. Band I, Lieferung 7*. Jena: Gustav Fischer, pp. 263–310.

Greenslade, P.J.M. (1978). Ants. pp. 109–113. *In:* W. A. Low (ed.), *The physical and biological features of Kunoth Paddock in central Australia*. CSIRO Division of Land Resources Technical Paper No. 4, Canberra.

Greenslade, P.J.M. (1979). *A guide to ants of South Australia*. South Australian Museum (Special educational Bulletin Series), Adelaide. xi + 44pp.

Gronenberg, W. (1995). The fast mandible strike in the trap-jaw ant *Odontomachus*: motor control. *Journal of Comparative Physiology A* 176: 399–408.

Gullan, P.J. and Stewart, A.C. (1996). A new genus and species of ant-associated coccid (Hemiptera: Coccidae: Myzolecaniinae) from *Canthium* Lam. (Rubiaceae). *Memoirs of the Queensland Museum* 39: 307–314.

Gunawardene, N. and Majer, J.D. (2004). Ants of the southern Carnarvon Basin, Western Australia: An investigation into patterns of association *Records of the Western Australian Museum* 22: 219–239.

Harrison, R.G. (1998). Origins: A Brief History of Research on Speciation. (Chapter 2) *In:* D.J. Howard, and S.H. Berlocher (eds), *Endless Forms*. Oxford University Press, New York, pp. 19–31.

Heinze, J., Kuhnholz, S., Schilder, K. and Hölldobler, B. (1993). Behavior of ergatoid males in the ant, *Cardiocondyla nuda*. *Insectes Sociaux* 40: 273–282.

Heterick, B.E. (2001). Revision of the Australian ants of the genus *Monomorium* (Hymenoptera: Formicidae). *Invertebrate Taxonomy* 15: 353–459.

Heterick, B.E. (2003). Two new Australian *Monomorium* Mayr (Hymenoptera: Formicidae), including a highly distinctive species. *Australian Journal of Entomology* 42: 249–253.

Heterick, B.E. (2006). A Revision of the Malagasy ants belonging to genus *Monomorium* Mayr, 1855 (Hymenoptera: Formicidae). *Proceedings of the California Academy of Sciences* 57(3): 69–202, 105 Figures

Heterick, B.E., Casella, J. and Majer, J.D. (2000). Influence of Argentine and Coastal brown ant (Hymenoptera: Formicidae) invasions on ant communities in Perth gardens, Western Australia. *Urban Ecosystems* 4: 277–292.

Heterick, B.E., Majer, J.D., Recher, H.F., and Postle, A.C. (2001). A checklist of the canopy, bark, soil and litter fauna of the Darling Plateau and adjacent woodland near Perth, Western Australia, with reference to the conservation of forest and woodland fauna. *Curtin University of Technology School of Environmental Biology Bulletin No.* 21. 35pp.

Heterick, B.E., Majer, J.D., Recher, H.F. and Postle, A.C. (2002). The canopy, bark, soil and litter fauna of the Darling Range and adjacent coastal woodland near Perth, Western Australia, with reference to the diversity of forest and woodland fauna. *Pacific Conservation Biology* 7: 229–239.

Hölldobler, B. and Taylor, R.W. (1983). A behavioral study of the primitive ant *Nothomyrmecia macrops* Clark. *Insectes Sociaux* 30: 384–401.

Hölldobler, B., and Wilson, E.O. (1990). *The Ants*. Springer-Verlag, Berlin Heidelberg, xii + 732 pp.

International Commission on Zoological Nomenaclature (1999). *International Code of Zoological Nomenclature: Fourth Edition*. (1999). The International Trust for Zoological Nomenclature, Natural History Museum, Cromwell Road, London. XXIX + 306 pp.

Kohout, R.J. (2000). A review of the distribution of the *Polyrhachis* and *Echinopla* ants of the Queensland Wet Tropics (Hymenoptera: Formicidae: Formicinae). *Memoirs of the Queensland Museum* 46: 183–209.

Kohout, R.J. and Taylor, R.W. (1990). Notes on Australian ants of the genus *Polyrhachis* Fr. Smith, with a synonymic list of the species (Hymenoptera: Formicidae: Formicinae). *Memoirs of the Queensland Museum* 28: 509–522.

LaPolla, J.S. 2004. *Acropyga* (Hymenoptera: Formicidae) of the World. *Contributions of the American Entomological Institute* 33: 1–130.

McAreavey, J.J. (1947). New species of the genera *Prolasius* Forel and *Melophorus* Lubbock (Hymenoptera, Formicidae). *Memoirs of the National Museum of Victoria* 15: 7–27.

McAreavey, J.J. (1949). Australian Formicidae. New genera and species. *Proceedings of the Linnaean Society of New South Wales* 74: 1–25.

McAreavey, J.J. (1957). Revision of the genus *Stigmacros* Forel. *Memoirs of the National Museum of Victoria* 21: 7–64.

McArthur, A.J. (2003). New species of *Camponotus* (Hymenoptera: Formicidae) from Australia. *Transactions of the Royal Society of South Australia* 127: 5–14.

McArthur, A.J. (2007). A key to *Camponotus* Mayr of Australia, pp. 290–351. *In:* R.R. Snelling, B.L. Fisher and P.S. Ward (eds), *Advances in ant systematics* (*Hymenoptera*: *Formicidae*): *homage to E.O. Wilson – 50 years of contributions*. Memoirs of the American Entomological Institute, 80.

McArthur, A.J. and Adams, M. (1996). A morphological and molecular revision of the *Camponotus nigriceps* group (Hymenoptera: Formicidae) from Australia. *Invertebrate Taxonomy* 10: 1–46.

McArthur, A.J., Adams, M. and Shattuck, S.O. (1997). A morphological and molecular review of the *Camponotus terebrans* Lowne (Hymenoptera: Formicidae) complex in southern Australia. *Australian Journal of Zoology* 45: 579–598.

McArthur, A.J. and Shattuck, S.O. (2001). A taxonomic revision of the *Camponotus macrocephalus* species group (Hymenoptera: Formicidae) in Australia. *Transactions of the Royal Society of South Australia* 125(1): 25–43.

McKenzie, N., Keighery, G., Gibson, N., Hopkins, A. and Tinley, K. (2000). *IBRA sub-regions in Western Australia: a report to Environment Australia*. Department of Conservation and Land Management, Western Australia, 8 pp.

Majer, J. D. (1982). Ant-plant interactions in the Darling Botanical District of Western Australia. pp. 45–61 *In* R.C. Buckley (ed), *Ant-Plant Interactions in Australia* . W. Junk Press, The Hague, Netherlands.

Majer, J. (1983). Ants: bio-indicators of mine-site rehabilitation, land use and land conservation. *Environmental Management* 7: 375–383.

Majer, J.D. and Brown, K.R. (1986). The effects of urbanization on the ant fauna of the Swan Coastal Plain near Perth, Western Australia, *Journal of the Royal Society of Western Australia* 69: 13–17.

Mallet, J. (1995). A species definition for the Modern Synthesis. *Trends in Ecology and Evolution* 10: 294–299.

May, J.E. and Heterick, B.E. (2000). Effects of the coastal brown ant *Pheidole megacephala* (Fabricius) on the ant fauna of the Perth metropolitan region, Western Australia. *Pacific Conservation Biology* 6: 81–85.

Mayr, E. (1942). *Systematics and the Origin of Species*. Columbia University Press, New York. 334 pp.

Mayr, E. (1963). *Animal Species and Evolution*. Belknap Press, Cambridge, Massachusetts. 797 pp.

Mayr, E. (1982). *The Growth of Biological Thought: Diversity, Evolution and Inheritance*. Harvard University Press, Cambridge, Massachusetts. 974 pp.

Mischler, B.D. and Brandon, R. (1987). Individuality, pluralism and the Phylogenetic Species Concept. *Biology and Philosophy* 2: 397–414.

Nitikin, M.I. (1979). Geographical distribution of three species of small ants common in New South Wales. *Australian Entomological Magazine* 5: 101–102.

Ogata, K. and Taylor, R.W. (1991). Ants of the genus *Myrmecia* Fabricius: a preliminary review and key to the named species (Hymenoptera: Formicidae: Myrmeciinae). *Journal of Natural History* 25: 1623–1673.

Ogata, K. and Yamane, S. (2003). Japanese Ant Database Group. http://ant.edb.miyakyo-u.ac.jp/E/JADG/index.html

Paterson, H.E.H. (1978). More evidence against speciation by reinforcement. *South African Journal of Science* 74: 369–371.

Paterson, H.E.H. (1981). The continuing search for the unknown and unknowable: a critique of contemporary ideas on speciation. *South African Journal of Science* 77: 113–119.

Paterson, H.E.H. (1982). Darwin and the origin of species. *South African Journal of Science* 78: 272–275.

Paterson, H.E.H. (1984). The Recognition Concept of Species: Michael MacNamara interviews H.E.H. Paterson. *South African Journal of Science* 80: 313–318.

Paterson, H.E.H. (1985). The Recognition Concept of Species. *In* B. Vrba (ed), *Species and Speciation*. Transvaal Museum Monograph No. 4, Pretoria pp. 21–29.

Paterson, H.E.H. (1988). On defining species in terms of sterility: problems and alternatives. *Pacific Science* 42: 65–71.

Paterson, H.E.H. (1993). *Evolution and the Recognition Concept of Species; Collected Writings* (McEvey, S. F., ed.). Johns Hopkins University Press, Baltimore, Maryland, xix+234 pp.

Philippe, H., Lartillot N. and Brinkmann, H. (2005). Multigene Analyses of Bilaterian Animals Corroborate the Monophyly of Ecdysozoa, Lophotrochozoa, and Protostomia. *Molecular Biology and Evolution* 22: 1246–1253.

Reichel, H.L.M. (2003) *Systematics of the ant genus* Rhytidoponera *(Hymenoptera: Formicidae) in Australia.* PhD thesis (unpubl.). viii + 229 pp.

Revision of the Interim Biogeographic Regionalisation for Australia (IBRA) and Development of Version 5.1 – Summary Report (2000). http://www.deh.gov.au/parks/nrs/ibra/version5–1/summary-report/

Samson, P.R (1989). Morphology and biology of *Acrodipsas illidgei* (Waterhouse and Lyell), a myrmecophagous lycaenid (Lepidoptera: Lycaenidae: Theclinae). *Journal of the Australian Entomological Society* 28: 161–168.

Santschi, F. (1906). A propos de moeurs parasitiques temporaires des fourmis du genre *Bothriomyrmex*. *Annales de la Société Entomologique de France* 75: 363–392.

Saunders, G.W. (1967). Funnel ants (*Aphaenogaster* spp., Formicidae) as pasture pests in North Queensland: I. Ecological background, status and distribution. *Bulletin of Entomological Research* 57: 419–432.

Schödl, S. (2007). Revision of Australian *Meranoplus*; the *Meranoplus diversus* group, pp. 370–424. *In:* R.R. Snelling, B.L. Fisher, and P.S. Ward (eds), *Advances in ant systematics* (*Hymenoptera*: *Formicidae*): *homage to E. O. Wilson – 50 years of contributions*. Memoirs of the American Entomological Institute, 80.

Seifert, B. (2003). The ant genus *Cardiocondyla* (Insecta: Hymenoptera; Formicidae) – a taxonomic revision of the *C. elegans, C. bulgarica, C. batesii, C. nuda, C. shuckardi, C. stambuloffi, C. wroughtonii, C. emeryi* and *C. minutior* species-groups. *Annalen des Naturhistorischen Museums in Wien* 104B: 203–338.

Shattuck, S.O. (1992a). Review of the dolichoderine ant genus *Iridomyrmex* Mayr with descriptions of three new genera (Hymenoptera: Formicidae). *Journal of the Australian Entomological Society* 31: 13–18.

Shattuck, S.O. (1992b). Generic revision of the ant subfamily Dolichoderinae (Hymenoptera: Formicidae). *Sociobiology* 21: 1–181.

Shattuck, S.O. (1993a). Revision of the *Iridomyrmex*

*purpureus* species-group (Hymenoptera: Formicidae). *Invertebrate Taxonomy* 7: 113–149.

Shattuck, S.O. (1993b). Revision of the *Iridomyrmex calvus* species-group (Hymenoptera: Formicidae). *Invertebrate Taxonomy* 7: 1303–1325.

Shattuck, S.O. (1996). Revision of the *Iridomyrmex discors* species-group (Hymenoptera: Formicidae). *Australian Journal of Entomology* 35: 43–47.

Shattuck, S.O. (1999). *Australian Ants: their biology and identification*. CSIRO Publishing, Collingwood, VIC. 226 pp.

Shattuck, S.O. (2000). The epopostrumiform genus group, pp. 30–67. *In* Bolton, B. The ant tribe Dacetini. *Memoirs of the American Entomological Institute* 65: 1–1028.

Shattuck, S.O. (2007). New species of myrmicine ants from Western Australia (Hymenoptera: Formicidae). *Zootaxa* 1661: 47–50

Shattuck, S.O. and Barnett, N.J. (2007). Australian ants online. CSIRO, Camberra. Available at http://www.ento.csiro.au/science/ants/

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

Shattuck, S.O. and McMillan, P. (1998). Revision of the *Iridomyrmex conifer* group (Hymenoptera: Formicidae) with notes on their biology. *Australian Journal of Zoology* 46(3): 301–315.

Smith, F. (1858). *Catalogue of hymenopterous insects in the collection of the British Museum. Part VI. Formicidae*. British Museum (Natural History), London. 216 pp.

Snelling, R.R. (1981). Systematics of social Hymenoptera. *In* H. R. Hermann (ed), *Social Insects*, vol. 2, pp. 369–474. Academic Press, New York.

Street, M.D., Donovan, G.R., Baldo, B.A., and Sutherland, S. (1994). Immediate allergic reactions to *Myrmecia* ant stings: immunochemical analysis of *Myrmecia* venoms. *Clinical and Experimental Allergy* 24: 590–597.

Taylor, R.W. (1978). *Nothomyrmecia macrops*: a living-fossil ant rediscovered. *Science (Washington D. C.)* 201: 979–985.

Taylor, R.W. (1990). The nomenclature and distribution of some Australian and New Caledonian ants of the genus *Meranoplus* Fr. Smith (Hymenoptera: Formicidae: Myrmicinae). *General and Applied Entomology* 22: 31–40.

Taylor, R.W. (1991). Nomenclature and distribution of some Australasian ants of the Myrmicinae. *Memoirs of the Queensland Museum* 30: 599–614.

Taylor, R.W. (1992). Nomenclature and distribution of some Australian and New Guinean ants of the subfamily Formicinae (Hymenoptera: Formicidae). *Journal of the Australian Entomological Society* 31: 57–69.

Taylor, R.W. and Brown, D.R. (1985). Formicoidea. pp. 1–149 *In:* D.W. Walton (ed), *Zoological Catalogue of Australia, Vol. 2. Hymenoptera: Formicoidea, Vespoidea and Sphecoidea*. Canberra: Australian Government Publishing Service. vi + 381 pp.

Templeton, A.R. (1989). The meaning of species and speciation: a genetic perspective. *In:* D. Otte, and J.A. Endler (eds), *Speciation and its Consequences*. Sinauer, Sunderland, Massachusetts, pp. 3–27.

Vander Meer, R.K., Jaffe, K. and Cedeno, A. (eds) (1990). *Applied Myrmecology: a World Perspective*. Westview Press, Boulder. xv + 741 p. pp. 3–14.

Ward, P.S. (2001). Taxonomy, phylogeny and biogeography of the ant genus *Tetraponera* (Hymenoptera: Formicidae) in the Oriental and Australian regions. *Invertebrate Taxonomy* 15: 589–665.

Wheeler, W.M. (1934). Contributions to the fauna of Rottnest Island, Western Australia. No. IX. The ants. *Journal of the Royal Society of Western Australia* 20: 137–163.

Williams, D.F. (ed) (1994). *Exotic ants. Biology, impact, and control of introduced species*. Westview Press, Boulder. xvii + 332 p.

Williams, D.J. (1978). The anomalous ant-attending mealybugs (Homoptera: Pseudococcidae) of south-east Asia. *Bulletin of the British Museum* (*Natural History*). *Entomology* 37: 1–72.

Williams, D. J. (1985). *Australian mealybugs*. British Museum (Natural History), London. 431pp.

Williams, D. J. and Watson, G. W. (1988). *The Scale Insects of the tropical South Pacific region. Part 2. The mealybugs (Pseudococcidae)*. CAB International Inst. Wallingford, Oxon. 260 pp.

Wilson, E.O. (1962). The Trinidad cave ant *Erebomyrma* (=*Spelaeomyrmex*) *urichi* (Wheeler), with a comment on cavernicolous ants in general. *Psyche* 69: 62–72.

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