Zootaxa 2845: 1–174 (2011)
www.mapress.com/zootaxa/

Monograph

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

ZOOTAXA

2845

Revision of the ant genus *Iridomyrmex* (Hymenoptera: Formicidae)

BRIAN E. HETERICK[1] & STEVE SHATTUCK[2]
[1] Curtin University of Technology, GPO Box U1987, Perth WA 6845, Australia
[2] CSIRO Ecosystem Science, P. O. Box 1700, Canberra ACT 2601, Australia

Magnolia Press
Auckland, New Zealand

Accepted by J. Longino: 1 Dec 2010; published: 29 Apr. 2011

BRIAN E. HETERICK & STEVE SHATTUCK
Revision of the ant genus *Iridomyrmex* (Hymenoptera: Formicidae)
(*Zootaxa* 2845)

174 pp.; 30 cm.

29 Apr. 2011

ISBN 978-1-86977-675-6 (paperback)

ISBN 978-1-86977-676-3 (Online edition)

FIRST PUBLISHED IN 2011 BY

Magnolia Press

P.O. Box 41-383

Auckland 1346

New Zealand

e-mail: zootaxa@mapress.com

http://www.mapress.com/zootaxa/

ISSN 1175-5326 (Print edition)

ISSN 1175-5334 (Online edition)

Table of contents

Abstract

The world fauna of the dolichoderine ant genus *Iridomyrmex* (Hymenoptera: Formicidae) is revised. Seventy-nine species are recognised, 31 described as new. Four species are removed from *Iridomyrmex*: *I. butteli* (Forel) to *Chronoxenus*, *I. extensus* Emery to *Anonychomyrma* and *I. krakatauae* Wheeler and *I. latifrons* Karavaiev to *Tapinoma*. Twenty-five species and subspecies pass into synonymy: *I. emeryi* Crawley is synonymised under *I. victorianus* Forel (itself raised to species), *I. vicinus* Clark is synonymised under *I. splendens* Forel (itself raised to species), *I. wingi* Donisthorpe is synonymised under *I. pallidus* Forel (itself raised to species), *I. gracilis* Lowne (a preoccupied name) is synonymised under *I. bicknelli* Emery, *I. mimulus* Shattuck is synonymised under *I. viridigaster* Clark, *I. albitarsus* Wheeler and *I. notialis* Shattuck are synonymised under *I. calvus* Emery, *I. obscurus* Crawley is synonymised under *I. suchieri* Forel (itself raised to species), *I. greensladei* Shattuck is synonymised under *I. purpureus*, *I. variscapus* Shattuck is synonymised under *I. bigi* Shattuck, and *I. meinerti* Forel is synonymised under *I. anceps* Roger. Of the subspecies, *I. anceps formosae* Forel, *I. anceps ignobilis* Mann, *I. rufoniger metallescens* Emery, *I. anceps sikkimensis* Forel and *I. anceps watsonii* Forel are synonymised under *I. anceps*, *Iridomyrmex bicknelli splendidus* Forel is synonymised under *I. bicknelli* Emery, *I. rufoniger fusciventris* Forel is synonymised under *I. brunneus* Forel (itself raised to species), *I. chasei concolor* Forel and *I. chasei yalgooensis* Forel are synonymised under *I. chasei* Forel, *I. rufoniger incertus* Forel is synonymised under *I. pallidus*, *I. rufoniger domesticus* Forel and *I. rufoniger septentrionalis* Forel are synonymised under *I. rufoniger* Lowne, and *I. mattiroloi parcens* Forel is synonymised under *I. victorianus*. In addition to the five taxa mentioned above, the subspecies *I. bicknelli azureus* Viehmeyer, *I. bicknelli brunneus* Forel, *I. mattiroloi continentis* Forel, *I. gracilis minor* Forel, *I. gracilis rubriceps* Forel and *I. gracilis spurcus* Forel are raised to species. A single species, *I. bicknelli luteus* Forel, could not be identified and is treated as *species inquirenda*. A key to workers of the genus is supplied. Lectotypes are designated for *I. brunneus* Forel, *I. chasei* Forel, *I. conifer* Forel, *I. discors* Forel, *I. minor* Forel, *I. mjobergi* Forel, *I. pallidus* Forel, *I. suchieri* Forel and *I. victorianus* Forel. Neotypes are established for *I. anceps* (Roger), *I. parcens* Forel and *I. rufoniger* (Lowne). Five fossil species are considered to belong to *Iridomyrmex*, although only one of these is supported by rigorous morphological data. Four fossil species are regarded as *incertae sedis* within the genus. The following fossil-based species are removed from *Iridomyrmex* (all new combinations): *geinitzi* Mayr to *Anonychomyrma*, *haueri* Mayr to *Dolichoderus*, *oblongiceps* Wheeler to *Eldermyrmex* (**gen. n.**) and *bogdassarovi* Nazaraw, Bagdasaraw & Uriew to *Liometopum*.

Key words: Hymenoptera, Formicidae, Dolichoderinae, *Iridomyrmex*, taxonomy, new species, SE Asia, Australia.

Introduction

The ant genus *Iridomyrmex* belongs to the subfamily Dolichoderinae. All members of this subfamily are readily characterised as possessing a slit-like opening on the underside of the end of the abdomen (*i.e.*, that part of the ant abdomen known as the gaster). This opening is the means by which various chemicals, e.g., for defence or trail-marking, can be disseminated to the environment. *Iridomyrmex* is a quintessentially Australian phenomenon. Although a small handful of species range as far away as India and China, the vast bulk of the taxa of this ecologically important and speciose genus is restricted to Australia. Within Australia, members of the genus are a conspicuous part of most ecosystems, although they tend to avoid the very moist areas such as wet sclerophyll and rain forests (Shattuck, 1992b).

Taxonomic history

The genus *Iridomyrmex* was erected by Mayr in 1862, although the type-species was not designated until 1903 (Bingham, 1903). The type-species *Iridomyrmex detecta* had previously become a junior synonym of *I. purpureus* (F. Smith) (Lowne, 1865a). In this early period, ant subfamily classification was confused, and it was not until 1878, 16 years after publication of the formal diagnosis of genus *Iridomyrmex*, that Forel established the subfamily Dolichoderinae (as 'Dolichoderidae') (Forel, 1878a). *Iridomyrmex* was placed in that subfamily later in the same year (Forel, 1878b).

From the time of its inception, the genus *Iridomyrmex* (Fig. 1A–I) has also suffered from a confused taxonomic understanding, not least because of the failure of early researchers to identify easy-to-recognise diagnostic features. Some diagnostic characters used, such as the morphology of the proventriculus, were not so much unreliable as unwieldy and made separation of dolichoderine genera difficult for most researchers. The result was the gradual development of a portmanteau genus containing unrelated ants, and taxonomic instability that multiplied with the accumulation of new forms (Shattuck, 1992b). Brown (1958) was probably the first myrmecologist to


A - *I. dromus*
B - *I. reburrus*
C - *I. discors*
D - *I. lividus*
E - *I. alpinus*
F - *I. purpureus*

FIGURE 1. *Iridomyrmex* workers. A. An *I. dromus* worker foraging on a *Eucalyptus* trunk in dry sclerophyll woodland. This ant was part of a loose foraging column between a feeding area high in the tree and the colony's soil-based nest. B. *Iridomyrmex reburrus* forms large nests containing tens of thousands of workers. Workers forage in high concentrations in the vicinity of the nest. C. *Iridomyrmex discors*, while generally uncommon, can occur in large numbers at suitable sites. D. *Iridomyrmex lividus* is a distinctive and common ant of the southern arid zone. E. *Iridomyrmex alpinus* is one of the most common and obvious species in the High Country of south-eastern Australia. While ground-nesting, it forages both on the ground and on vegetation including trees. F. Like most species of *Iridomyrmex, I. purpureus* workers are highly visual and interactive, communicating with each other as well as attacking intruders to their territories.

strongly question the monophyly of *Iridomyrmex*, when he indicated that the Argentine ant (then *Iridomyrmex humilis* Mayr) differed from the true Indo-Australian *Iridomyrmex* by reason of its 'internal characters'. The same author (Brown, 1977) elaborated on those differences when he stated that the Indo-Australian *Iridomyrmex* lack Pavan's apparatus, whereas the Argentine ant and its new World relatives possess this structure. Snelling and Hunt (1975), citing Brown (1958), also queried the placement of New World species in *Iridomyrmex*. In a separate judgement, based on chromosomal differences, Crozier (1968) suggested '*Iridomyrmex glaber*' (now *Ochetellus glaber* (Mayr)) should also be removed from *Iridomyrmex*.

Despite these rumblings of discontent, a proper overhaul of *Iridomyrmex* only commenced in the early 1990's. Shattuck (1992a) redefined the genus, and transferred 91 named taxa to six separate dolichoderine genera, three of them new. *Anonychomyrma* Donisthorpe received 31 taxa, *Doleromyrma* Forel three taxa, *Linepithema* Mayr 28 taxa, *Ochetellus* Shattuck 10 taxa, *Papyrius* Shattuck five taxa and *Philidris* Shattuck 14 taxa. Sixty-two named taxa remained in *Iridomyrmex*. Shattuck (1992b) undertook a generic revision of the entire subfamily Dolichoderinae and included a diagnosis of all castes of each genus (insofar as these were known). Diagnostic features for the *Iridomyrmex* worker were all cephalic, and included the posterior position of the eyes on the head capsule, the presence of shoulders on the anterolateral clypeal margin, and a pointed or rounded projection of the anteromedial clypeal margin (here termed the anteromedial clypeal prominence). As well as a broad generic analysis of *Iridomyrmex*, Shattuck, alone or in collaboration, has also revised some of the constituent groupings within the genus, these being the *I. purpureus* group (Shattuck, 1993a), the *I. calvus* group (Shattuck, 1993b), the *I. discors* group (Shattuck, 1996) and the *I. conifer* group (Shattuck and McMillan, 1998). These are all relatively easily recognised groups with distinctive diagnostic characters, and include most of the larger species. At the time of writing, 79 living taxa (species and subspecies) and a *nomen nudum* are listed under *Iridomyrmex*, and there are also five fossil taxa.

The development of a robust species-group level classification within the genus has proven problematic with a number of alternative arrangements been proposed (Anderson 2000, 2007; Shattuck, 1993a, 1993b, 1996; Shattuck and McMillan, 1998). Confusingly, there has often not been agreement on the exact boundaries and composition of these groups, further reducing their utility. Pending molecular phylogenetic analyses to test the monophyly of these groups, we have here chosen to emphasize species-level taxonomy rather than possible arrangements of higher groupings.

Progress on the species-level taxonomy within *Iridomyrmex* has been complicated by the conservative and uniform nature of the taxa: the mandible, palps and antennal segments are uniform across all taxa, the body lacks excrescences of any sort, and the pilosity often appears a trivial character (there are no uniquely informative bristles, as in, for example *Camponotus*, and hairiness is often an intraspecific feature). The often subtle trait antennal scape length is uniform in most taxa and this is a useful character for recognising species, while the appearance of the anteromedial clypeal prominence may be an indicator of deeper radiations at a species-group or species-complex level. The appearance of the frontal carinae is occasionally helpful. Minor characters include appearance of the cuticle and presence or absence of a psammophore. Colour is relatively uniform within most species, but is rarely helpful beyond species-level. This lack of substantive or obvious morphological differentiation among taxa and the taxonomic significance of a number of subtle characters have resulted in little progress being made on the species-level taxonomy within the genus, even given the large amounts of material available for study.

The apparent reason for the morphologically conservative nature of *Iridomyrmex* is the exceptionally high speciation rate within the genus (Fig. 5). Based on the work of Ward et al. (2010), the genus *Iridomyrmex* arose approximately 12 million years ago. The sister group to this genus, *Froggattella*, has just two species even though it is the same age. To reach the same number of species currently understood to belong to *Iridomyrmex* requires the inclusion of all eight Indo-Australian dolichoderine genera basal to it, i.e., a total of 73 described species (slightly

fewer than the tally for *Iridomyrmex*). The age of this clade is estimated at 23 million years. Thus, it would seem that *Iridomyrmex* has speciated nearly as much in the last 12 million years as its close relatives have over the last 23 million years (acknowledging that extinction will have reduced the number of taxa among the close relatives more than within the much younger *Iridomyrmex*). This means that the species within *Iridomyrmex* are relatively young and will not have diverged genetically (and morphologically) to the degree seen in other genera within the subfamily.

Biology and Ecology (Figs 2A–H, 3A–G, 4A–H)

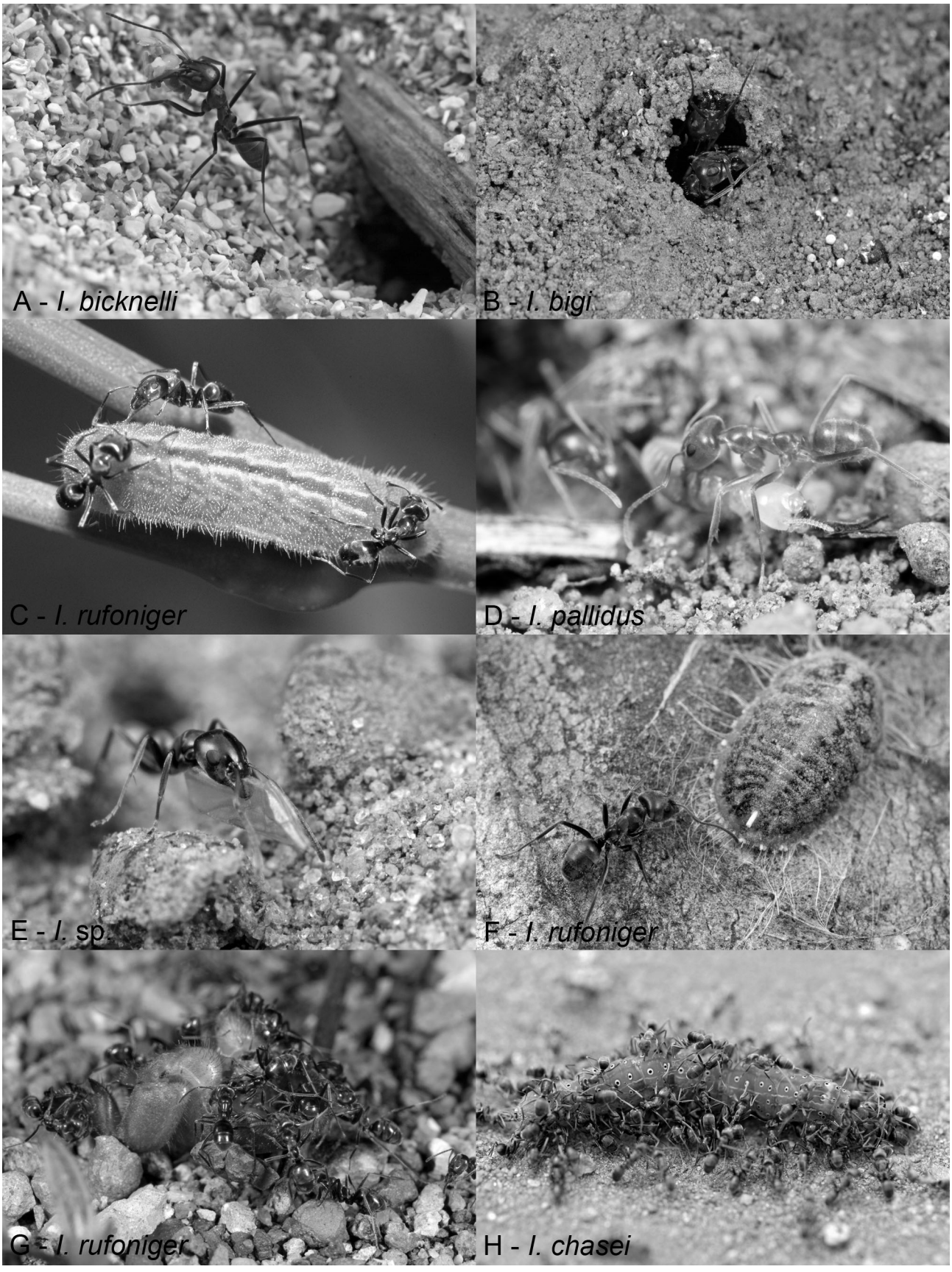
Iridomyrmex species need no introduction for many Australians. The largest species, the meat ants, are a familiar sight in rural areas, and the smaller brown and black species are found in most ecosystems, but are most abundant in the semi-arid and arid zone. Several species are also frequently observed in urban areas. Although generally categorised as 'aggressive' (Shattuck, 1999; Andersen, 2000), some species are timorous and avoid combative interactions with other organisms, including other ants. Nearly all nests are in soil, either in the open or under rocks, bark, logs or other cover, and the appearance of the entrance may vary from multiple holes surrounded with a large, pebble-strewn mound, to a single small hole, the size of a worker. The size of the nests is variable, from a few hundred workers to over 300,000 workers (Shattuck, 1999).

Behaviour

Many species of *Iridomyrmex* are extremely aggressive, with workers that are more than willing to attack anything that disturbs their nests or foraging columns. Members of the *I. purpureus* species group, the "meat ants", will literally boil from their mounds at the slightest disturbance, attacking any and all intruders. These species are also ecologically dominant, significantly impacting on the foraging behaviours of other species occurring near their nests because of the large numbers of workers active in these areas. They commonly monopolise food sources and prevent access by other species (Andersen and Patel, 1994). Even relatively small species such as *I. chasei* and *I. rufoniger* are notably aggressive and will swarm over those disturbing them, and while they don't sting, they will give a sharp, painful bite. These species are commonly found in urban areas and while they generally do not enter houses, they can be abundant in yards and gardens where they are mainly a nuisance as they excavate soil from under paving stones and along pathways and bite those approaching their nests. In a few cases these and other species are known to enter homes in search of food and water, but this is relatively uncommon and generally occurs for only short periods.

In contrast to these aggressive species, many species are quite timid, running and hiding when disturbed and avoiding contact with more aggressive ant species. These include *I. agilis*, *I. bicknelli*, *I. dromus*, *I. longisoma*, *I. mjobergi*, *I. suchieroides* and *I. victorianus*. Among these species, foraging is often undertaken by single workers with recruitment limited to only a few nest mates. When nests are disturbed, workers busy themselves removing exposed brood to safety rather than attacking intruders. While removing soil from nests, workers will ignore nearby disturbances and remain focused on the task at hand. If attempts are made to capture these workers they will scurry out of sight into leaf litter to hide. In extreme cases, such as *I. victorianus*, workers are known to feign death to avoid capture, lying motionless until the danger has passed.

FIGURE 2. *Iridomyrmex* biology. A. Nest construction is a major undertaking for nearly all ants. This *I. bicknelli* worker carries excavated soil from the nest entrance and will deposit it several centimetres away. B. *Iridomyrmex bigi* is a nocturnal species that blocks the nest entrance during the day. These workers are repairing a damaged entrance. C. These *I. rufoniger* workers are tending a lycaenid butterfly larva. The ants provide protection for the caterpillar in exchange for a sugar and protein-rich meal. D. *Iridomyrmex* workers forage for a wide range of prey, in this case a termite being carried to an *I. pallidus* nest. E. While the nutritional value of an insect wing is minimal, this forager nonetheless returned to the nest with one as food for the colony's larvae. F. An *I. rufoniger* worker visits a scale insect on a Eucalyptus trunk in search of honeydew excreted from the straw-like process on the homopteran's posterior surface. G. *Iridomyrmex* workers are highly effective foragers, as in this case where numerous *I. rufoniger* workers cooperate to dismember this orthopteran and transport it to their nest. H. These *I. chasei* workers have been recruited to a butterfly larva discovered several metres from their nest. They work together to subdue the prey and carry it to their nest.


A - I. bicknelli
B - I. bigi
C - I. rufoniger
D - I. pallidus
E - I. sp.
F - I. rufoniger
G - I. rufoniger
H - I. chasei

While meat ants are some of the most aggressive and territorial species in the genus, one species, *I. purpureus*, has developed elaborate ritualised territorial displays to resolve boundary disputes among closely situated nests (Ettershank and Ettershank, 1982; van Wilgenburg et al., 2005). When members of separate colonies meet, they follow a tightly scripted routine until appeasement occurs. This routine starts with antennation and open mandibular posturing, escalates to body elevation and front leg "kick boxing" and finally progresses to turned gasters and hind leg boxing. This last step continues until one of the combatants backs down, in which case both will enter a period of self-grooming followed by searching for another "foreign" worker. These boundary disputes may continue for months during the summer, and be repeated year after year at essentially the same location. It seems that ultimate resolution is based not on the effectiveness of individual workers but by the number of workers recruited to the battle by each colony; in other words, the larger colony generally wins in the end. Additionally, in a few cases fierce fighting can occur in these ants, sometimes leading to serious injury or death. This sort of fighting is most often initiated by the territory-defending ant while ritualised fighting is most often initiated by the intruding ant. Clearly a range of complex behaviours have developed within these ants relating to colony and territorial defence.

Foraging Patterns

As far as is known, all species of *Iridomyrmex* are general predators and scavengers as well as tending a wide range of arthropods for honeydew, including a variety of Hemiptera and lycaenid butterfly larvae. These Hemiptera and caterpillars produce sugary fluids from their digestive systems or specialised glands, and ants will tend and protect these for this reward. Some species will also take plant material, especially the oil and protein rich arils (or elaiosomes) of seeds. Workers subdue or scavenge a wide variety of food items, ranging from the smallest arthropods to the largest dead vertebrates, and show little specialisation or preference for the items taken. They will also forage on flowers of many plants, both to collect nectar and also in search of small prey items. While all forage on the ground, many species will forage on tree-trunks and low vegetation and will even climb high into trees in search of food.

The vast majority of *Iridomyrmex* workers forage during the day in loose columns, although a few (including *I. omalonotus* and *I. rufoniger)* will forage at night as well. Some species (for example *I. dromus, I. exsanguis, I. hartmeyeri* and *I. pallidus*) are primarily active at night and some will block their nest entrances during the day. Despite this generally nocturnal disposition, most of these species are also diurnally active in suitable conditions. A notable exception is *I. bigi*, which is apparently strictly nocturnal and firmly blocks its nest entrances during the day, quickly replacing the plug if disturbed.

When foraging, most species form large, conspicuous foraging trails between their nests and feeding areas. Ground-based trails can become virtual highways over time, worn smooth and becoming free from plants and surface litter. These trails are especially well developed in species such as *I. purpureus* and *I. rufoniger.* In a few species (including *I. agilis* and *I. cephaloinclinus*) workers forage singly along well defined but indistinct paths across the ground, scurrying quickly, often with their gasters raised. In other species, intermediate patterns are seen, with workers forming loose foraging trails away from their nests and then dispersing over large areas where they forage individually.

Nests

Nearly all species of *Iridomyrmex* are ground nesting, with nests found in the open or under rocks, logs or other objects on the ground. A few species (including *I. alpinus, I. mayri, I. meridianus* and *I. splendens*) will nest in rotten wood, but generally in these cases soil is also involved. There are a limited number of records of nests being found under bark (for example in *I. minor* and *I. victorianus*) but these are uncommon and even those species involved show a preference for nesting in soil. The vast majority of species show little preference for specific soil types with most being found in a wide range of situations. In fact, some species, such as *I. bicknelli*, can be found nesting in virtually any location, from pure sand beaches to spaces between barren footpaths in large cities. A few species, such as some members of the *purpureus* group, tend to avoid loose, sandy soil types (Greenslade, 1974), but this is exceptional for the genus.

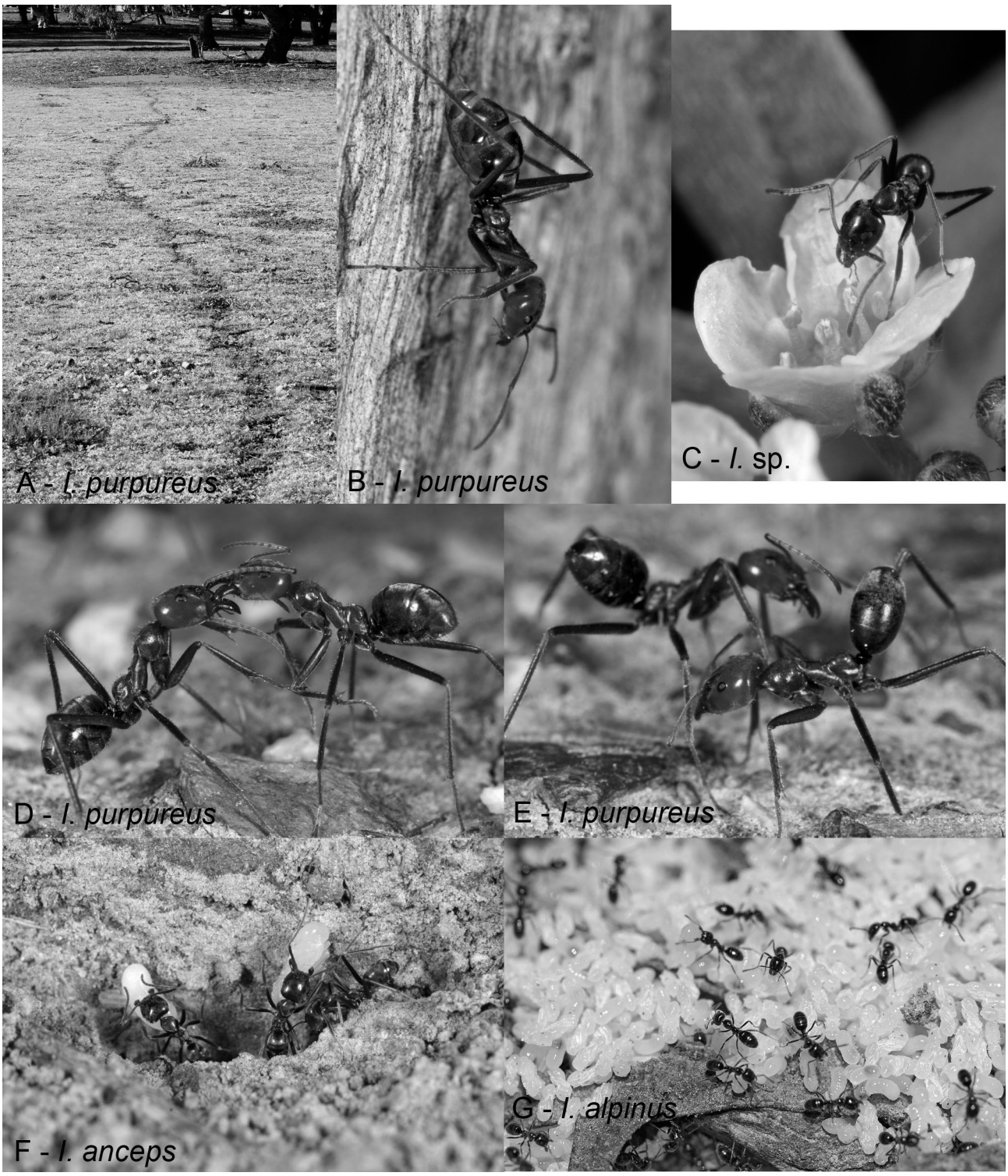


FIGURE 3. *Iridomyrmex* biology. A. Colonies of *I. purpureus* consist of a series of individual nests connected by paths that can extend to a kilometre or more. Frequently used paths can sometimes become freeways, as in this case, worn nearly smooth by the action of thousands of tarsi. B. This *I. purpureus* worker is returning to its nest after feeding high in a *Eucalyptus tree*. Notice the enlarged gaster, filled with honeydew collected from hemipterans. C. While ants are poor pollinators because the antibiotics that cover their bodies kill pollen grains, they commonly explore flowers while foraging. D. *Iridomyrmex purpureus* workers initiating ritualised fighting with antennation and gaping mandibles. E. If antennation and gaping mandibles do not appease one of the combatants, the conflict escalates with side-to-side positioning, raised and twisted gasters and hind leg kicking. This will continue until one of the workers breaks contact and moves away. F. While most species of *Iridomyrmex* are highly aggressive, some, such as these *I. anceps*, are so timid that even a slight disturbance will initiate frantic nest evacuation and the moving of larvae to a "safer" location. G. Individual *Iridomyrmex* nests can be very productive, as in this case (*I. alpinus*) where the nest, under a rock, contained thousands of larvae and pupae.

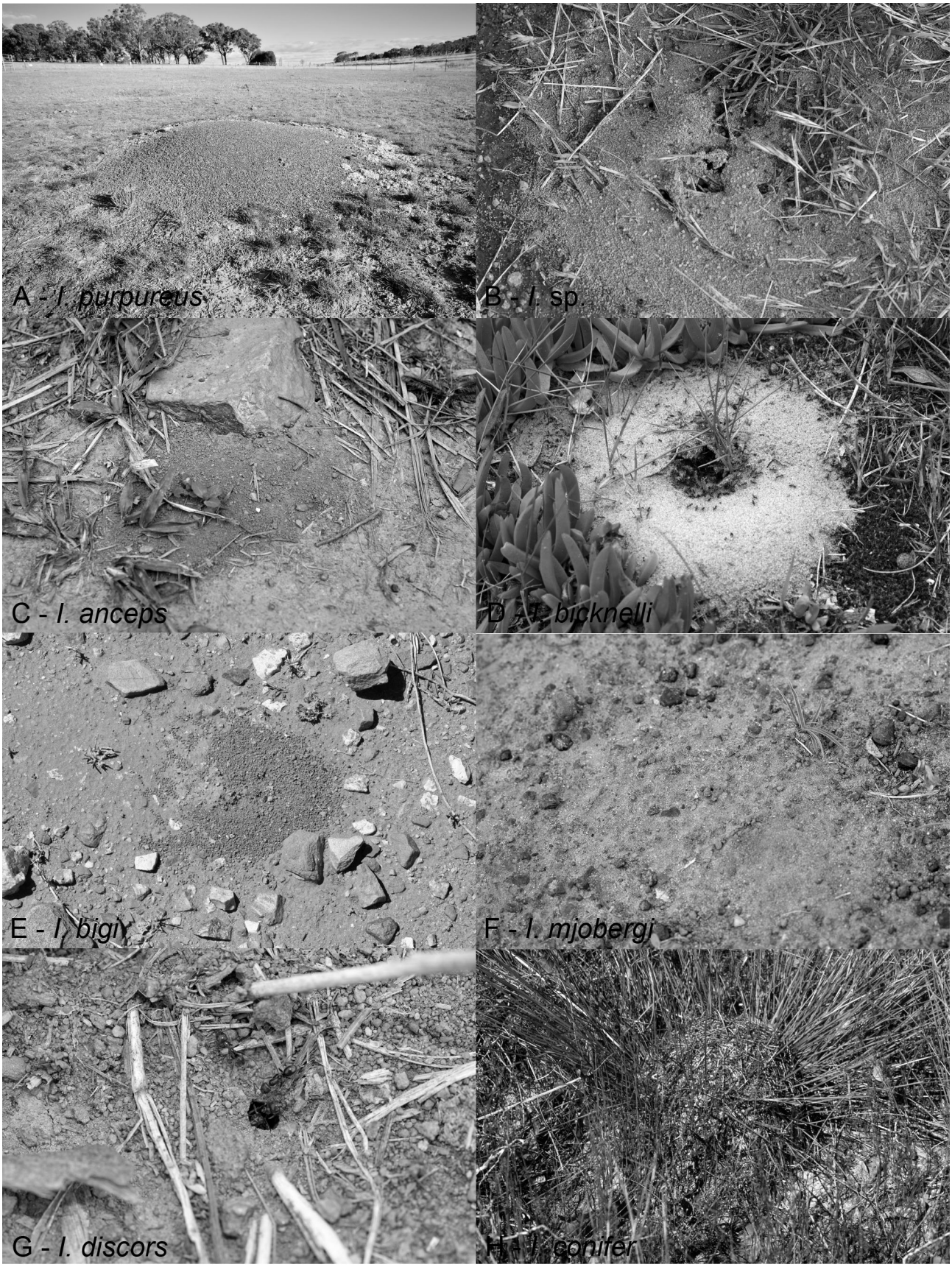

A - I. purpureus
B - I. sp.
C - I. anceps
D - I. bicknelli
E - I. bigi
F - I. mjobergj
G - I. discors
H - I. conifer

FIGURE 4. Nests. A. Many of the meat ants, such as *I. purpureus*, form large pebble-covered mounds above their nests. It is not uncommon to find mounds several metres in diameter with nests containing several hundred thousand workers. B. The majority of *Iridomyrmex* species form nests with low, messy mounds of loose soil at the entrance. Often several entrances are present, scattered across the mound. C. Nests are commonly found under rocks and other objects on the ground. In some cases, such as *I. anceps*, loose dirt from excavation is scattered near the entrance. D. *Iridomyrmex bicknelli* nests in a wide range of soil types, and it is one of the few species that can nest in pure sand, such as this colony found in coastal dunes. E. *Iridomyrmex bigi* is a nocturnal foraging species that blocks the entrance to its nest during the day. The only indication that this species is present is a slight bare patch and sometimes a low, thin scattering of loose soil. F. Some *Iridomyrmex* species, such as this *I. mjobergi*, scatter soil excavated from their nests over a broad area, leaving essentially no clue as to the location of their nests. In these species the only surface indication of the nest is a single, small entrance. G. While *I. discors* form no obvious mound above their nests, their colonies contain numerous separate nests with much "traffic" connecting them. Even though individual nests can be cryptic, colonies can be quite obvious because of the large numbers of active workers. H. Only a few species, including *I. conifer* (shown here) and close relatives, use thatching to construct nest mounds. But even here, *I. conifer* switches between soil-based nests during the summer and thatched nests during the winter.

Soil nests range from huge, pebble-covered mounds with numerous entrances found in most species of the *purpureus*-group to single, simple holes barely larger than the size of a worker, as in *I. agilis*. The majority of species form nests between these extremes, usually a single entrance surrounded by a low mound of loose dirt variously scattered around the entrance, either symmetrically or off to one side. Mound size can vary significantly throughout the year, for example in *I. chasei* and *I. rufoniger*, with large amounts of loose soil accumulating during warm summer months while during cooler periods nests are reduced to simple entrances. A few species (including *I. rubriceps* and *I. sanguineus*) have been found nesting in termite mounds or occasionally in association with other ants (such as *I. victorianus* being found nesting with the much larger *Myrmecia pyriformis* (based on label data)). Individual colonies can consist of a single nest or a series of separate nests, in some cases the separate nests being connected by well-worn paths travelled by thousands of workers a day. In one species of meat ants (*I. purpureus*) the placement of new nests has been shown to be closer to trees containing Hemiptera than existing nests, thus allowing the ants to exploit this important food source while minimising foraging distances (van Wilgenburg & Elgar, 2007).

While the above mentioned nest architectures are the norm, the nesting habits of members of the *I. conifer* group, specifically *I. conifer* and *I. turbineus*, are highly unusual and certainly unique among the Australian fauna. These ants construct two distinct nest types: above ground thatched mounds used during the winter and subterranean nests used during the summer. The underground summer nests are always placed near food sources while thatched winter nests are situated to maximise sun exposure (Shattuck & McMillan, 1998). It has been shown that simply changing the temperature will cause the ants to switch the type of nest being constructed by workers. The close relative *I. alpinus* will also construct thatched mounds, but this habit seems to be weakly developed with this species occupying a much broader range of nest sites; it is not known whether this species switches nest types in response to seasonal changes as do other species in this group.

Distribution

Iridomyrmex has its centre of diversity on mainland Australia, with nearly all species occurring here, the only exceptions being two species on New Caledonia (*I. neocaledonica* and *I. obsidianus*) and one on Phillip Island (*I. phillipensis*). Among the Australian-based species, several also occur offshore. These include *I. anceps* (India east through the Philippines to Kiribati and south across northern Australia), *I. calvus* (southern Australia, Lord Howe Island, Norfolk Island, New Caledonia), *I. coeruleus* (northern Australia, Papua New Guinea), *I. mjobergi* (mainland Australia, East Timor, eastern Indonesia, Papua New Guinea), *I. angusticeps* (northern Australia, Papua New Guinea, Philippines) and *I. pallidus* (northern Australia, eastern Indonesia, Papua New Guinea, Solomon Islands). A few species have apparently been dispersed outside Australia through human activities. These include *I. rufoniger* (New Caledonia, New Zealand, Brazil) and *I. suchieri* (Fiji, New Zealand, Norfolk Island, Phillip Island). It is possible that *I. suchieri*, which is widespread on the Australian mainland, has dispersed under its own power and its occurrence overseas should be investigated further.

Within Australia, species range from common to rare and from widespread to narrowly endemic. Species such as *I. bicknelli*, *I. brunneus*, *I. chasei*, *I. dromus*, *I. mjobergi*, *I. rufoniger* and *I. suchieri* occur throughout the Aus-

tralian mainland, some being found in habitats ranging from deserts to rainforest. Others, such as *I. adstringatus*, *I. anteroinclinus*, *I. curvifrons*, *I. longisoma* and *I. xanthocoxa*, are known from limited areas and seem to have genuinely restricted distributions. Interestingly, while *I. xanthocoxa* has a limited range it is relatively common where it occurs, unlike the other, much rarer species. Exceptionally common species include *I. chasei*, *I. mjobergi* and *I. suchieri*, while *I. anderseni*, *I. gumnos*, *I. infuscus* and *I. tenebrans* have been collected only once each.

At a continental level, it is clear that *Iridomyrmex* is well adapted to Australian conditions with a dozen or more species present in most areas (with the except of wet, cool Tasmania, where there are currently only nine species known). While regional variation in number of species is minimal, there is a trend for the greatest diversity to be found in western Western Australia, in the ranges of the southern Northern Territory, and in a broad band extending from the Eyre Peninsula eastward through north-central New South Wales to south-eastern Queensland and north along the Queensland coast to the base of Cape York Peninsula (Fig. 5). In higher diversity areas between 25 and 30 species can be found while in lower diversity regions the number of species drops to below about 20. These high diversity areas correspond to transitional habitats between the dry, arid areas of central Australia and the wet, cooler areas of the extreme south-west and south-east corners of the continent. It should be noted, however, that many of the lower density areas are also the most poorly collected and it is likely that additional species will be found in these areas in the future. However, given the large amount of data presently available it is unlikely that the broad pattern outlined here will change significantly.

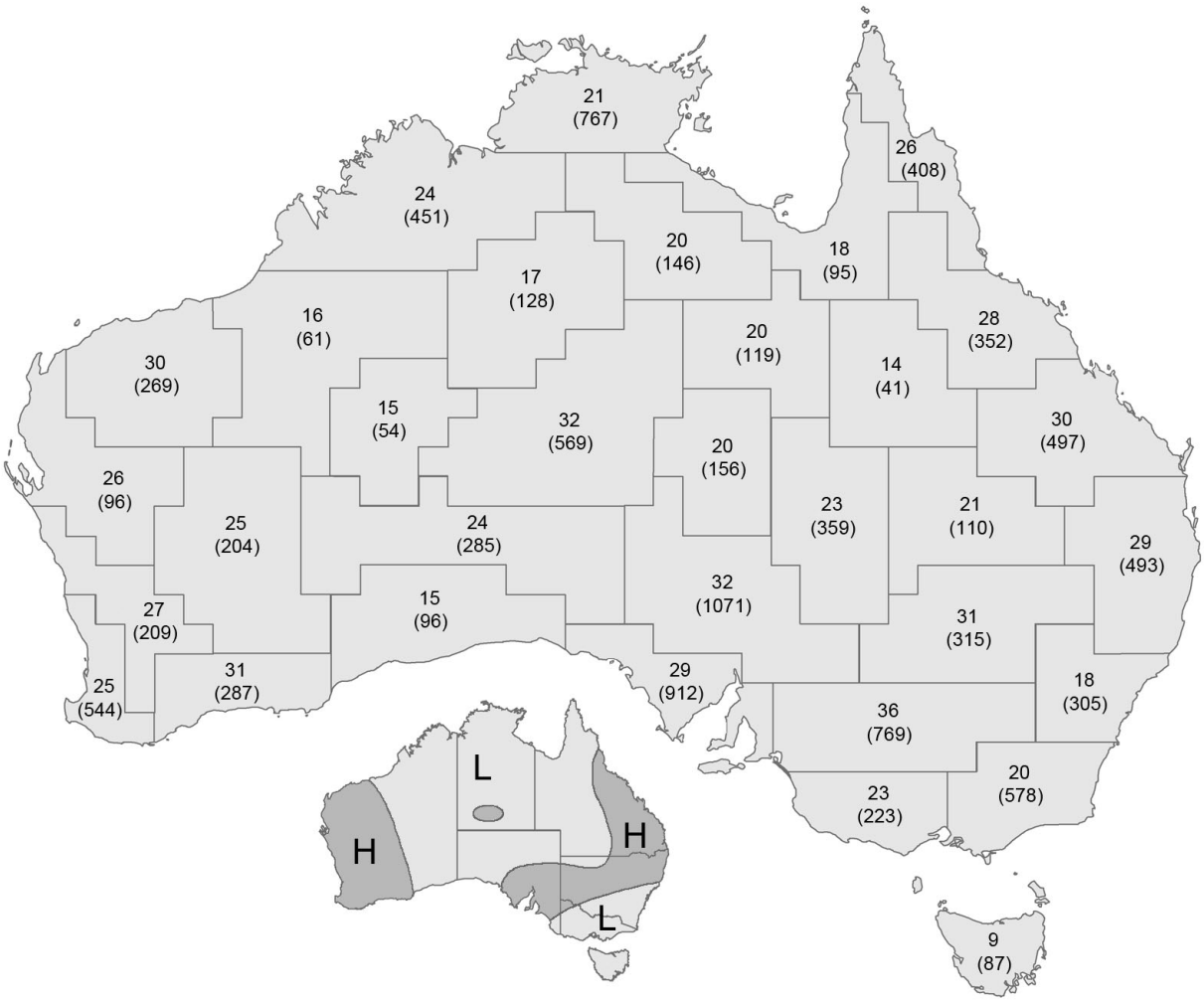


FIGURE 5. Geographic pattern of species richness for the Australian *Iridomyrmex* fauna. A. Number of species (top number) and collecting events (bottom number in parentheses) clustered by the botanical regions suggested by Barlow (1985), based on material examined during this study. B. Density plot based on A as well as the distribution of individual species, with areas containing greater than approximately 30 species labelled "H" ("high" diversity) and areas with fewer than approximately 20 species labelled "L" ("low" diversity).

Associations

A number of species of *Iridomyrmex* have developed close relationships with a range of caterpillars, most notably those in the genus *Jalmenus* (in the family Lycaenidae) (Eastwood and Fraser, 1999; Fiedler, 2001). These include, among others, *I. curvifrons*, *I. mayri*, *I. obscurior*, *I. difficilis* and *I. rubriceps*. In exchange for protection, the caterpillars provide honeydew, a carbohydrate rich secretion used as a food source by the ants. The abovementioned species as well as many other ants will also tend various Hemiptera for honeydew, but in these cases the relationship is generally opportunistic rather than the close relationship found with the butterfly larvae, although the Hemiptera are known to benefit from the ants' attention (Eastwood, 2004).

While some species, such as *I. rubriceps* and *I. sanguineus*, will nest within large termite mounds (Wheeler, 1936), this is largely opportunistic and there is no evidence of special interactions between the ants and termites. In fact, *Iridomyrmex* workers regularly feed on termite workers, suggesting that the relationship is one of predator-prey.

Predators

Various predators of *Iridomyrmex* include birds and reptiles (that often feed on the queens embarking on their nuptial flights) and a variety of invertebrates. Some spiders and predaceous ground beetles specialise on *Iridomyrmex* workers, and one cursorial spider exploits the chemical alarm pheromone produced by the meat ant *I. purpureus* in order to prey on workers (Allan et al., 1996).

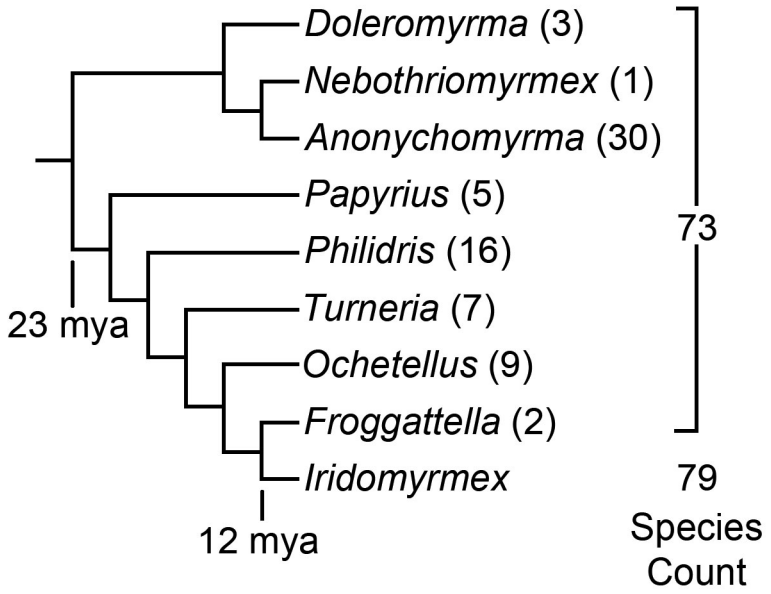


FIGURE 6. Phylogenetic relationships among the "Austral" genera of the subfamily Dolichoderinae (modifed from Ward et al., 2010). The age of the basal node is estimated at 23 million years ago (mya) while the separation of *Iridomyrmex* from its most recent common ancestor is estimated as occurring approximately 12 mya. The number of currently known species in the eight most closely related genera to *Iridomyrmex* is 73 while *Iridomyrmex* contains 79 species. The number in parentheses after the generic name is the number of described species in that genus.

The current position of *Iridomyrmex*

Despite the labours of Shattuck and earlier researchers, the current taxonomic state of the genus and its constituent species has remained unsatisfactory. Because of their overall uniformity of appearance, the smaller or more nondescript *Iridomyrmex*, which include some of the most familiar Australian ants for both city and country dwellers, can only be assigned with difficulty to a described species or remain undescribed. The actual magnitude of the task of revision has lacked clarity, as the likely size of the group has not been subject to systematic analysis. Andersen (2007) gave a total final count of around 350 species for Australian *Iridomyrmex* alone. Here we conclude that the actual number may be substantially lower. We recognize 79 species but acknowledge that further molecular, ecological and biogeographic analyses will likely distinguish multiple species among what are here treated as single

morphologically variable taxa. However, since the species not covered by the earlier taxonomic revisions are often very populous, appear to have an important cohesive function in the Australian environment (e.g., as generalist predators, scavengers, seed dispersal agents, tenders of sap-sucking bugs and even pollinators) and frequently feature in biomonitoring programmes, there is no doubting that a comprehensive revision of the entire genus has been long overdue. Due to their sheer numbers and interconnecting links with other small fauna as well as native flora, *Iridomyrmex* ants may also be part of a mix of indicator species that could act as signals for climatic variability and anthropogenic climate change in this part of the world.

Because of its importance, as outlined above, this genus of ants has been targeted by CSIRO for a comprehensive, multifaceted taxonomic review on a global scale. This paper reports on the morphological work and its outcomes. An associated project, using multiple molecular markers from mitochondrial and nuclear DNA, will be reported elsewhere. It should be noted, however, that results from these molecular investigations have influenced the present study and are noted where applicable. The genus *Iridomyrmex* is here redefined, and a key to workers of all known living species is provided.

Materials and Methods

The key to species is based on workers, as species-level separation of the other adult castes is not only extremely difficult, but of very limited utility. This is partially because workers are the caste most frequently seen and most familiar, and partially because external (i.e., non-genitalic) characters of the reproductive castes of Iridomyrmex are very similar, even among quite different species. Moreover, in many cases, the reproductive castes of the less common species have either not been collected or are unable to be associated with workers (since most material examined has come from trapping or opportunistic hand collection, rather than from nests). The key was constructed manually, with preference given to characters that are easily observable and show minimal ambiguity in their interpretation. We note, however, that to be precise and reduce errors in determinations this is not always possible and in some cases complex characters and/or sets of characters were utilised. Species descriptions were prepared using the DELTA software package (www.delta-intkey.com) and hand-crafted after initial generation.

Species concept used in this work

The biological species concept has provided a framework within which we have interpreted morphological, ecological and distributional data to frame species level hypothesis (e.g. Heterick, 2009). Nevertheless, it is anticipated that as additional data become available several of the species hypotheses proposed here may need refinement. For example, preliminary molecular data suggests that what is here proposed as the single species *I. bicknelli*, while monophyletic, may be better treated as a composite of several species rather than a single species (see Comments under *I. bicknelli* below). A number of similar situations exist within this genus and these are discussed under specific species as required. It is hoped that this study will inspire additional and targeted research projects that explore these challenging cases and provide further refinements to the species concepts proposed in this study. In other words, we appreciate that taxonomic research is an iterative process and that future work will expand and enhance the proposals made here.

The number of *Iridomyrmex* species proposed in the present study (79) is conservative compared with that suggested by Andersen (2007) (223 species known, estimated to total 350 in nature). To some degree, this difference in interpretation is a matter of scale: in the case of Andersen and authors who have adopted a similar approach, definitions of species tend to be informed by small-scale or regional variation (see Nipperess et al., 2008). The current authors have preferred a broader-scale, evolutionary-based approach. The present study does recognise the importance of small-scale or regional morphological variation but this variation has been interpreted as either intraspecific (see Comments under *I. dromus*, *I. minor*, *I. mjobergi* and to a lesser extent *I. rufoniger*) or interspecific (see *I. longisoma*, *I. suchieriodes*), the decision being made on a case by case basis when taking all available data into consideration.

Abbreviation and morphological terms

Size and shape characters were quantified and are reported as lengths or indices. Measurements were made with a stereomicroscope using a dual-axis stage micrometer wired to digital readouts. All measurements were recorded in

thousandths of a millimetre, but expressed here to the nearest hundredth. The following measurements and indices are reported.

CI—cephalic index: HW/HL x 100.

EI—eye index: EL/HW x 100.

EL—Maximum eye length.

EW—Maximum eye width.

HFL—Maximum length of hind femur, measured in anterior view.

HL—maximum head length in full-face (dorsal) view, measured from the anterior-most point of the clypeal margin to the midpoint of a line drawn across the posterior margin of the head.

HW—maximum head width measured in full-face (dorsal) view.

ML—mesosomal length measured from the anterior surface of the pronotum proper (excluding the collar) to the posterior extension of the propodeal lobes measured in lateral (side) view.

MTL—maximum length of the tibia of the middle leg, excluding the proximal part of the articulation which is received into the distal end of the femur.

PpH—maximum height of propodeum measured tangentially to the line measuring PpL.

PpL—length of propodeum measured from the metanotal groove to the posterior extension of the propodeal lobes.

SI—scape index: SL/HW x 100.

SL—scape (first antennal segment) length excluding the basal neck and condyle.

Sources of Material

The following Museums and research institutions provided loans or otherwise assisted with making material available for this study:

ANIC—Australian National Insect Collection, Canberra, ACT, Australia.

BMNH—The Natural History Museum, London, UK.

HNHM—Hungarian Natural History Museum, Budapest, Hungary.

JDM—Curtin Ant Collection, Curtin University of Technology, Perth, Western Australia, Australia.

MCSN—Museo Civico di Storia Naturale 'Giacomo Doria', Genoa, Italy.

MCZC—Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA.

MHNG—Muséum d'Histoire Naturelle, Geneva, Switzerland.

MVMA—Museum of Victoria, Abbotsford, Victoria, Australia.

NHMB—Naturhistorisches Museum, Basel, Switzerland.

NMW—Naturhistorisches Museum, Wien, Austria.

OXUM—Oxford University Museum, Oxford, UK.

SAMA—South Australian Museum, Adelaide, South Australia, Australia.

TERC—Tropical Ecosystems Research Centre, CSIRO Sustainable Ecosystems, Darwin, N.T., Australia.

UASK—Ukrainian Academy of Science, Kiev, Ukraine.

USNM—United States National Museum of Natural History, Washington, D.C., USA.

WAMP—Western Australian Museum, Perth, Western Australia, Australia.

ZMHB—Museum für Naturkunde der Humboldt Universität, Berlin, Germany.

Pilosity Characters

The abundance and placement of pilosity is critical in diagnosing species. However, it should be noted that these hairs are easily abraded and therefore caution should be used when examining older specimens or when limited amounts of material are available. In some cases older or damaged material may not be reliably identifiable to species-level.

Colour

In these ants, colour has two components: a background pigment colour and a superimposed iridescence which gives a metallic sheen or reflectance. The light source used when evaluating these colours is important, with fluorescent, solar and incandescent light giving slightly different results.

Unfortunately, colour may fade with age, especially if material is exposed to strong light for extended periods while stored in alcohol. This phenomenon is aggravated if plant material or soil is stored with the ants. The back-

ground colour is most susceptible, although the iridescence can be affected as well. Thus, older material may differ significantly from fresh or living material, and species-level identifications may not be possible.

Lists of material examined can be found in the Appendix.

Iridomyrmex Mayr

Iridomyrmex Mayr, 1862: 702. Type species: *Formica detecta* Smith, 1858 by subsequent designation of Bingham, 1903: 297

Worker Diagnosis. The anterior margin of the clypeus above the mandibles is usually highly modified with convex areas towards the sides and a central projection (this central projection, hereafter termed the anteromedial clypeal prominence, varies from strongly to weakly developed in most *Iridomyrmex*, but is absent in *I. mirabilis* **sp. n.** and vestigial and barely noticeable in several species related to *I. calvus* and *I. brunneus*). The compound eyes are placed relatively high on the head and away from the mandibles (Shattuck, 1992b, fig. 95). Most other genera in this subfamily have the anterior margin of the clypeus weakly convex, straight or weakly concave. Only *Froggattella* and *Philidris* share the anteromedial clypeal prominence with *Iridomyrmex*, but these have the eyes low on the head, nearer to the clypeus and *Froggattella* has the propodeal spiracle higher and on the propodeal spines.

Worker Description. ***Head***. Posterior margin strongly convex to strongly concave. Compound eyes present, generally oval, with slightly to strongly lobate inner margin, eye may also be narrower posteriad than anteriad; eyes located relatively posteriorly on head. Ocelli normally absent but one or more ocelli may be present in some species. Antenna 12-segmented. Scape short to long, surpassing posterior margin of head by maximum of about one half of its length, but failing to attain posterior margin in several species. Anterolateral clypeal margin posterior to mediolateral region, and separated from it by a shoulder. Anteromedial margin usually with a sharp to weak central prominence, sometimes straight (several species related to *I. calvus* and *I. brunneus*). Posterior clypeal margin between the anterior and posterior surfaces of the antennal socket cavities. Anterior tentorial pit nearer the antennal socket than the mandibular insertion. Frontal carinae present. Anterolateral hypostoma reduced to a thin sclerite. Median hypostoma entire. Psammophore usually absent, but some arid area species with many curved, erect setae in gula region. ***Mouthparts***. Palp formula 6,4. Third maxillary palp segment subequal in length to segment 4 (except in *I. trigonoceps*). Fifth maxillary palp segment situated apically. Mandible of more-or-less uniform appearance across all species, usually with 7–10 teeth and 2–5 denticles. Apical tooth longer than subapical tooth. Basal angle distinct or indistinct, basal margin denticulate distally, smooth proximally. ***Mesosoma***. Spines absent from all surfaces. Posterior pronotum planar, rounded or angled. Mesothoracic spiracles opening on small dorsal prominences in some species. Mesopleural process absent. Anteromedial mesosternum even with lateral regions. Dorsal face of propodeum may be uniformly convex to flat, abruptly conical, or convex anteriad and flattened posteriad. Propodeal angle commonly absent, but may be sharply defined and even (rarely) acute. Declivitous face of propodeum convex to flat, longer to shorter than dorsal face. Metanotal groove always present and forming a weak to strong angle between the mesonotum and propodeum. Propodeal spiracle nearly always lateral and ventral of the propodeal surface, rarely located at propodeal angle or immediately adjacent to declivitous surface. Erect setae on mesosoma 0–80 plus, appressed pubescence sparse to dense. ***Petiole***. Node present (present as angle in *I. mirabilis*), usually squamiform, but may be thicker, even approaching subcuboidal when viewed in profile. Dorsum of node generally rounded, rarely angulate or even acuminate. In profile, node usually angled anteriad, with anterior face subequal to or slightly shorter than posterior face, but anterior face may be much shorter than posterior face, the posterior face curved in several species. Petiole with or without a ventral lobe. ***Gaster***. First tergite usually vertical and not concealing the petiole in dorsal view, with or without a groove or indentation for receiving the basal portion of the petiole: however, in several species related to *I. calvus* the first gastral tergite is arched posteriad away from the node. Anterior tergosternal suture extends laterally from helcium in a distinct arch which extends dorsal of the dorsal helical surface. Gastral compression usually absent, but dorsoventral compression evident in *I. mirabilis*. ***Legs***. Mesotibia with one spur, which varies from simple to pectinate; metatibia with one pectinate spur. ***General characters***. Worker caste mostly monomorphic, rarely polymorphic. Integument thin and flexible, sculpture mainly limited to fine punctation or microreticulation. ***Proventriculus***. Cupola much broader than bulb; round with short pile; smooth, without sculpture; and with narrow phragma. Bulb completely hidden by cupola in lateral view. Longitudinal muscle No.1 absent. Occlusory tract absent.

***Iridomyrmex* species**

adstringatus **sp. n.**
agilis Forel
alpinus **sp. n.**
anceps (Roger)
    excisus Mayr
    discoidalis (Donisthorpe)
    formosae Forel (new synonym)
    ignobilis Mann (new synonym)
    meinerti Forel (new synonym)
    metallescens Emery (new synonym)
    papuana Emery
    sikkimensis Forel (new synonym)
    watsonii Forel (new synonym)
anderseni Shattuck
angusticeps Forel
anteroinclinus Shattuck
atypicus **sp. n.**
azureus Viehmeyer (raised to species)
bicknelli Emery
    gracilis (Lowne) (new synonym, preoccupied name)
    splendidus Forel (new synonym)
bigi Shattuck
    variscapus Shattuck (new synonym)
brennani **sp. n.**
brunneus Forel (raised to species)
    fusciventris Forel (new synonym)
calvus Emery
    albitarsus Wheeler (new synonym)
    notialis Shattuck (new synonym)
cappoinclinus Shattuck
cephaloinclinus Shattuck
chasei Forel
    concolor Forel (new synonym)
    yalgooensis Forel (new synonym)
coeruleus **sp. n.**
conifer Forel
continentis Forel (raised to species)
cuneiceps **sp. n.**
cupreus **sp. n.**
curvifrons **sp. n.**
cyaneus Wheeler
difficilis **sp. n.**
discors Forel
    aeneogaster Wheeler
    occipitalis Forel
dromus Clark
elongatus **sp. n.**

exsanguis Forel
fulgens **sp. n.**
galbanus Shattuck
gibbus **sp. n.**
gumnos **sp. n.**
hartmeyeri Forel
hertogi **sp. n.**
hesperus Shattuck
infuscus **sp. n.**
innocens Forel
    argutus Shattuck
    occiduus Shattuck
lividus Shattuck
longisoma **sp. n.**
luteoclypeatus **sp. n.**
macrops **sp. n.**
mattiroloi Emery
mayri Forel (raised to species)
meridianus **sp. n.**
minor Forel (raised to species)
mirabilis **sp. n.**
mjobergi Forel
neocaledonica **sp. n.**
niger **sp. n.**
nudipes **sp. n.**
obscurior Forel
obsidianus Emery
omalonotus **sp. n.**
pallidus Forel (raised to species)
    incertus Forel (new synonym)
    wingi Donisthorpe (new synonym)
phillipensis **sp. n.**
prismatis Shattuck
purpureus (F. Smith)
    aeneum (Mayr)
    castrae Viehmeyer
    detecta (F. Smith)
    greensladei Shattuck (new synonym)
    horni (Kirby)
    smithii (Lowne)
reburrus Shattuck
roseatus **sp. n.**
rubriceps Forel (raised to species)
rufoinclinus Shattuck
rufoniger (Lowne)
    domesticus Forel (new synonym)
    mamillatus (Lowne)
    septentrionalis Forel (new synonym)

sanguineus Forel
setoconus Shattuck & McMillan
spadius Shattuck
splendens Forel (raised to species)
    vicinus Clark (new synonym)
spodipilus Shattuck
spurcus Wheeler (raised to species)
suchieri Forel (raised to species)
    obscurus Crawley (new synonym)
suchieroides **sp. n.**
tenebrans **sp. n.**
tenuiceps **sp. n.**
trigonoceps **sp. n.**
turbineus Shattuck & McMillan
victorianus Forel (raised to species)
    emeryi Crawley (new synonym)
    parcens Forel (new synonym)
viridiaeneus Viehmeyer
viridigaster Clark
    mimulus Shattuck (new synonym)
xanthocoxa **sp. n.**

Unplaced species treated as *species inquirenda*
bicknelli luteus Forel

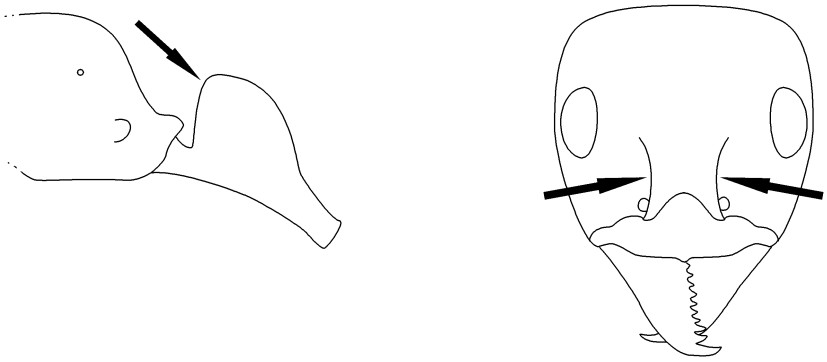
Species removed from *Iridomyrmex*
butteli (Forel) (to *Chronoxenus*, new combination)
extensa (Emery) (to *Anonychomyrma*, new combination)
krakatauae (Wheeler) (to *Tapinoma*, new combination)
latifrons (Karavaiev) (to *Tapinoma*, new combination)

Fossil-based species
breviantennis Théobald (*incertae sedis*)
florissantius Carpenter (*incertae sedis*)
mapesi Wilson (*incertae sedis*)
obscurans Carpenter (*incertae sedis*)
shandongicus Zhang

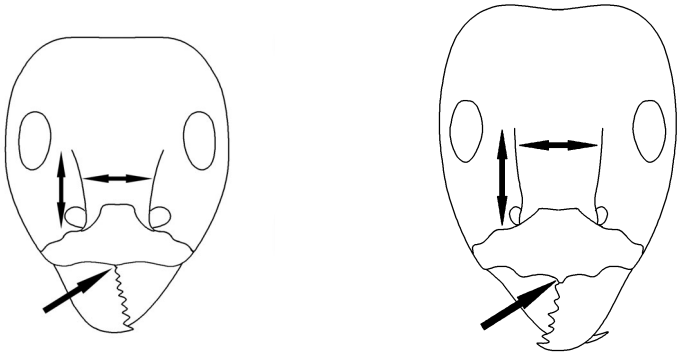
Fossil-based species removed from *Iridomyrmex*
constricta (Mayr) (to *Anonychomyrma*, new combination)
geinitzi (Mayr) (to *Anonychomyrma*, new combination)
samlandicus (Wheeler) (to *Anonychomyrma*, new combination)
goepperti (Mayr) (to *Ctenobethylus*)
haueri (Mayr) (to *Dolichoderus*, new combination)
oblongiceps (Wheeler) (to *Eldermyrmex* **gen. n.**)
humiloides (Wilson) (to *Gracilidris*)
bogdassarovi (Nazaraw, Bagdasaraw & Uriew) (to *Liometopum*, new combination)
hispaniolae (Wilson) (to *Technomyrmex*)

Key to *Iridomyrmex* species based on workers

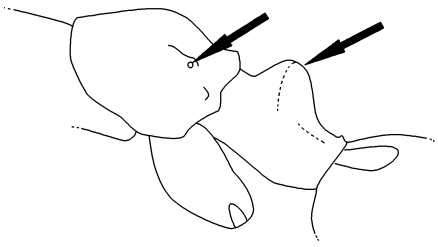
1. In profile, petiolar node thick, very elongate and strongly inclined anteriad, the anterior face very short or even virtually absent; in full-face view, frontal carinae strongly concave 2
- In profile, petiolar node not as above; frontal carinae moderately to weakly concave, straight or weakly convex 5



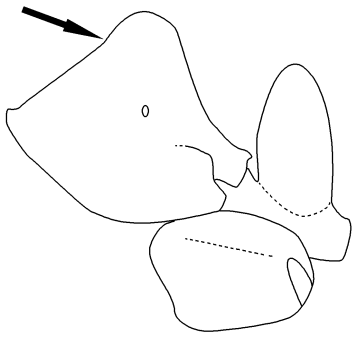
2. Head uniformly reddish, without infuscation; gaster with blue iridescence . . . . . *rufoinclinus*
- Head partially or wholly infuscated; gaster coppery, lacking blue iridescence 3
3. Infuscation limited to frons of head capsule, lateral and ventral surfaces of head reddish, matching colour of posterior mesosoma . . . . . *cappoinclinus*
- Entire head brown to black, contrasting with reddish colour of posterior mesosoma 4
4. Pronotum infuscated and darker than rest of mesosoma . . . . . *anteroinclinus*
- Pronotum of the same reddish colour as rest of mesosoma . . . . . *cephaloinclinus*
5. In full-face view, anterior margin of clypeus weakly to strongly concave between its lateral lobes, its central point well posterior to an imaginary line connecting the outer margins of the lateral lobes, and the anteromedial clypeal prominence absent or denoted by a weak undulation; frontal carinae short (as long as distance between them) and usually concave, but may be straight 6
- In full-face view, anterior margin of clypeus not concave between its lateral lobes, its central point at or anterior to an imaginary line connecting the outer margins of the lateral lobes, and usually with a weak to strong anteromedial clypeal prominence or undulation; frontal carinae often longer (i.e., longer than distance between them) and straight or weakly sinuate 17



6. In profile, propodeal spiracle situated near confluence of dorsal and declivitous faces of propodeum; petiolar node reduced to thick ridge . . . . . *mirabilis*
- In profile, propodeal spiracle situated well below dorsum of propodeum; well-developed petiolar node always present as a thick or thin scale-like projection 7

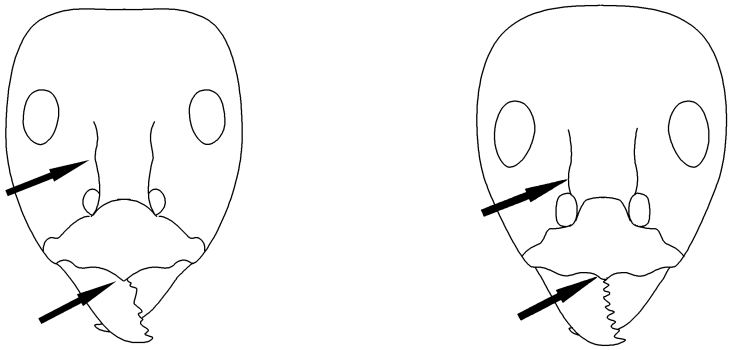


7. Mesosoma with very many (25 or more) erect hairs 8
- Mesosoma with fewer (0–6) erect hairs 15
8. Cuticle strongly shining, with sculpture (where present) confined to a very weak, superficial reticulation; long, J-shaped hairs absent from underside of head capsule (a few slightly bent hairs may be present); appressed setae on mesosoma sparse, not hiding cuticle . . . . . *innocens*
- Cuticle not uniformly shining, coriaceous or shagreenate sculpture present; long J-shaped hairs present on underside of head capsule; appressed setae thick on some areas of mesosoma, hiding underlying cuticle 9
9. Head, body and appendages with weak blue to bluish-green iridescence; cuticular pigment uniformly brown to black . . . . . *prismatis*
- Blue or bluish-green iridescence (if present) confined to gaster; head and body never black and rarely uniformly brown, usually with light ochre to reddish head and mesosoma (with degrees of brown infuscation on frons and propodeum), and dark brown gaster 10
10. Tibiae lacking erect or semi-erect setae; node relatively thick, not scale-like (seen in profile, width of node greater than or equal to 0.6 × length of posterior face of node) . . . . . *nudipes*
- Tibiae with at least 3-4 semi-erect or erect setae (may be small and inconspicuous), often numerous setae present; node relatively thin and scale-like (seen in profile, width of node less than or equal to 0.5 × length of posterior face of node) 11
11. Smaller species (HW ≤ 0.95mm) . . . . . *adstringatus*
- Larger species (HW ≥ 1.14mm) 12
12. Head and mesosoma uniformly brown, gaster chocolate; legs concolorous with pronotum (one specimen from Crowdy Bay, New South Wales) . . . . . *tenebrans*
- Head and mesosoma not uniformly brown, pronotum, at least, yellowish to brick-red or reddish-brown, legs conspicuously darker than pronotum 13
13. In full-face view, frontal carinae straight (one specimen from Black Mtn, ACT) . . . . . *infuscus*
- In full-face view, frontal carinae visibly curved throughout all or most of their length 14
14. Antennal scapes relatively long (SI > 85) (Fig. 86) (Western Australia only) . . . . . *hesperus*
- Antennal scapes relatively short (SI < 85) (Fig. 86) . . . . . *viridigaster*
15. Larger species (HL ≈ 1.40mm, HW ≈ 1.33mm, SL ≈ 1.03mm) (Figs 87, 88) . . . . . *anderseni*
- Smaller species (HL < 1.10mm, HW < 0.97mm, SL < 0.91mm) (Figs 87, 88) 16
16. Scapes longer (SL > 0.89mm, SI > 105, exceeding posterior margin of head by ≈ 3 × their greatest diameter) (Fig. 87); blackish-brown to black, shining species (New Caledonia) . . . . . *obsidianus*
- Scapes shorter (SL < 0.88mm, SI < 100, exceeding posterior margin of head by less than or equal to 1 × their greatest diameter) (Fig. 87); light brown to dark brown species, weakly shining to matte in appearance . . . . . *calvus*
17. Propodeum expanded dorsally to form a triangular projection (best seen in side view) 18
- Propodeum not so expanded, though it may be strongly protuberant 20

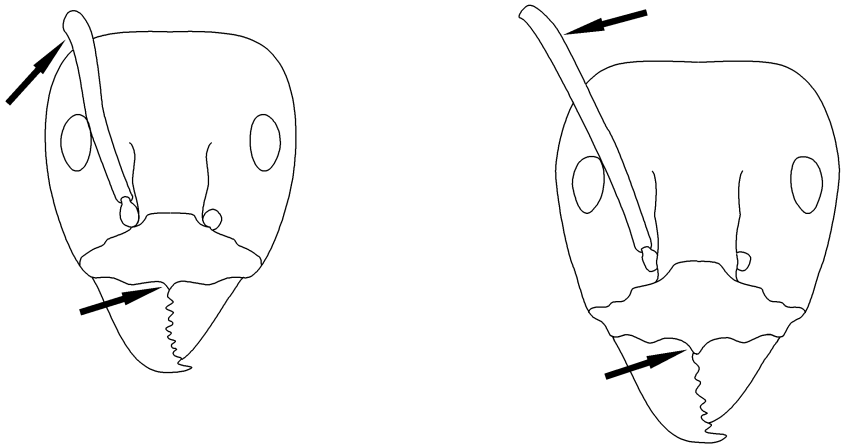


18. Erect or suberect hairs generally absent from pronotum, but when present short, stout and essentially straight . . . . . *conifer*
- More than eight gently curved erect or suberect hairs present on the pronotum 19
19. Lateral margin of head (in full face view) generally lacking erect hairs, but when present the posterior hairs are longer than the maximum scape diameter and distinctly curved . . . . . *turbineus*
- Lateral margin of head (in full face view) always with numerous short (less than maximum scape diameter), straight or very slightly curved erect hairs . . . . . *setoconus*

20. Acute anteromedial clypeal prominence present as a conspicuous triangle; erect setae present on antennal scapes, sides of head and hind femora; frontal carinae distinctly sinuate with small flanges on carinae often tending to angulate medially; metathoracic spiracles prominent (medium-large to large ants, often with broad, triangular heads and purple, pink, blue or green iridescence on body and legs) 21
- Anteromedial clypeal prominence not a conspicuous triangle (either a small blunt projection, an indistinct undulation of the cuticle or completely absent) *or* erect setae absent from one or more of antennal scapes, sides of head and hind femora; frontal carinae rarely distinctly sinuate 31



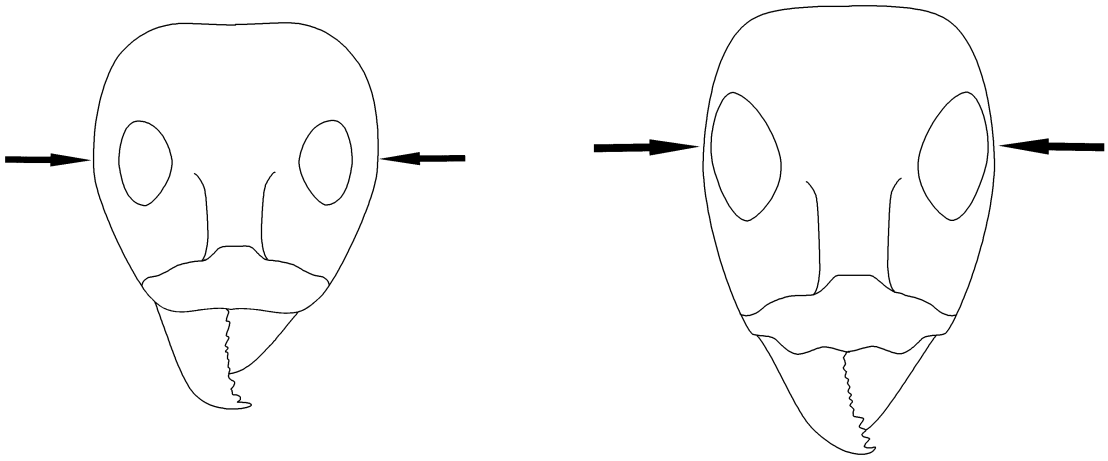
21. Propodeal dorsum straight or weakly convex; antennal scapes relatively long (SI > 109, surpassing posterior margin of head by 0.2–0.5 × their length) (Fig. 89) . . . . . *roseatus*
- Propodeal dorsum strongly convex and often protuberant; antennal scapes relatively short (scapes surpassing posterior margin of head by less than or equal to 2 × their greatest diameter) 22
22. Eyes large (EI ≥ 30); scapes with erect setae mainly confined to outer surface; in profile, mesonotum straight . . . . . *bigi*
- Eyes smaller (EI < 25); scapes with erect setae on all surfaces; in profile, mesonotum sinuate, convex anteriorly and flat to convex posteriorly 23
23. Antennal scapes short (SL < 1.30mm); in full-face view, anteromedial clypeal prominence shorter, not extending beyond lateral lobes of anterior clypeal margin; erect hairs on head and body fine and pale in colour . . . . . *discors*
- Antennal scapes long (SL > 1.37mm); in full-face view, anteromedial clypeal prominence longer, extending beyond lateral lobes of anterior clypeal margin; erect hairs on head and body typically bristly and dark in colour 24



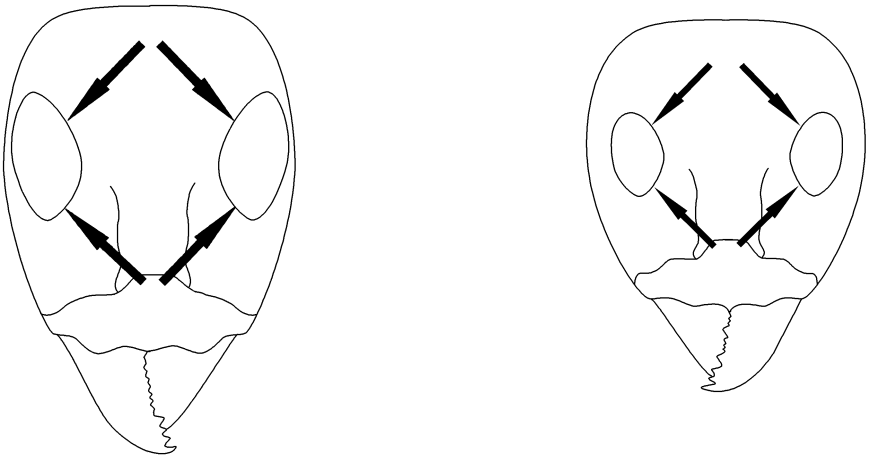
24. Lateral and/or dorsal regions of head with at least weak but distinct green iridescence (often with purple iridescence as well) 25
- Lateral and/or dorsal regions of head with purple or blue and occasionally weak greenish-yellow iridescence; (some SW *I. purpureus*), but never with distinctly green iridescence 26
25. Head similar in colour to mesosoma, or at most only slightly lighter . . . . . *viridiaeneus*
- Head always distinctly lighter in colour than mesosoma . . . . . *galbanus*

26. Posterior region of pronotum (immediately anterior of the pro-mesonotal suture) in profile rising above the mesonotum in a short, strongly convex arch; lateral regions of head often with at most very weak purplish iridescence 27
- Posterior region of pronotum (immediately anterior of the pro-mesonotal suture) in profile rising above the mesonotum in a broad, uniform, weakly convex arch; lateral regions of head with well developed iridescence (usually purple or blue) 29

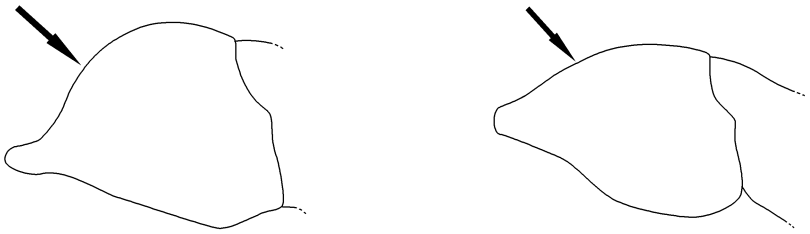
27. Erect mesosomal setae pale; posterolateral region of first gastral tergite with less than six appressed setae; known only from New South Wales, southern Queensland and South Australia . . . . . *spodipilus*
- Erect mesosomal setae dark (sometimes superficially appearing pale when viewed against a lightly-coloured background); posterolateral region of first gastral tergite with more than eight appressed setae; mainly northern Australia north of about 24°N 28
28. In full face view, lateral margin of head with more than 4 erect or suberect hairs, and often with more than 10 . . . . . *reburrus*
- In full face view, lateral margin of head generally without erect or suberect hairs, but always with less than five . . . *sanguineus*
29. Head light yellow-red, distinctly lighter in colour than the pronotum; known only from Queensland north of approximately Rolleston . . . . . *spadius*
- Head reddish brown, at most only slightly lighter in colour than the pronotum; widespread in southern Australia with one species in southern Queensland 30
30. Head and mesosoma dark reddish brown to black; head often with strong blue iridescence; propodeal dorsum often strongly arched, forming a blunt right angle as propodeum rounds into its declivitous face . . . . . *lividus*
- Head and mesosoma reddish brown; head with purple iridescence; propodeal dorsum generally rounded, not forming angle as propodeum rounds into its declivitous face. . . . . *purpureus*
31. Second and third maxillary palp segments elongate so that their combined length is equal to or greater than palp segments 4–6 combined . . . . . *trigonoceps*
- Second and third maxillary palp segments individually about as long as or only slightly longer than segments 4–6, so their combined length is much less than combined length of segments 4-6 32
32. Semi-erect to erect setae present on antennal scapes and hind tibiae (and, often, sides of head). 33
- Semi-erect to erect setae absent from antennal scapes, or hind tibiae, or both parts 43
33. Broad-headed (CI 90 or more), yellow, depigmented, tropical species; eye with distinctly protuberant anteromedial margin; in full-face view, eyes placed at least 0.5 × their own diameter away from sides of head; setae on scapes small and suberect or subdecumbent, erect and suberect setae present on legs. . . . . *pallidus* (part)
- If yellow and depigmented, differing from the above in respect of the appearance and placement of the eyes, and the narrower head 34



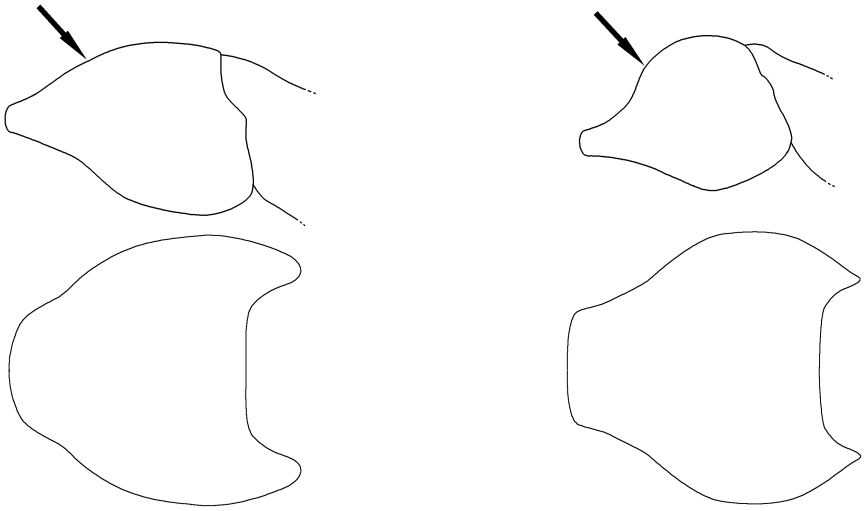
34. Eye with distinctly protuberant anteromedial margin, and a posterior lobe that is narrower than its anterior lobe; yellow, depigmented ants . . . . . *macrops* (part)
- Eye with, at most, a slightly protuberant anteromedial margin, and a posterior lobe that is not narrower than its anterior lobe; ants bicoloured or concolorous reddish-brown to black 35



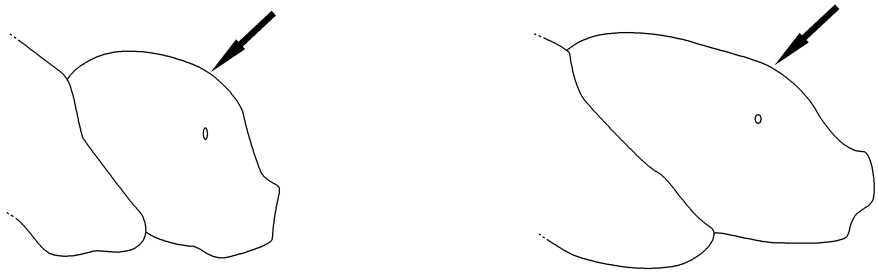
35. Ant with reddish or reddish brown foreparts, darker gaster without iridescence; anterior pronotum strongly arched at angle of 60º or more; antennal scapes shorter, barely surpassing posterior margin of head. . . . . *chasei* (part)
- If ant with short antennal scapes, then anterior pronotum less strongly arched at angle of 60° or less, and gaster with blue-green or greenish-yellow iridescence 36



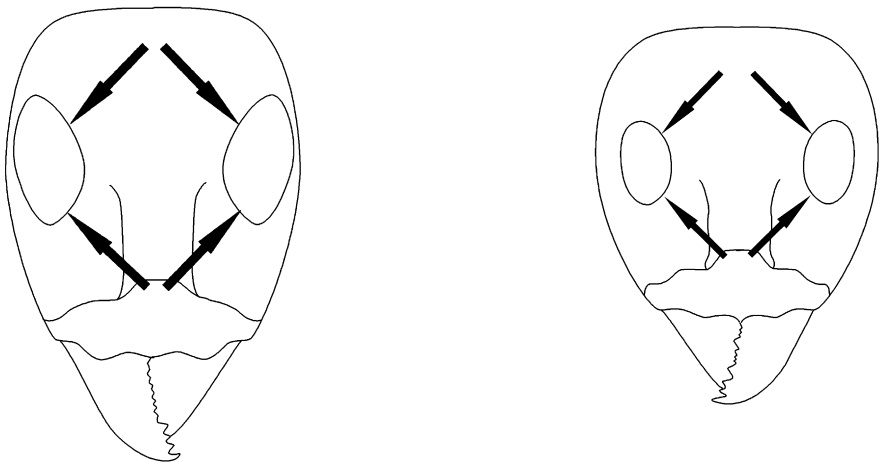
36. Antennal scapes relatively short, surpassing posterior margin of head by maximum of 1-1.5 × their greatest diameter; hind femur shorter, less than 0.8 × length of mesosoma. 37
- Antennal scapes longer, surpassing posterior margin of head by minimum of 2 × their greatest diameter; hind femur longer, greater than or equal to 0.85 × length of mesosoma. 40
37. Sides of head mostly lacking short, erect hairs, where present, these concentrated around mandibular insertion (shiny brown ants from inland Australia) . . . . . *fulgens*
- Sides of head with many short, erect hairs along their length. 38
38. In full-face view, posterior margin of head planar; in profile, curve of anterior pronotum usually broad and gradual, when viewed dorsally, pronotum tapering gradually towards its anterior flange. . . . . *suchieri* (part)
- In full-face view, posterior margin of head distinctly concave; in profile, curve of anterior pronotum more distinctly circular, when viewed dorsally, pronotum tapering sharply towards its anterior flange. 39



39. Propodeum smoothly rounding onto its declivitous face without noticeable angle, declivitous face straight or weakly convex; bicoloured ants, often with reddish or orange foreparts (Australia) . . . . . *rufoniger* (part)
- Propodeum abruptly rounding onto its declivitous face through a blunt angle of 90°, declivitous face weakly concave (brown ants with weakly metallic gaster from Phillip Island only). . . . . *phillipensis*
40. Antennal scapes surpassing posterior margin of head by greater than or equal to 0.35 × their length; larger species (HW ≥ 0.95mm); bluish-green to yellow green iridescence often present on body and legs in darker, brown to black specimens, tending towards pinkish-purple on reddish workers . . . . . *mayri*
- If larger (HW ≥ 0.95mm), then scapes surpassing posterior margin of head by less than or equal to 0.30 × their length; distinct iridescence absent on head and mesosoma (may be coppery or faintly bluish-green on gaster) 41
41. Densely hairy, longest setae on antennal scapes and tibiae greater than or equal to greatest diameter of scape and tibia; semi-erect setae present on dorsal surface of fore basitarsus. . . . . *spurcus*
- Longest setae on antennal scapes and tibiae less than greatest diameter of scape and tibia; semi-erect setae absent from dorsal surface of fore basitarsus. 42
42. Ratio of propodeal dorsum to propodeal declivity ≈ 1:1; generally larger species (HW 0.85–1.19mm) (Fig. 90); scapes surpassing posterior margin of head by less than or equal to 0.30 × their length; in profile, dorsum of propodeum always convex, shorter: confined to eastern Queensland, New South Wales, ACT and Victoria . . . . . *obscurior*
- Ratio of propodeal dorsum to propodeal declivity greater than 1:1; generally smaller species (HW 0.60–0.90 mm) (Fig. 90); scapes length variable, surpassing posterior margin of head by greater than 0.30 × their length in larger workers; in profile, dorsum of propodeum often rather elongate and flattened; mainly Western Australia and South Australia . . . . . *omalonotus*



43. Erect setae present on antennal scapes, but absent from hind tibiae (gracile, black species with blue iridescence from SW Western Australia). . . . . *longisoma*
- Erect setae absent from antennal scapes 44
44. Hind tibiae with distinct erect and/or semi-erect setae in addition to appressed or decumbent setae (may be sparse) 45
- Hind tibiae without distinct erect and/or semi-erect setae 52
45. Eye with distinctly protuberant anteromedial margin, and a posterior lobe that is narrower than its anterior lobe 46
- Eye with, at most, a slightly protuberant anteromedial margin, and a posterior lobe that is not narrower than its anterior lobe 47



46. Antennal scapes long (SL > 0.73mm, SI > 110, surpassing posterior margin of head by 0.25 × their length) (Fig. 91) . . . . . *macrops* (part)
- Antennal scapes short (SL < 0.73mm, SI < 110, surpassing posterior margin of head by only their own maximum diameter) (Fig. 91) . . . . . *cupreus*
47. Antennal scapes relatively short (SL < 0.93mm and SI < 97, surpassing posterior margin of head by less than their greatest diameter) (Fig. 92); posterior margin of head concave, with erect hairs on vertex not extending to sides; gaster nearly always with blue, greenish-blue or greenish-yellow iridescence . . . . . *rufoniger* (part)
- Antennal scapes relatively long (SL > 0.93mm or SI > 96) (Fig. 92); posterior margin of head planar to strongly convex, with

or without erect hairs on the sides 48

48. In full-face view, erect hairs confined to posterior margin of the head; erect setae on hind tibia sparse, often confined to one or two . . . . . *anceps* (part)

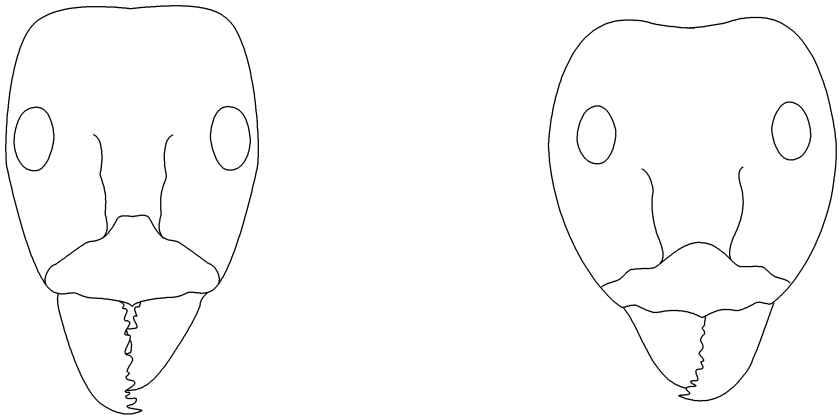
- In full-face view, erect hairs extending along lateral margins of head to at least the eyes; typically, erect setae on hind tibia moderately plentiful to abundant and extending along length of tibia 49

49. Antennal scapes short (SL < 0.90mm, surpassing posterior margin of head by 2 × their greatest diameter or less) (Fig. 92); less gracile (length of hind femur less than 0.75 × length of mesosoma); gaster often with weak bluish-green or yellow-green iridescence . . . . . *suchieri* Forel (part)

- Antennal scapes long (SL > 0.90mm, surpassing posterior margin of head by at least 0.2 × their length, i.e., much more than 2 × their greatest diameter) (Fig. 92); more gracile (length of hind femur greater than 0.82 × length of mesosoma); gaster without iridescence 50

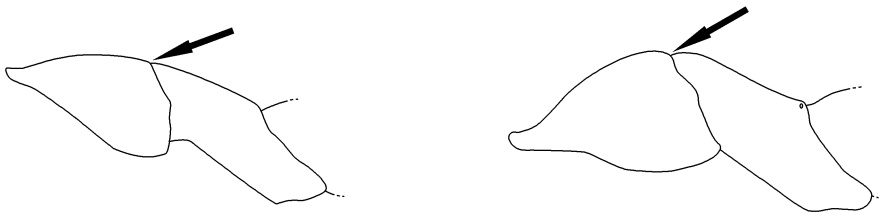
50. In full-face view, head capsule subrectangular, the posterior margin planar . . . . . *minor* (part)

- In full-face view, either head capsule distinctly oval or its posterior margin strongly convex 51



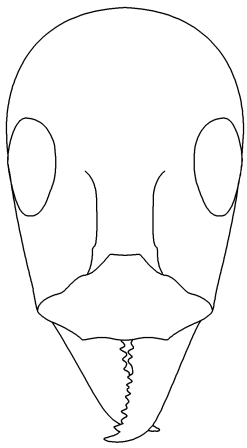
51. In profile, pronotum and mesonotum combined forming a very weak, almost imperceptible arc; in full-face view, posterior margin of head strongly convex; antennal scapes long (SL > 1.15mm, SI > 150, surpassing posterior margin of head by 0.4 × their length) (Fig. 92) . . . . . *elongatus*

- In profile, pronotum and mesonotum forming a moderate convexity; in full-face view, posterior margin of head very weakly concave to very weakly convex; antennal scapes short (SL < 1.15mm, SI < 110, surpassing posterior margin of head by less than 0.3 × their length) (Fig. 92) . . . . . *curvifrons*

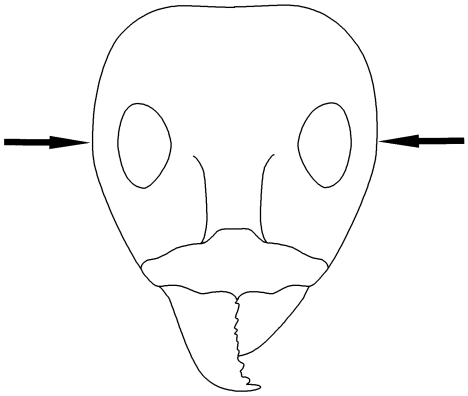


52. Head in full-face view extremely narrow (CI 64–70); in dorsal view, pronotum tapering very weakly towards its anterior margin; eyes large (EL > 0.24mm, EW > 0.19mm, EI > 38, eye width greater than or equal to 3 × greatest diameter of antennal scape) 53

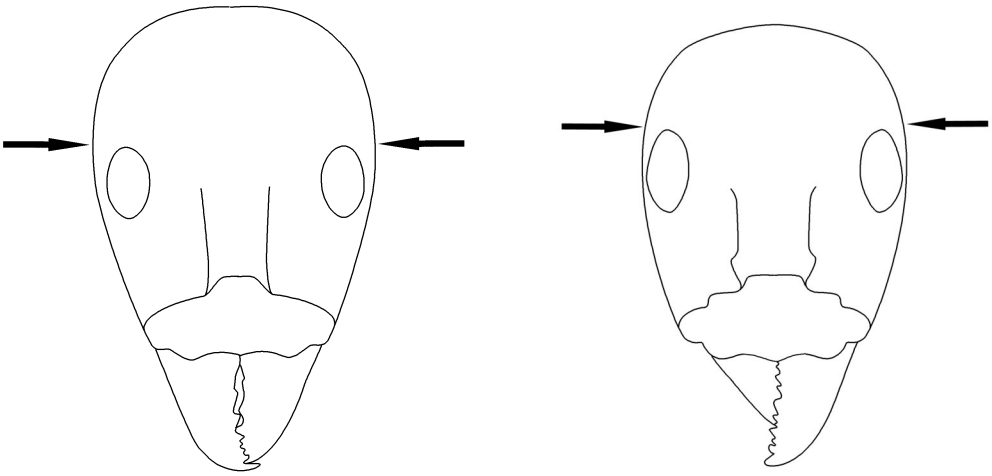
- Without above combination of three characters (in similar species, eye either smaller or pronotum strongly tapered towards its anterior margin) 54



53. Mesosoma glabrous (lacking hairs). . . . . *tenuiceps*
- Mesosoma with very short, bristly hairs (mainly New Guinea and Torres Strait) . . . . . *angusticeps* Forel
54. Broad-headed (CI ≥ 90), yellow, depigmented, tropical species; eye with distinctly protuberant anteromedial margin; in full-face view, eyes placed at least 0.5 × their own diameter away from sides of head; setae on scapes and legs very small, all of same size and decumbent or subdecumbent, often giving these parts a shaggy appearance (best seen against a dark background) . . . . . *pallidus* (part)
- If yellow and depigmented, differing from the above in respect of the appearance and placement of the eyes, and setae on scapes and legs 55

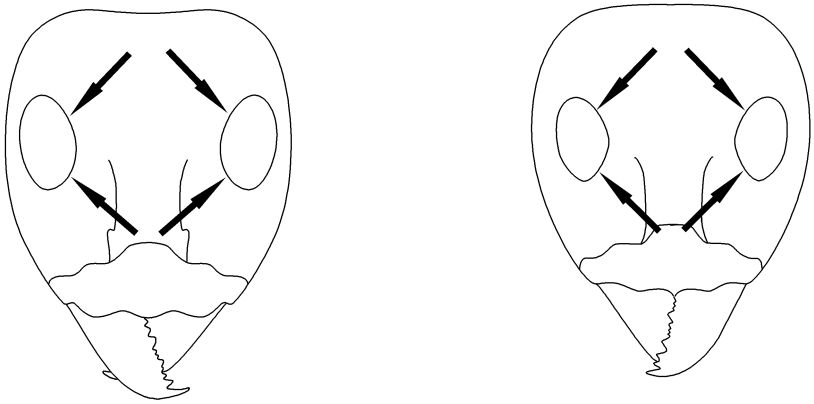


55. Head in full-face view elongate (CI < 83), upper vertex rather broad above eyes; in full-face view, eyes placed at about midpoint of head; anteromedial margin of clypeus produced as a sharp, narrowly triangular tooth; hind femur very long, length greater than or equal to length of mesosoma. 56
- If head elongate (e.g., *bicknelli* Emery), then length of hind femur less than length of mesosoma or, in full-face view, eyes placed above midpoint of head, upper vertex narrow compared with region below eyes and anteromedial clypeal margin not produced as a sharp, narrowly triangular tooth 57



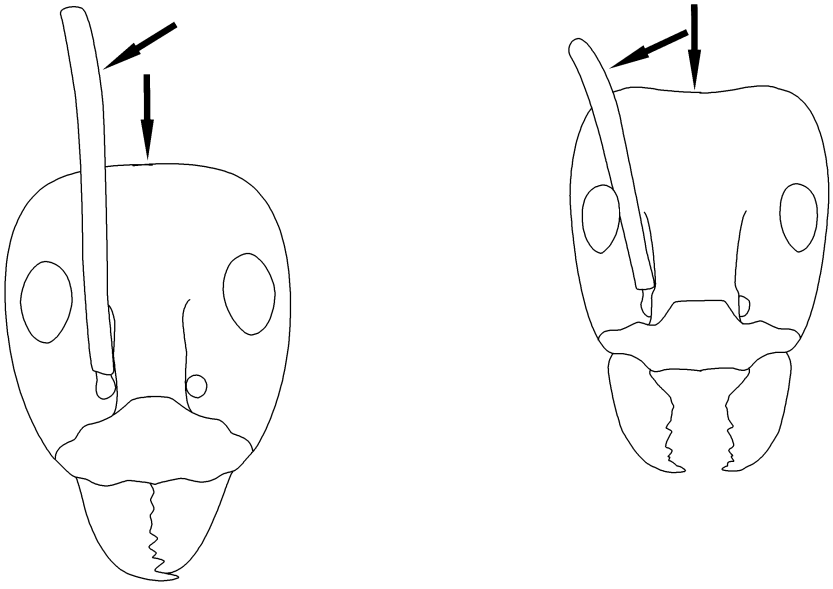
56. Mesonotum and propodeum brown, contrasting with orange head and brownish-orange pronotum; seen in full-face view, sides of head without short, erect hairs except for a few around mandibular insertions; mesic habitats (coastal New South Wales and Queensland). . . . . *rubriceps*
- Very colour variable, but never as above (commonly light orange to reddish with brownish gaster, but dark red and even dark bluish-red forms can occur); seen in full-face view, usually with few to many short, erect hairs on sides of head; drier habitats throughout Australian mainland . . . . . *agilis*
57. Brown to dark brown species with blue, pinkish-purple or pink iridescence over entire body; eye with marked anteromedial protuberance; in profile, junction of dorsal and declivitous propodeal face abrupt, even carinate, declivitous face of propodeum vertical and flat or slightly bent anteriad, giving this structure the appearance of having been sectioned. . . . . *cyaneus*
- If ant brown or dark brown and iridescent, then appearance not as above, and propodeum never with abrupt junction between dorsal and declivitous faces. 58
58. Eye distinctive, with protuberant anteromedial margin, and a posterior lobe that is narrower than its anterior lobe; most commonly depigmented or tawny yellow 59

- Eye without protuberant anteromedial margin, ***or***, if somewhat asymmetrical, then posterior lobe of eye not narrower than anterior lobe 61

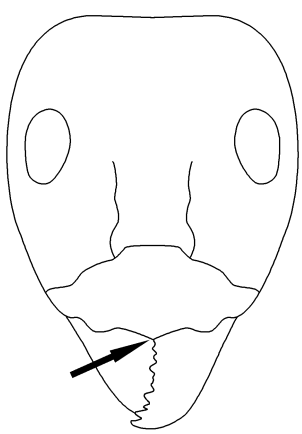


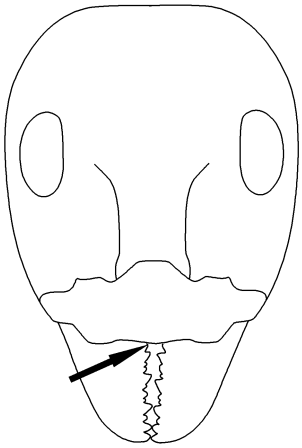
59. Erect hairs short, pronotal and mesonotal hairs fewer than 6, often mesosoma glabrous (lacking hairs); in profile, propodeum strongly protuberant; in full-face view, posterior margin of head weakly to strongly concave . . . . . *hartmeyeri*
- Mesosoma always with some pilosity, and if propodeum protuberant or truncate in profile, then with 6 or more short mesosomal hairs, hairs often numerous; in full-face view, posterior margin of head generally slightly convex or planar, but may be very weakly concave 60
60. In profile, propodeal dorsum curved on to its declivitous surface through a blunt to sharp right angle, propodeum truncate and often weakly protuberant; colour mainly pale, depigmented yellow, occasionally tawny brownish-yellow (northern species) . . . . . *exsanguis*
- In profile, propodeal dorsum curved on to its declivitous surface smoothly, without distinct right angle, propodeum relatively short and truncate to elongate, rarely protuberant; colour variable, from yellow to dark brown, gaster and head often darker than mesosoma and appendages . . . . . *dromus*

61. Antennal scapes surpassing posterior margin of head by 1/3–1/2 of their length or workers with bright orange, orange-red or variegated head capsule and scapes that surpass posterior margin of head by ≈ 3 × their greatest diameter; workers more slender, with relatively elongate, often low propodeum (length of dorsum greater than length of declivitous face); eyes anteriorly divergent in several species; vertex in full-face view convex, straight or gently concave; anteromedial clypeal protuberance usually present as a blunt to sharp triangle 62
- Without this combination of characters; in particular, red and orange-headed workers with a deeply concave posterior margin of the head, and antennal scapes not or only barely surpassing the posterior margin of the head or propodeum short and truncate or protuberant. 72

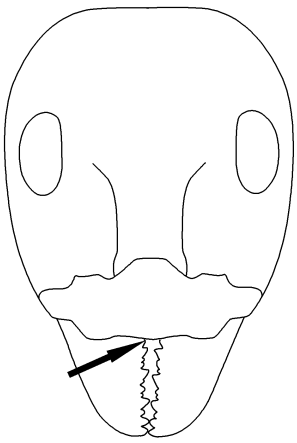


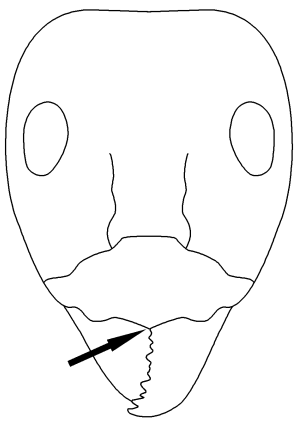
62. Ant with reddish foreparts and with bluish-green to purple iridescence on head and mesosoma . . . . . *azureus*
- Ant without such iridescence, ***or*** ant black 63
63. Small species (HW 0.70–0.75mm); dull brown with faint coppery reflections; head rather narrow (CI < 79); sides of head parallel or weakly convex; posterior margin of head planar; mandibles and often much of clypeus bright yellow . . *luteoclypeatus*
- Without the above combination of characters (*bicknelli* Emery is close, but here CI is usually less than 79, posterior margin of head is weakly to strongly convex, and sides of head converge towards mandibles). 64
64. Head elongate, narrow (CI < 79); sides of head convergent towards mandibles; posterior margin of head weakly (many Western Australian populations) to strongly (Eastern states) convex; ant dark brown to black with coppery, yellowish-green to more distinctly bluish iridescence (iridescence absent from some older material) . . . . . *bicknelli*
- If ant dark brown to black, then head less elongate (CI > 82); posterior margin of head planar or concave, and sides of head convex or parallel 65
65. Side of head with at least six erect hairs; colour various shades of red or brown, but gaster always darker than mesosoma *or* mandibles larger (crossed mandibles ≈ 0.25 × head length) 66
- Side of head usually without erect hairs; if hairs present, then body concolorous, coppery dark brown *or* mandibles smaller (crossed mandibles ≈ 0.20 × head length). 67
66. Anteromedial clypeal prominence a distinct, triangular spur that projects between the anterolateral clypeal lobes; in profile mesonotum straight or slightly sinuate, not forming an even curve with the pronotum. . . . . *minor* (part)
- Anteromedial clypeal prominence vestigial, barely forming an interruption in the curve between the anterolateral clypeal lobes; in profile mesonotum weakly convex, forming an even curve with the pronotum . . . . . *brunneus* (part)





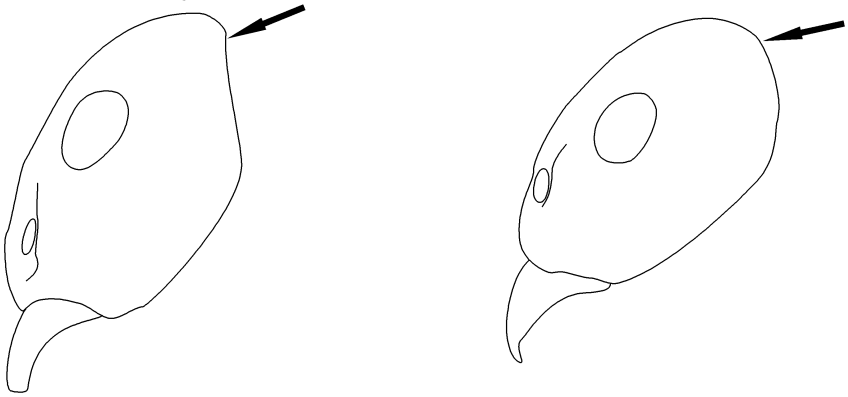
67. Pronotum and mesonotum glabrous or with 1–6 minute hairs (length of hairs much less than narrowest diameter of antennal scape). 68
- Longer pronotal hairs longer than or equal to greatest diameter of antennal scape. 69
68. Body variegated blackish-red, head infuscated reddish-black; larger (HW > 1.25mm, ML > 2.03mm) (Fig. 93) . . . . . *brennani*
- Head reddish-orange to dark brown, mesosoma light orange to brown, usually with lighter patches but colour combination never as above; smaller (HW < 1.25mm, ML < 2.04mm) (Fig. 93) (a few populations). . . . . *minor* (part)
69. Head, mesosoma, and fore coxae bright orange, legs brown, gaster dark brown (NW Western Australia). . . . . *xanthocoxa*
- If foreparts red or reddish, then fore coxae brown, agreeing with colour of remaining leg segments 70
70. Anteromedial clypeal prominence vestigial, barely forming an interruption in the curve between the anterolateral clypeal lobes; in profile mesonotum weakly convex, forming an even curve with the pronotum; body and legs not uniformly brown . . . . . *brunneus* (part)
- Anteromedial clypeal prominence a distinct, usually triangular spur projecting between the anterolateral clypeal lobes; in profile mesonotum straight or slightly sinuate, not forming an even curve with the pronotum or body and legs uniformly brown. 71



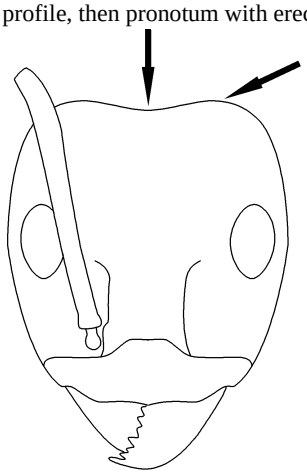


71. Concolorous brown to dark brown, often with coppery reflections; hairs on pronotum and mesonotum short and bristly, their length not exceeding greatest diameter of the eye; length of hind femur variable, but usually less than 0.90 × length of mesosoma . . . . . *anceps* (part)
- Not concolorous brown (generally, gaster darker than body, and head and foreparts often with varying degrees of reddish or orange coloration); length of hairs on pronotum and mesonotum often exceeding greatest diameter of the eye; length of hind femur greater than or equal to 0.90 × length of mesosoma. . . . . *minor* (part)

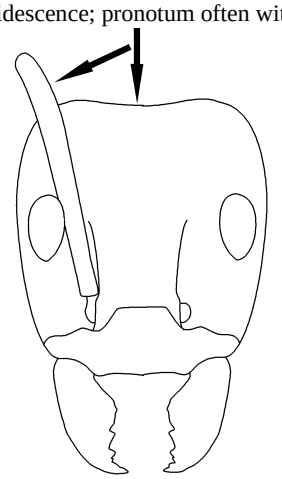
72. In profile, posterior region of head flattened, giving it a wedge-shaped appearance (dull brown, NW Western Australia species) . . . . . *cuneiceps*
- In profile, head rounded normally 73



73. In full-face view, posterior margin of head broadly concave, posterolateral corners angulate; pronotum without erect hairs; gaster without iridescence; in profile, propodeum truncate and protuberant . . . . . *gumnos*
- In full-face view, if posterior margin of head broadly concave with posterolateral corners angulate, gaster lacking iridescence and propodeum truncate and protuberant in profile, then pronotum with erect hairs. 74

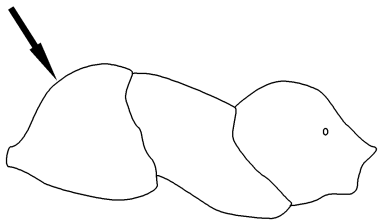


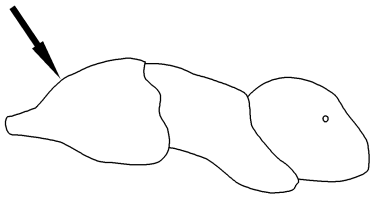
74. In full-face view, posterior margin of head broadly concave, posterolateral corners broadly angulate; propodeum narrowly protuberant; head and mesosoma without iridescence; if gaster with blue-green reflections then ground colour of gaster black and foreparts bright orange with or without some brown infuscation, usually gaster with coppery reflections only; pronotum with few to many erect hairs 75
- In full-face view, if posterior margin of head broadly concave and posterolateral corners broadly angulate, then gaster shades of brown with generally faint to strong blue-green to yellow-green iridescence, ***or*** head, mesosoma and gaster generally with faint to strong blue-green to yellow-green iridescence; pronotum often with one or two small erect hairs only. 76



75. In profile, anterior pronotum humped, arising steeply at angle of ≈ 60 º, ascending curve of pronotum much more steeply inclined than descending curve of mesonotum; posterior margin of head noticeably and broadly concave in full-face view; pronotum usually with 10 or more erect hairs; variably coloured, but cuticle of head and mesosoma usually with reddish tinge, most commonly orange or brownish-orange, or brown with orange highlights . . . . . *chasei* (part)

- In profile, anterior pronotum moderately inclined at angle of ≈ 45 º, ascending curve of pronotum almost identical with descending curve of mesonotum; posterior margin of head weakly concave or almost planar in full-face view; pronotum often with 6 or fewer erect hairs; uniformly brown (compact, small species (HL < 0.72mm, HW < 0.67mm, SL < 0.66mm, ML < 0.86mm) from northern Western Australia, Queensland and the Northern Territory, easily confused with *I. chasei* . . . . *gibbus*





76. In full-face view, erect hairs extending along sides of head . . . . . *suchieroides*

- In full-face view, erect hairs either absent or confined to posterior margin of head. 77

77. Eyes large (EL ≈ 0.26mm, EW ≈ 0.21mm, eye width = 2.5 × greatest diameter of antennal scape), almost semi-circular in shape; anteromedial clypeal prominence well defined and acute; head capsule rather elongate (CI ≈ 78) (known only from Lake Mere, New South Wales) . . . . . *atypicus*

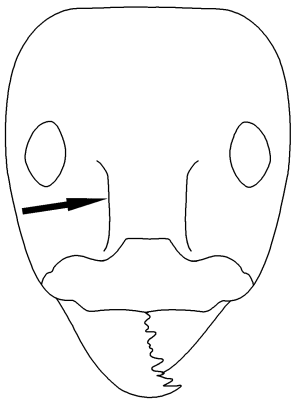
- Eyes not as above ***or*** head broader and more square (CI > 85) ***or*** anteromedial clypeal prominence weakly developed, vestigial or absent 78

78. Eyes rather large (eye width greater than or equal to 2 × greatest diameter of antennal scape); entire body usually with weak to moderate bluish- or yellowish-green iridescence, iridescence may be absent in some populations, especially those found outside of Australia; mandible very pale, much lighter in colour than head in Australian workers; underlying cuticle coriaceous, weakly to moderately shining; short, pale, bristly hairs present on mesosoma; anteromedial clypeal prominence broad and well developed; curved hairs longer than greatest diameter of eye present on venter of head (may be abraded) . . . . . *coeruleus*

- If ant with bluish- or yellow-green iridescence and pale, bristly hairs, then ***either*** eye smaller (eye width less than or equal to 1.5 × greatest diameter of antennal scape) ***or*** curved hairs on underside of head (if present) shorter; ***or*** if ant lacks bluish- or yellow-green iridescence and pale, bristly hairs then anteromedial clypeal prominence absent or vestigial (e.g., *I. niger*, which is superficially similar); underlying cuticle (in all cases) often superficially microreticulate, shining 79

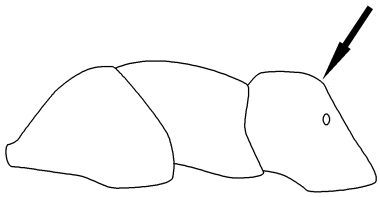
79. In full-face view, frontal carinae straight; in profile, propodeum narrow, protuberant, often forming a rounded, low cone; generally larger species (most specimens HW > 0.76mm . . . . . *alpinus*

- Frontal carinae weakly convex; in profile, propodeum not protuberant as above or forming a rounded, low cone; most species with HW < 0.76 mm 80

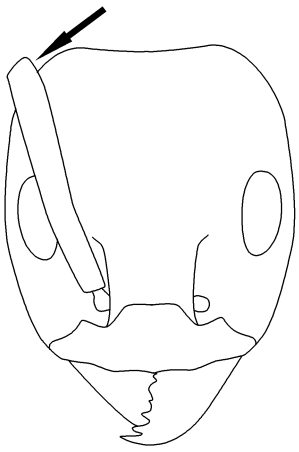


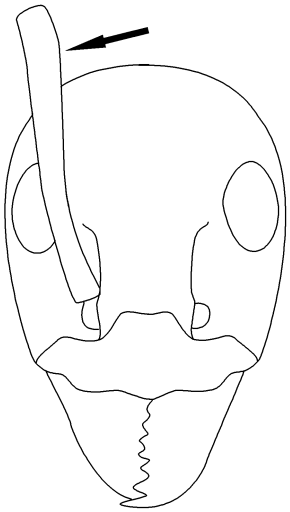
80. Very small, mostly coal-black or bluish ants, rarely dark, shining yellowish brown (*I. hertogi*) (HL ≈ 0.59–0.76mm, HW ≈ 0.51–0.65mm, ML ≈ 0.71–0.99mm), appearance as in *I. coeruleus*, some workers completely glabrous, except for one or two tiny bristles on propodeum, while others have short, bristly hairs; in full-face view, sides of head convergent anteriad; in profile, mesosoma forming a seamless, even curve; head narrow (CI ≈ 84–86); anteromedial clypeal margin without prominence; propodeum truncate, tending to protuberant in profile 81

- If ant very small (i.e., HW < 0.55mm), then body shades of brown and, in full-face view, head rectangular (i.e., CI > 85, except in a few *I. mjobergi* workers, which are brown ants), sides of head not noticeably convergent anteriad; erect, non-bristly hairs usually present (absent in northern *I. difficilis*), at least on margins of gastral tergites; head width variable; anteromedial clypeal prominence usually noticeable 82



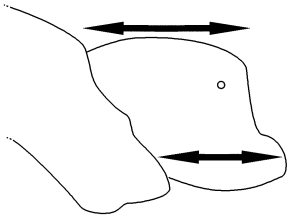
81. Body smaller (HL < 0.61mm, HW < 0.52mm, ML < 0.73mm) (Fig. 94); confined to northern Australia . . . . . *hertogi*
- Body larger (HL > 0.61mm, HW > 0.52mm, ML > 0.77mm) (Fig. 94); confined to SE Australia . . . . . *niger*
82. Antennal scapes very short (SL < 0.60mm and SI < 97, surpassing posterior margin of head by less than their greatest diameter) 83
- Antennal scapes longer (SL > 0.60mm and SI > 97, surpassing posterior margin of head by at least 1.5 × their greatest diameter) 85
83. Mesosoma with many short, bristly hairs throughout; mandible dark, concolorous with head or nearly so; confined to Tasmania . . . . . *mattiroloi*
- Mesosoma either glabrous or with sparse to moderate non-bristly hairs mainly on pronotum; colour of mandible yellow to darkish orange, distinctly lighter in colour than head; found throughout Australian mainland as well as Tasmania 84
84. In full-face view, antennal scapes not or barely breaking the outline of the posterior margin of head (SL < 0.55mm, SI < 95) (Fig. 95); in profile, worker usually with relatively steep curve to the anterior pronotum; metanotal groove deep, with propodeum either narrow and protuberant or narrow and truncate; smaller, brown species . . . . . *difficilis*
- In full-face view, antennal scapes slightly longer (surpassing posterior margin of head by at least 1 × greatest diameter of scape, SL > 0.50mm, SI > 91) (Fig. 95); anterior pronotum usually an even curve; metanotal groove relatively weak, propodeum may be narrow and truncate (a few small workers) but never protuberant; mostly larger species . . . . . *mjobergi* (part)





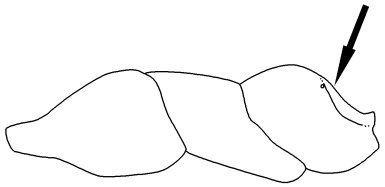
85. In profile, length of dorsum of propodeum greater than length of its declivitous face, and also greater than length of its base; dorsum of propodeum straight or only weakly convex; posterior margin of head with row or aggregation of short hairs . . . . . *suchieri* (part)

- In profile, if appearance of propodeum broadly as above (some *I. mjobergi*), then posterior margin of head lacking row or aggregation of short hairs 86



86. Posterior sector of propodeum flattened, so that propodeal angle is more-or-less erased and propodeal spiracle is near confluence of dorsal and declivitous propodeal faces; antennae usually longer, antennal scapes surpassing posterior margin of head by greater than or equal to 2 × its greatest diameter in most specimens; ant glossy blackish-brown with strong coppery reflections . . . . . *continentis*

- If ant similar (some northern populations of *I. mjobergi*), then propodeal spiracle placed well below flattened region of dorsum of propodeal dorsum, and antennal scapes surpasses posterior margin of head by less than or equal to 1.5 × its greatest diameter 87



87. Antennal scapes longer (SL > 0.92mm, SI > 112, surpassing posterior margin of head by ≈ 3 × its greatest diameter) (Fig. 96) (New Caledonia) . . . . . *neocaledonica*

- Antennal scapes shorter (SL < 0.92mm, SI < 116 (but usually < 110), surpassing posterior margin of head by less than or equal to 2 × its greatest diameter at a maximum, usually by less) (Fig. 96) (Australia) 88

88. Head weakly to moderately, but evenly concave when seen in full-face view; when seen in profile, propodeum truncate to protuberant, with straight to concave declivitous surface; weak bluish- to yellowish green iridescence usually present in fresh material, but confined to gaster . . . . . *victorianus*

- Without above combination of characters: in particular, if propodeum truncate or protuberant, then ant with planar posterior margin of head and coppery brown without noticeable iridescence on gaster, ***or*** ant with iridescence on both body and gaster 89

89. Seen in full-face view, posterior margin of head surmounted by row or aggregation of short, erect hairs; most populations uniformly dark brown or black with uniform weak bluish- to yellowish-green iridescence, but non-iridescent bicoloured brown-and-dark-brown, or even light-brown-and-orange workers can occur . . . . . *splendens*

- Seen in full-face, posterior margin of head with a few well-dispersed hairs, or a well-separated pair of hairs or without erect hairs; where several hairs present, ant without distinct iridescence or bicoloured as above 90

90. Head, mesosoma and gaster with very weak to moderate yellowish- or bluish-green iridescence in Western Australian workers; pronotum normally glabrous across all populations, but may have one or two tiny bristly, erect hairs; mandibles commonly brown to dark brown but may be orange in Western Australian populations, concolorous with head capsule in Tasmanian material that lacks noticeable iridescence; antennal scapes surpassing posterior margin of head by ≈ 2 × its greatest diameter (blackish ants confined to Tasmania and the extreme south and southwest of Western Australia) . . . . . *meridianus*

- Rarely with iridescence on head, mesosoma and gaster, if present (SW Australia, rare) then pronotum with several erect, bristly hairs and mandible orange, contrasting with blackish head capsule; mandible also always lighter in colour than head capsule in non-iridescent populations; antennal scapes generally shorter, surpassing posterior margin of head by 1.5–2 × its greatest diameter; mesosoma often with erect hairs, although may be lacking in specimens from drier environments . . . . . *mjobergi* (part)

***Iridomyrmex adstringatus* sp. n.**
(Fig. 7)

Types. Holotype worker from Coolatoo, Coorong, South Australia, 12 October 1975, P. J. M. Greenslade (ANIC, ANIC32-042656). Paratypes: 1 worker from Salt Creek, Coorong, South Australia, 11 November 1972, P. J. M. Greenslade (ANIC, ANIC32-042658); 1 worker from 5km W Mt. Rough, Coorong-Keith, South Australia, 25 October 1972, P. J. M. Greenslade (MCZC, ANIC32-042657).

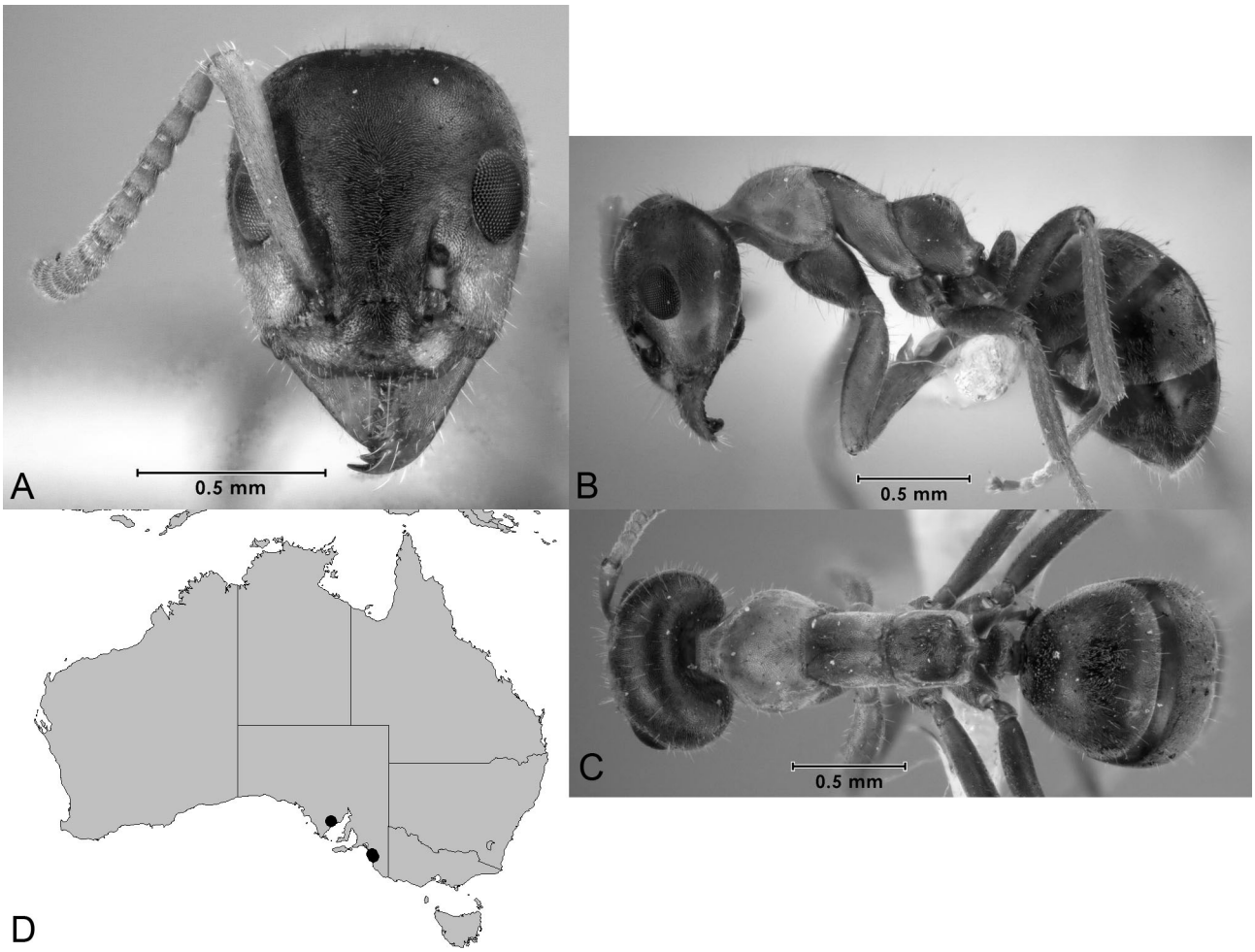


FIGURE 7. *Iridomyrmex adstringatus* (paratype, Coorong National Park, SA, ANIC32-042658): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Worker Description. ***Head.*** Posterior margin of head planar to weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae present on sides of head in full-face view. Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae concave; antennal scape barely attaining posterior margin of head, or surpassing it by less than 1 x its diameter. Erect setae on scape present and abundant; prominence on anteromedial clypeal margin present as an indistinct swelling or undulation; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule present. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae moderate in number (6–12), longest setae elongate, flexuous and/or curved. Mesonotum straight. Erect mesonotal setae moderate in number (6–12), short and bristly. Mesothoracic spiracles always prominent as small, vertical protuberances; propodeal dorsum smoothly and evenly convex; placement of propodeal spiracle posteriad and near propodeal declivity; propodeal angle present as a bluntly defined right angle, the dorsal and declivitous propodeal faces never separated by a carina. Erect propodeal setae numerous (12 or more) and elongate, flexuous and/or curved. ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientated anteriad. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General***

characters. Allometric differences between workers of same nest absent. Colour frons, upper genae, legs and gaster brown, mesosoma and legs mainly orange with some darker, brownish areas.

Measurements. *Worker* (n = 2)—CI 91-92; EI 28-29; EL 0.23-0.25; EW 0.18-0.21; HFL 0.92-1.00; HL 0.90-0.94; HW 0.82-0.87; ML 1.22-1.26; MTL 0.69-0.73; PpH 0.18-0.18; PpL 0.53-0.53; SI 84-85; SL 0.69-0.74.

Comments. *Iridomyrmex adstringatus* is a close relative of *I. calvus* characterised by its small size (HW ≤ 0.85mm), hairy mesosoma and hind tibiae and matte sculpture. As with a number of other species related to *I. calvus*, *I. adstringatus* is rare and has only been collected in South Australia. Most specimens have come from the Coorong district.

Etymology. Latin: '*adstringatus*' meaning 'compressed' or 'drawn together', referring to the chunky, compact appearance of the worker.

Iridomyrmex agilis Forel

(Fig. 8)

Iridomyrmex agilis Forel, 1907a: 295.

Types. Syntypes from Yalgoo, Western Australia (ANIC, 1 worker (missing petiole and gaster), examined; MCZC, 1 worker (missing petiole and gaster), examined; MHNG, 2 workers (1 missing petiole and gaster); WAMP, 1 worker (missing petiole and gaster), examined).

Worker Description. ***Head.*** Posterior margin of head strongly convex; erect setae on posterior margin in full-face view set in a row; sides of head convergent anteriad; erect genal setae present on sides of head in full-face view, or absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular. Frontal carinae straight; antennal scape surpassing posterior margin of head by 0.2-0.5 x its length. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin projecting as triangular spur; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum weakly undulant or almost straight. Erect pronotal setae numerous (12 or more), short and bristly. Mesonotum sinuous. Erect mesonotal setae moderate in number (6-12), short and bristly. Mesothoracic spiracles prominent or inconspicuous; propodeal dorsum smoothly and evenly convex; placement of propodeal spiracle posteriad and near propodeal declivity, or mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae moderate in number (6-12), short and bristly. ***Petiole.*** Dorsum of node convex, or planar; node thin, scale-like, orientation more-or-less vertical, or thick, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite, or absent on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour of foreparts variable, from light-yellow-orange to dark purple with iridescence ranging from very pale pink or yellowish to blue, legs brown with weak bluish iridescence, gaster dark brown. Colour of erect setae pale, whitish.

Measurements. *Worker* (n = 5)—CI 78–81; EI 24–26; EL 0.31–0.34; EW 0.25–0.27; HFL 2.44–2.93; HL 1.56–1.70; HW 1.26–1.33; ML 2.11–2.31; MTL 1.72–2.20; PpH 0.22–0.25; PpL 0.79–0.86; SI 118–137; SL 1.55–1.75.

Comments. *Iridomyrmex agilis* can be distinguished from most other *Iridomyrmex* species by its elongate form, long head, which, in full-face view, is broader at and just above the eyes, and the distinctive, spur-like anteromedial clypeal prominence. Its near relative, *I. rubriceps*, can be separated from *I. agilis* by the contrasting colour of its head and pronotum compared with its mesonotum and propodeum (the former parts are of uniform colouration with the rest of the mesosoma in *I. agilis*). *Iridomyrmex bicknelli* is also similar, but has a slightly differently shaped head, and the hind femora are shorter in relation to the mesosoma. *Iridomyrmex agilis* is typically found in drier regions, where workers forage singly along well defined but indistinct paths across the ground, scurrying quickly with their gasters raised.

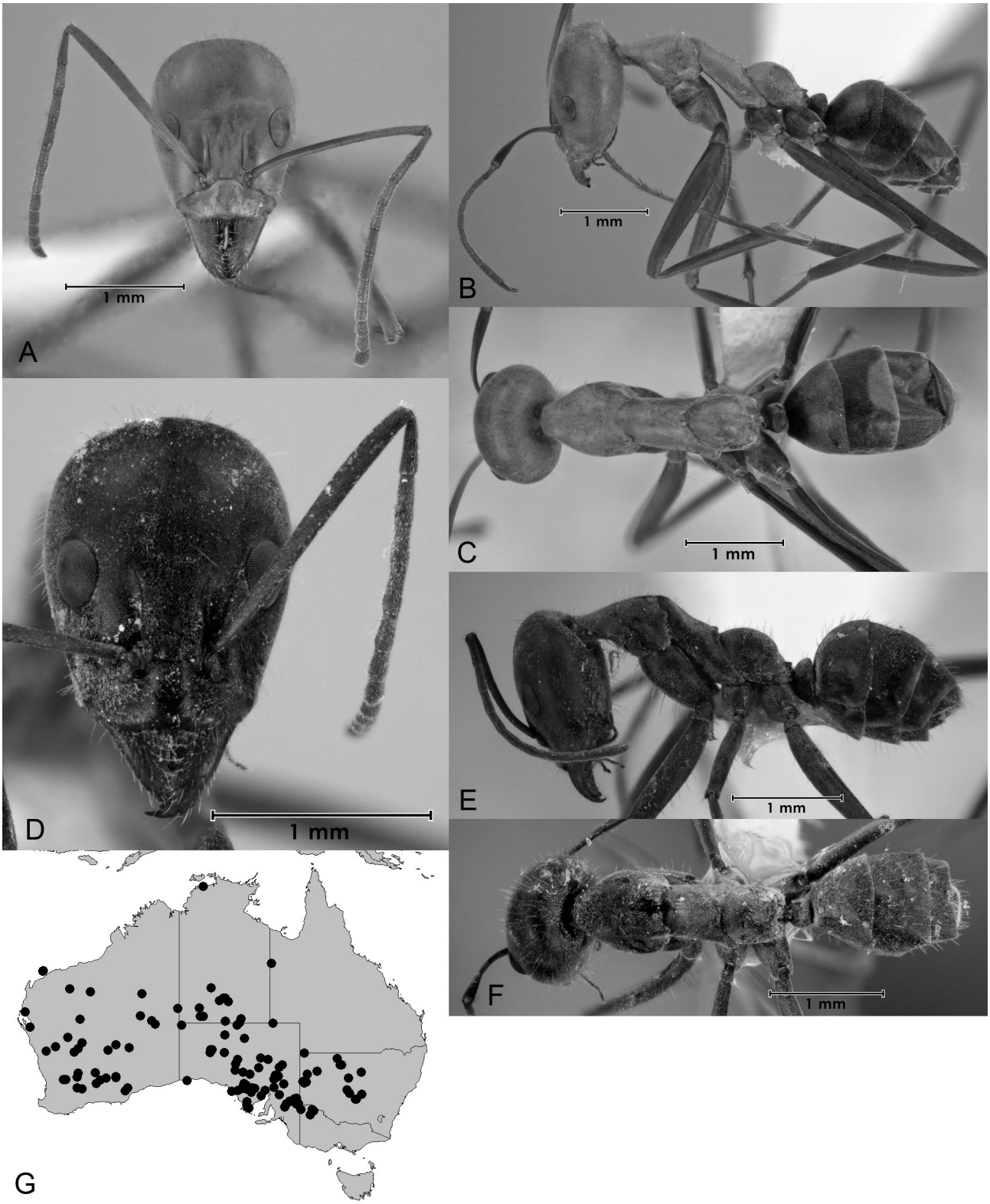


FIGURE 8. *Iridomyrmex agilis*, typical form (Murray Sunset National Park, Vic., ANIC32-043285): A. Front of head; B. Side of body; C. Top of body. *Iridomyrmex agilis*, dark form (Cowangie, Vic., ANIC32-038651): D. Front of head; E. Side of body; F. Top of body; G. Distribution of material examined.

***Iridomyrmex alpinus* sp. n.**
(Fig. 9)

Types. Holotype worker from 12km W Orroral Tracking Station, ACT, 25 November 1990, S. O. Shattuck, dry sclerophyll (ANIC, ANIC32-059637). Paratypes: 8 workers, same data as holotype (ANIC, ANIC32-038488); 15 workers from 2 miles N Mount Aggie, 4500ft., ACT, 25 August 1966, R. W. Taylor, wet sclerophyll (ANIC, ANIC32-040860, 9 workers; BMNH, ANIC32-040860, 3 workers; MCZC, ANIC32-040860, 3 workers); 6 workers from Mount Aggie, 4700ft., 5 November 1966, R. W. Taylor (ANIC, ANIC32-040862).

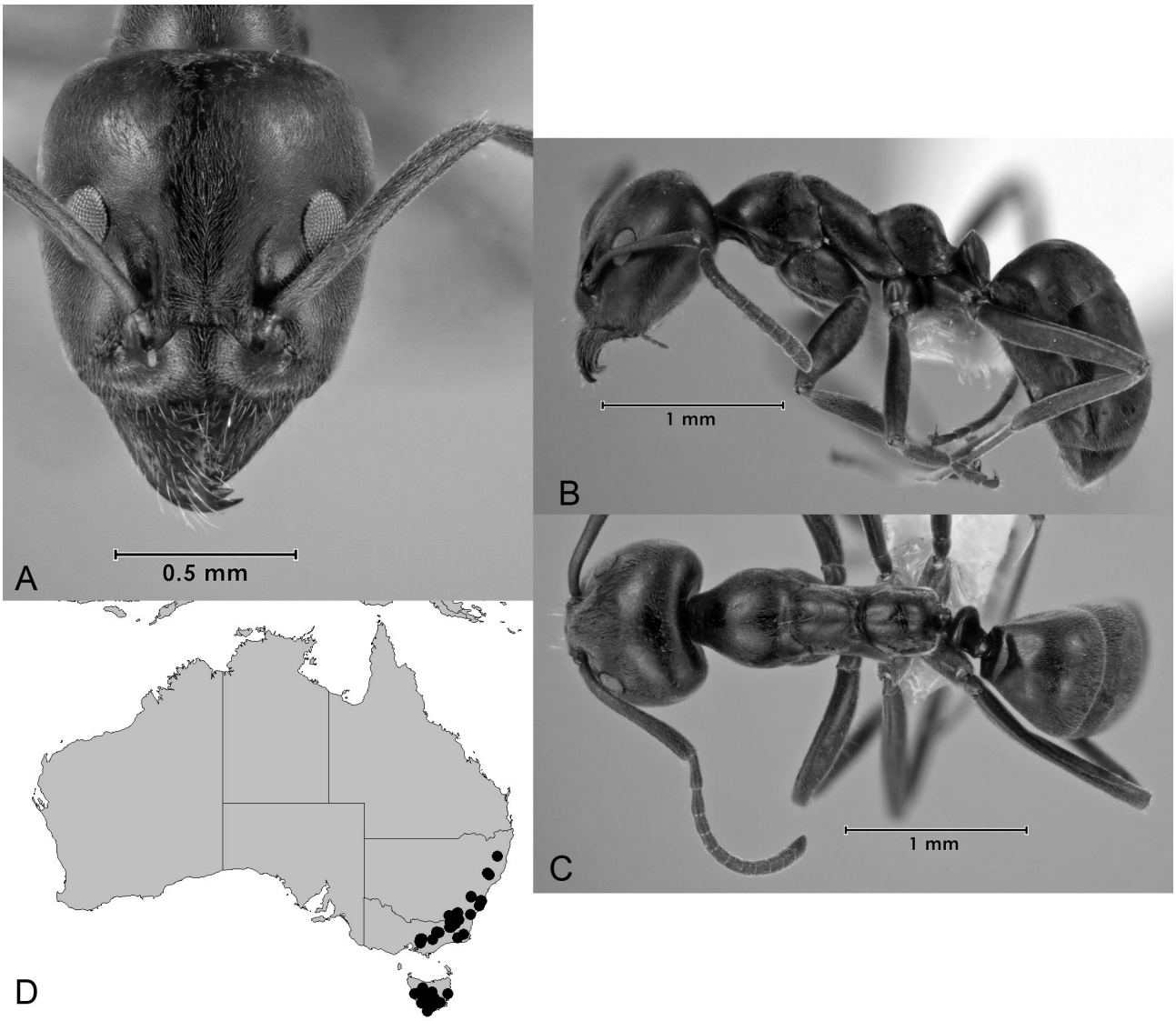


FIGURE 9. *Iridomyrmex alpinus* (Kosciuszko National Park, NSW, ANIC32-043208): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Worker Description. ***Head.*** Posterior margin of head planar to weakly concave; erect setae on posterior margin absent; sides of head noticeably convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set above midpoint of head capsule; in profile, eye set anteriad of head capsule; eye asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae straight; antennal scape surpassing posterior margin of head by 1-2 x its diameter. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin present as an indistinct swelling or undulation; mandible triangular with distinct angle between masticatory and basal margins; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum strongly inclined anteri-

orly. Erect pronotal setae sparse to absent. Mesonotum straight. Erect mesonotal setae sparse to absent. Mesothoracic spiracles prominent or inconspicuous; propodeal dorsum protuberant; placement of propodeal spiracle posteriad and near propodeal declivity, or mesad, more than its diameter away from propodeal declivity; propodeal angle present as a bluntly defined right angle, the dorsal and declivitous propodeal faces never separated by a carina, or weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae lacking or very minute (one or two tiny setae present). ***Petiole.*** Dorsum of node acuminate, or convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present or absent on first gastral tergite; marginal erect setae of gaster present on first tergite, or absent on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour concolorous medium brown to black. Colour of erect setae light brown.

Measurements. *Worker* (n = 13)—CI 90–101; EI 21–24; EL 0.18–0.24; EW 0.10–0.16; HFL 1.18–1.18; HL 0.82–1.13; HW 0.75–1.12; ML 0.32–0.49; MTL 0.87; PpH 0.12–0.21; PpL 0.42–0.60; SI 85–98; SL 0.73–0.98.

Comments. While closely related to *I. conifer, I. setoconus* and *I. turbinus* and sharing a number of characters with them, *I. alpinus* can be readily separated by its lack of a strongly conical propodeal dorsum and its biogeography (it is eastern while the others occur in southern Western Australia). The ant can also be separated from the morphologically similar *I. pallidus* and *I. hartmeyeri* in terms of biogeography and habitat preference and the shape and size of the eye (small-medium and oval versus large and asymmetrical). *Iridomyrmex alpinus* is confined to very wet and often montane areas in New South Wales, Victoria and Tasmania. In fact, it has been taken in alpine vegetation at elevations in excess of 2000 m. Label data indicates that, within its range, the species is very adaptable in terms of habitat: ants have been sampled from a variety of cool temperate vegetation types, including alpine meadows and grassland, the edge of rainforests and open, wet sclerophyll forest. The appearance of the nests also varies, so that the nest entrance can be either a simple hole in the ground or a mound (the latter, presumably, in a mature colony). Conversely, the ants can establish their nest under cover (e.g., a stone), in rotting wood, under piles of dead leaves and twigs or in sphagnum moss. One New South Wales worker is described as being taken from the nest of 'a stick ant'. Workers have been found foraging in litter and on alpine vegetation. Collection methods have been various; hand collections, pitfall traps, berlesates and even a human dung trap! This species, unlike most ants, does not mind nesting in wet soil, and a number of the ANIC collections have been taken adjacent to waterways. All in all, the large amount of material available for study suggests that this species is an important component of the eastern seaboard ant fauna in phytogeographic areas and in physical habitats that would support few ant species and very few *Iridomyrmex*.

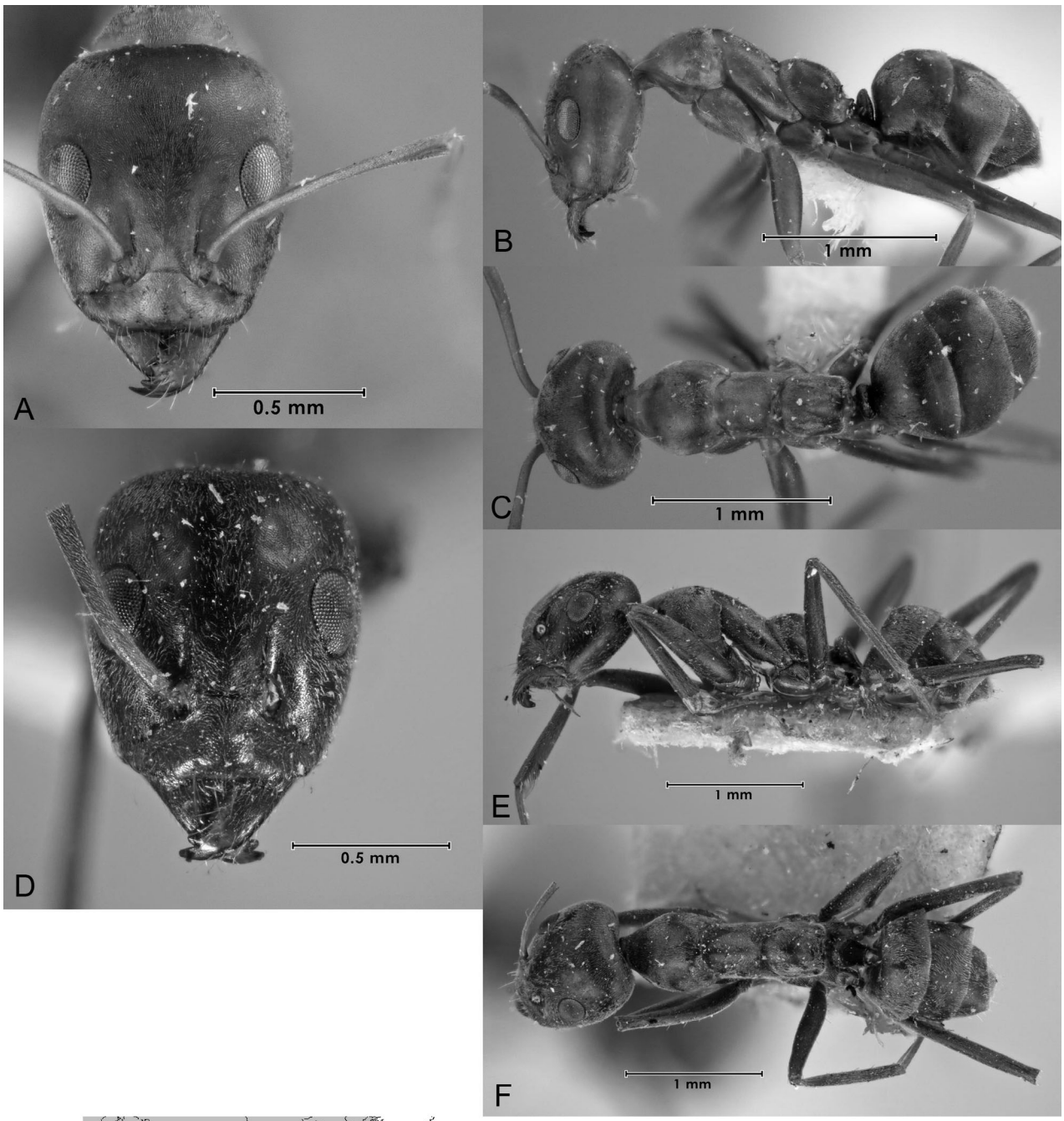
Etymology. Latin: 'alpine' (mountain), referring to the common habitat of this species.

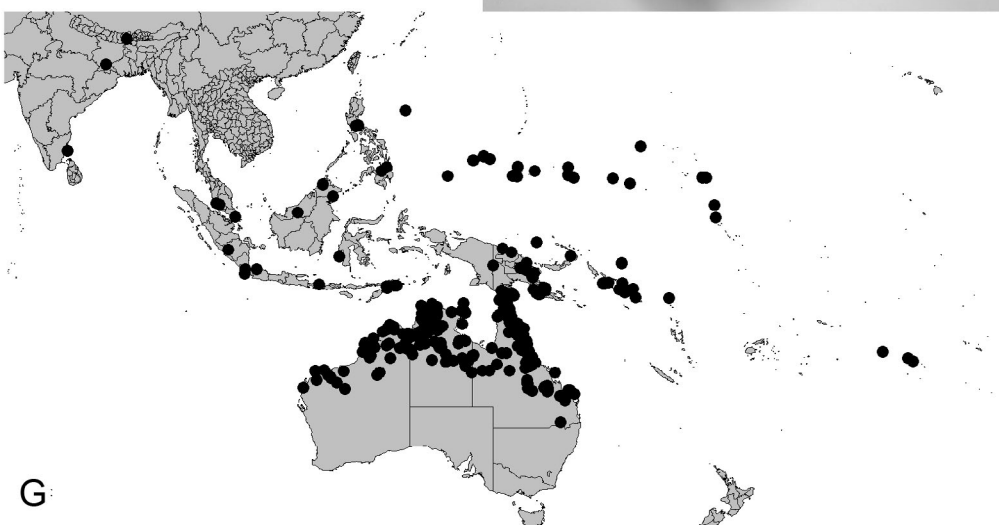
Iridomyrmex anceps (Roger)

(Figs 10, 92)

Formica anceps Roger, 1863: 164 (combination in *Iridomyrmex* by Dalla Torre, 1893: 168).
Iridomyrmex excisus Mayr, 1867a: 77 (junior synonym of *anceps* by Dalla Torre, 1893: 168; Forel, 1895: 469; Emery, 1895: 475).
Iridomyrmex rufoniger metallescens Emery, 1893: 194. **New synonym.**
Iridomyrmex anceps watsonii Forel, 1895: 468. **New synonym.**
Iridomyrmex gracilis papuana Emery, 1897: 572 (race of *anceps* by Forel, 1901: 19; junior synonym of *anceps* by Wilson & Taylor, 1967: 78).
Iridomyrmex meinerti Forel, 1901: 22. **New synonym.**
Iridomyrmex anceps sikkimensis Forel, 1904: 27. **New synonym.**
Iridomyrmex bicknelli formosae Forel, 1912: 70. **New synonym.**
Iridomyrmex gracilis papuana neocaledonica Emery, 1914: 419 (unavailable infrasubspecific name, see Taylor, 1987: 33).
Iridomyrmex anceps ignobilis Mann, 1921: 472. **New synonym.**
Prenolepis discoidalis Donisthorpe, 1947 (junior synonym of *papuana* by Smith, M. R., 1957: 347).

FIGURE 10. *Iridomyrmex anceps*, typical form (Musselbrook Camp, Qld, ANIC32-014004): A. Front of head; B. Side of body; C. Top of body. *Iridomyrmex anceps*, dark form (*sikkimensis* syntype, MHNG): D. Front of head; E. Side of body; F. Top of body; G. Distribution of material examined.


A
0.5 mm
B
1 mm
C
1 mm
D
0.5 mm
E
1 mm
F
1 mm


G

Types. *Formica anceps* Roger: Neotype worker (top worker, here designated) from Kuala Lumpur, Malaysia, 9 February 1967, D.H. Murphy, on sand, A-290-1 (ANIC, ANIC32-036430). *Iridomyrmex excisus* Mayr: Syntypes from "Coloniae indo-neerlandicae" (not located during this study). *Iridomyrmex rufoniger metallescens* Emery: Holotype worker from Ambon (as Amboina), Maluku, Indonesia (MCSN, examined). *Iridomyrmex anceps watsonii* Forel: Syntype workers and queen from upper Myanmar (MHNG, 3 workers, 1 queen, examined). *Iridomyrmex gracilis papuana* Emery: Syntype workers from Kapakapa, Papua New Guinea (MHNG, 1 worker, examined). *Iridomyrmex meinerti* Forel: Holotype queen from Rabaul (as Ralum), East New Britain, Papua New Guinea (not located during study, apparently lost). *Iridomyrmex anceps sikkimensis* Forel: Syntype workers from Sikkim and Garo Hills, Assam, India (MHNG). *Iridomyrmex bicknelli formosae* Forel: Syntype workers and queens from Peinan (as Pilam), Taiwan (MHNG, 1 queen, examined). *Iridomyrmex anceps ignobilis* Mann: Syntypes from Nadarivatu, Viti Levu, Fiji (USNM, 3 workers, examined). *Prenolepis discoidalis* Donisthorpe: Holotype male from K. B. Mission, Milne Bay, Papua New Guinea (USNM, examined).

Worker Description. ***Head.*** Posterior margin of head planar to weakly concave; erect setae on posterior margin in full-face view set in a row, or present in small aggregations on one or both sides of posterior margin of head, or present singly or as a couple of setae on either side of posterior margin of head; sides of head noticeably convex; erect genal setae present on sides of head in full-face view, or absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Number of ocelli one (a minute ocellus), position of obsolete ocelli indicated by small pits only or pits lacking, or ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set around midline of head capsule; eye semi-circular, or elongate. Frontal carinae convex; antennal scape surpassing posterior margin of head by 0.2–0.5 x its length. Erect setae on scape present and sparse, or absent, except at tip; prominence on anteromedial clypeal margin projecting as triangular spur; mandible regularly triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum moderately and evenly curved over its length, or weakly undulant or almost straight. Erect pronotal setae moderate in number (6–12), short and bristly, or sparse to absent. Mesonotum straight. Erect mesonotal setae varying from absent to numerous (12 or more), short and bristly (when present). Mesothoracic spiracles prominent or inconspicuous; propodeal dorsum smoothly and evenly convex, or straight and long (half as long again as length of propodeal declivity); placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae moderate in number (6–12), short and bristly. ***Petiole.*** Dorsum of node convex, or planar; node thin, scale-like, orientation more-or-less vertical, or thin, scale-like, orientated anteriad. ***Gaster.*** Non-marginal erect setae of gaster present or absent on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest present. Colour uniformly light to dark brown. Colour of erect setae pale, whitish.

Measurements. *Worker* (n = 11)—CI 84–97; EI 24–30; EL 0.21–0.28; EW 0.16–0.23; HFL 1.09–1.55; HL 0.82–1.20; HW 0.70–1.17; ML 1.08–1.61; MTL 0.79–1.11; PpH 0.14–0.22; PpL 0.42–0.62; SI 104–134; SL 0.93–1.22.

Comments. *Iridomyrmex anceps* is a very widespread, nondescript brown ant that is almost ubiquitous in many northern regions of Australia, where it is generally found near the coast and at wetter inland sites. The species also has a wide range throughout the Pacific, where it has been recorded from several southern and southeast Asian countries (including China, India and Malaysia) and a variety of Pacific islands. While the phenotype varies somewhat in terms of the shape of the propodeum, the short, erect, mesosomal setae and uniform brown to blackish colouration always enable Australian populations to be distinguished from the other common northern *Iridomyrmex* of medium size, *I. minor*, with which it is often sympatric. The relatively long antennal scape also enables it to be separated from species related to *I. rufoniger* that are of the same size and general appearance. Probably because of its generic habitus, *I. anceps* has been confused in the past with other medium–sized *Iridomyrmex*. A case in point is where a mildly invasive *Iridomyrmex* recognised from New Zealand (mainly from the North Island) was wrongly identified as *I. anceps* for many years, based on a provisional initial identification by Dr. R.W. Taylor. The exotic ant is now known to be unrelated to *I. anceps* (Don, 2007). The ant has recently been ascribed to 'the *suchieri* group' (A. Andersen, pers. comm. cited in Don, 2007), and, in the opinion of the present authors, is likely to be *I. suchieri* itself.

Type material for *I. anceps* could not be located during this study, and, given the number of years since the species was described and the damage caused to museums and similar institutions during WWII, has probably been

destroyed. A worker (top specimen on a pin of two workers) collected from Malaysia is here designated a neotype to give stability to the name. The erection of a neotype is a necessary task, since the name '*anceps*' has been assigned promiscuously to various common species of *Iridomyrmex* in the past, as mentioned above, and this has caused considerable confusion—despite the fact that the original description is sufficiently detailed to make the identity of an *Iridomyrmex anceps* worker a matter that is not difficult to establish. Type material of *I. meinerti* could also not be located during this study. While Forel (1901) states that the single queen on which this taxon is based is highly distinctive (and thus he decided to base this taxon on this single specimen), the description meets the concept of *I. anceps* developed here. Because of this, *I. meinerti* is here treated as a synonym of *I. anceps* until either the type is located or a suitable specimen is selected as a replacement type, at which time the status of this name can be reassessed.

Iridomyrmex anderseni Shattuck

(Figs 11, 87, 88)

Iridomyrmex anderseni Shattuck, 1993b: 1310, figs 22, 23, 38.

Types. Holotype worker from Olympic Dam, South Australia (ANIC, ANIC32-000063, examined).

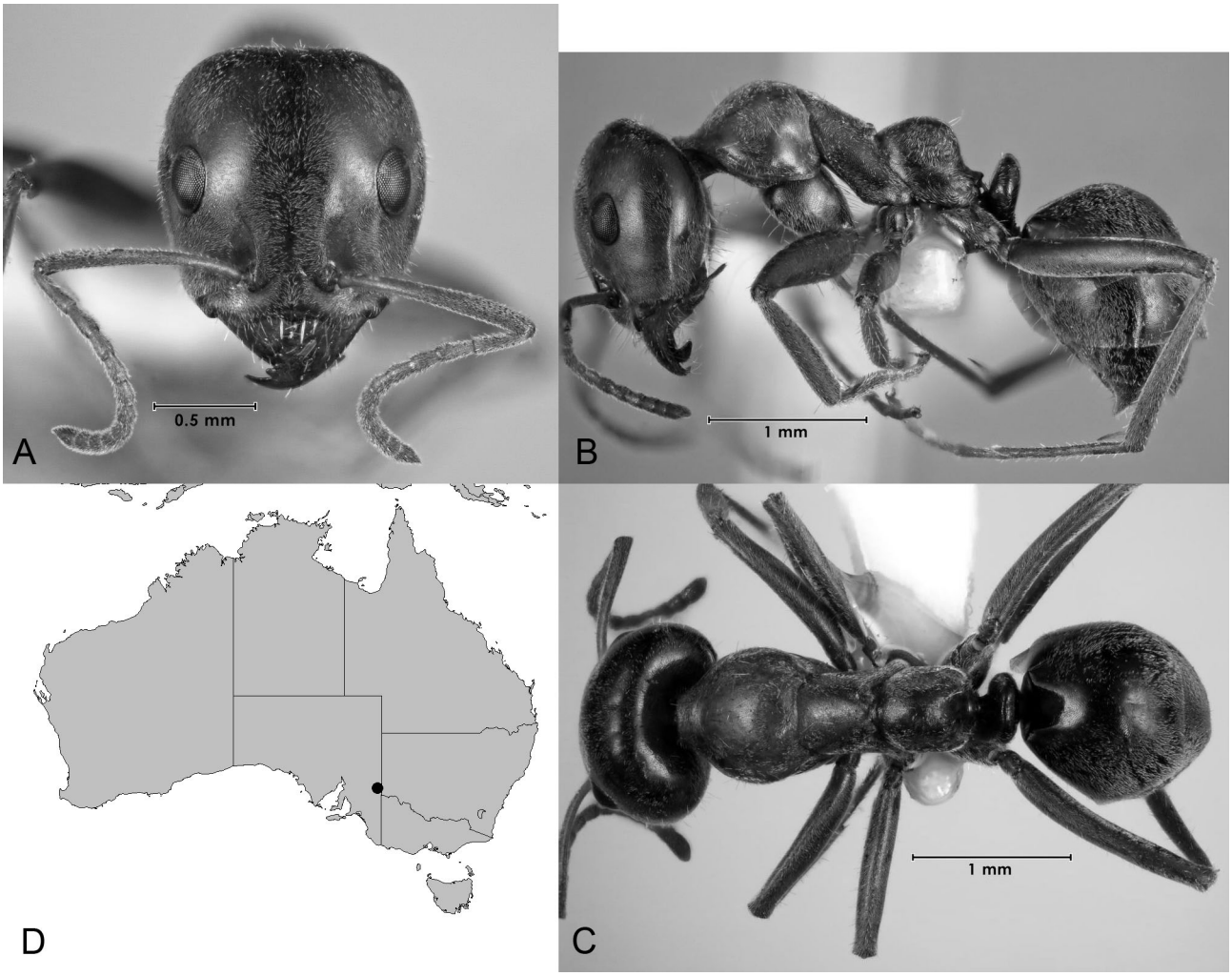


FIGURE 11. *Iridomyrmex anderseni* (holotype, Olympic Dam, SA, ANIC32-000063): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Worker Description. ***Head.*** Posterior margin of head weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae present on sides of head in full-face view. Ocelli absent; in full-face view, eyes set above midpoint of head capsule; in profile, eye set anteriad of head capsule; eye asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae concave; antennal scape failing to attain posterior margin of head. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin present as an indistinct swelling or undulation; mandible regularly triangular with oblique basal margin; long, curved setae on venter of head capsule present. ***Mesosoma.*** Pronotum strongly inclined anteriorly. Erect pronotal setae lacking or very minute (one or two tiny setae may be present). Mesonotum straight. Erect mesonotal setae lacking or very minute (one or two tiny setae present). Mesothoracic spiracles always prominent as small, vertical protuberances; propodeal dorsum protuberant; placement of propodeal spiracle posteriad and near propodeal declivity; propodeal angle present as a bluntly defined right angle, the dorsal and declivitous propodeal faces never separated by a carina. Erect propodeal setae sparse to absent. ***Petiole.*** Dorsum of node planar; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster absent on first gastral tergite; marginal erect setae of gaster absent on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour head, mesonotum propodeum and legs reddish brown, pronotum orange, gaster dark chocolate.

Measurements. *Worker* (n = 1)—CI 95; EI 24; EL 0.32; EW 0.18; HL 1.40; HW 1.33; ML 0.55; PpH 0.23; PpL 0.75; SI 77; SL 1.03.

Comments. This medium-sized member of the *I. viridigaster* complex is known only from the holotype from inland South Australia. The characters separating this form from *I. viridigaster* are weak, and more material is needed to confirm that it is a *bona fide* species. The taxon is discussed in Shattuck (1993b).

Iridomyrmex angusticeps Forel

(Fig. 12)

Iridomyrmex angusticeps Forel, 1901: 19.

Types. Syntype workers from Rabaul (as Ralum), Papua New Guinea (NHMB, one headless worker, examined (images provided by www.anttypes.org)).

Worker Description. ***Head.*** Posterior margin of head weakly convex; erect setae on posterior margin in full-face view set in a row, or present in small aggregations on one or both sides of posterior margin of head; sides of head straight or weakly convex; erect genal setae present on sides of head in full-face view. Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye elongate, or asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae straight; antennal scape surpassing posterior margin of head by 0.2-0.5 x its length. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin projecting as triangular spur; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum weakly undulant or almost straight. Erect pronotal setae numerous (12 or more), short and bristly. Mesonotum straight. Erect mesonotal setae moderate in number (6-12), short and bristly, or sparse to absent. Mesothoracic spiracles always inconspicuous; propodeal dorsum straight and long (half as long again as length of propodeal declivity); placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae moderate in number (6-12), short and bristly. ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour brown to grey-brown. Colour of erect setae pale brownish-yellow.

Measurements. *Worker* (n = 4)—CI 66-69; EI 39-41; EL 0.26-0.31; EW 0.20-0.23; HFL 1.50-1.88; HL 0.98-1.16; HW 0.66-0.78; ML 1.36-1.67; MTL 1.10-1.31; PpH 0.14-0.19; PpL 0.51-0.66; SI 161-171; SL 1.08-1.26.

Comments. This species is one of the few *Iridomyrmex* that can be found outside of Australasia: at least two pins in ANIC were collected on the Island of Mindanao, in the Philippines. Other collections have been made in Papua New Guinea and also in northern regions of Queensland, Northern Territory and Western Australia. Of the more common *Iridomyrmex*, this species most resembles *I. bicknelli*, but the head is much narrower in relation to

its length (CI 66-69 versus 74-78 in *I. bicknelli*). The nearest close relative appears to be *I. tenuiceps*, but *I. angusticeps* has minute, bristly, white, erect setae on the mesosomal dorsum, and these are lacking in the glabrous *I. tenuiceps*. The Philippines workers were collected in pineapple fields while Australian material has been collected in rainforest and *Acacia* shrubland. As is typical of most species within the genus, nests are in soil. The syntype worker examined lacks a head and is in generally poor condition, but its identity is not in doubt.

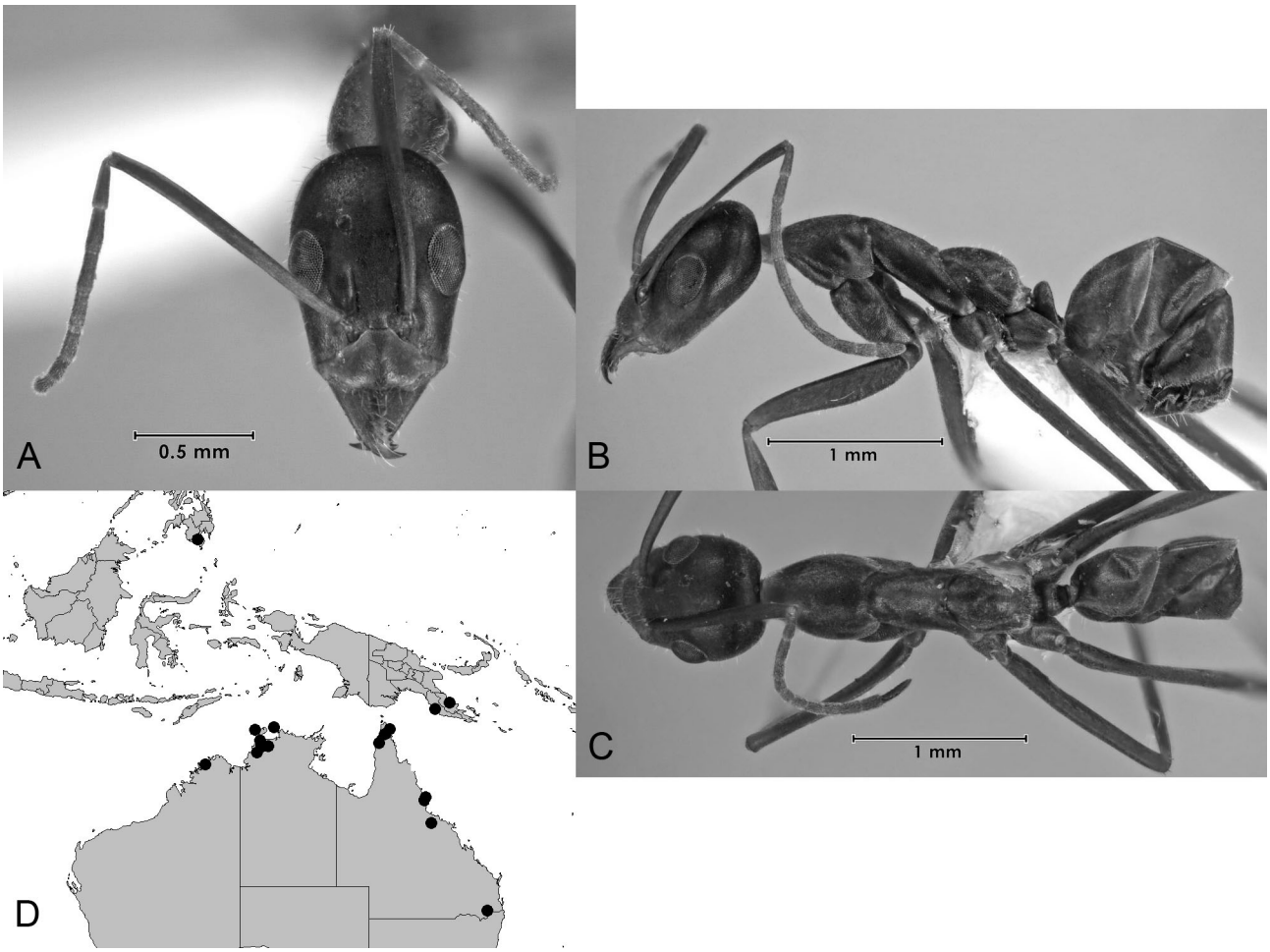


FIGURE 12. *Iridomyrmex angusticeps* (Bushy Island, Great Barrier Reef, Qld, ANIC32-042168): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

***Iridomyrmex anteroinclinus* Shattuck**
(Fig. 13)

Iridomyrmex anteroinclinus Shattuck, 1993b: 1311, figs 28, 29, 37.

Types. Holotype worker from King Edward River, Kimberley Region, 15°08'50"S 126°08'40"E, Western Australia (ANIC, ANIC32-000009, examined). Paratypes: worker from Cape Bernier, Kimberley Region, Western Australia (ANIC, ANIC32-000008, examined); worker from Mining Camp, Mitchell Plateau, Western Australia (ANIC, ANIC32-000007, examined).

Worker Description. ***Head.*** Posterior margin of head weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae present on sides of head in full-face view. Number of ocelli one (a minute ocellus), position of obsolete ocelli indicated by small pits only or pits lacking; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular. Frontal carinae concave; antennal scape surpassing posterior margin of head by 1–2 x its diameter. Erect

setae on scape present and abundant; prominence on anteromedial clypeal margin present as an indistinct swelling or undulation; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule present. ***Mesosoma.*** Pronotum weakly undulant or almost straight. Erect pronotal setae numerous (12 or more) and longest setae elongate, flexuous and/or curved. Mesonotum straight. Erect mesonotal setae numerous (12 or more) and elongate, flexuous and/or curved. Mesothoracic spiracles always prominent as small, vertical protuberances; propodeal dorsum protuberant; placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae numerous (12 or more) and elongate, flexuous and/or curved. ***Petiole.*** Dorsum of node a thin rim only; node reduced to anterior lip only, the rest incorporated in the petiole. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour head, gaster, coxae, fore femora and tibiae brown, most of mandibles, part of clypeus, mid and hind legs (except coxa) and most of mesosoma bright orange, pronotum a cloudy brown-orange.

Measurements. *Worker* (n = 3)—CI 100–102; EI 24–27; EL 0.33–0.37; EW 0.20–0.23; HL 1.22–1.38; HW 1.22–1.38; ML 0.59–0.66; PpH 0.23–0.26; PpL 0.70–0.80; SI 81–84; SL 0.99–1.15.

Comments. *Iridomyrmex anteroinclinus* shares with close relatives a markedly flattened petiolar node with a much reduced anterior face, as well as the short, concave frontal carinae. However, it differs in the infuscation of both the head capsule and the pronotum. Nothing is known about the biology of the species (see Shattuck, 1993b).

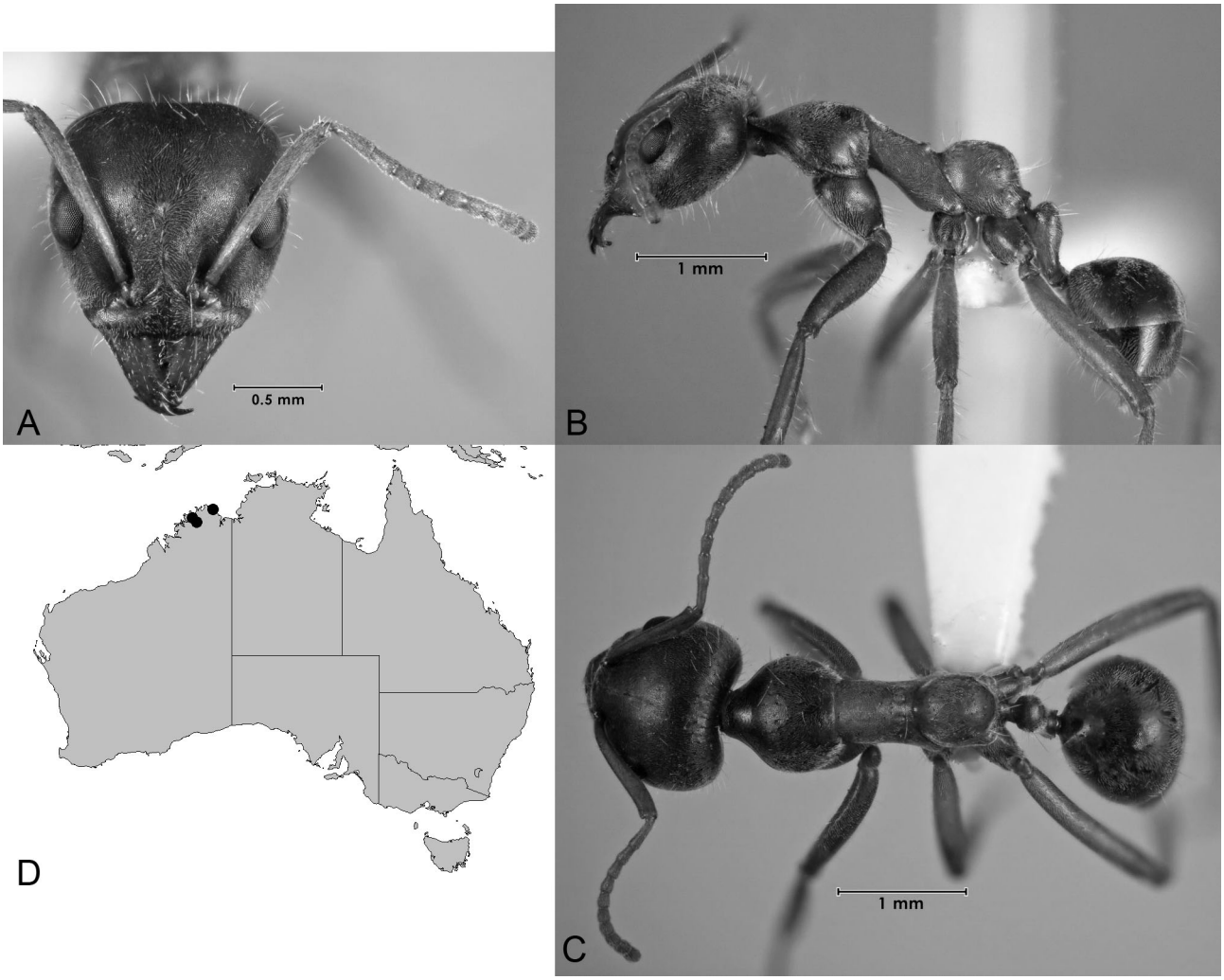


FIGURE 13. *Iridomyrmex anteroinclinus* (holotype, King Edward River, WA, ANIC32-000009): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

***Iridomyrmex atypicus* sp. n.**
(Fig. 14)

Types. Holotype worker from 40km NNW Louth (Lake Mere), New South Wales, 30 October 1986, P. J. M. Greenslade (ANIC, ANIC32-032735). Paratypes: 2 workers from CSIRO Lake Field stn. near Louth, New South Wales, January 1995, M. Bryannah (ANIC, ANIC32-036481, 1 worker; MCZC, ANIC32-036482, 1 worker).

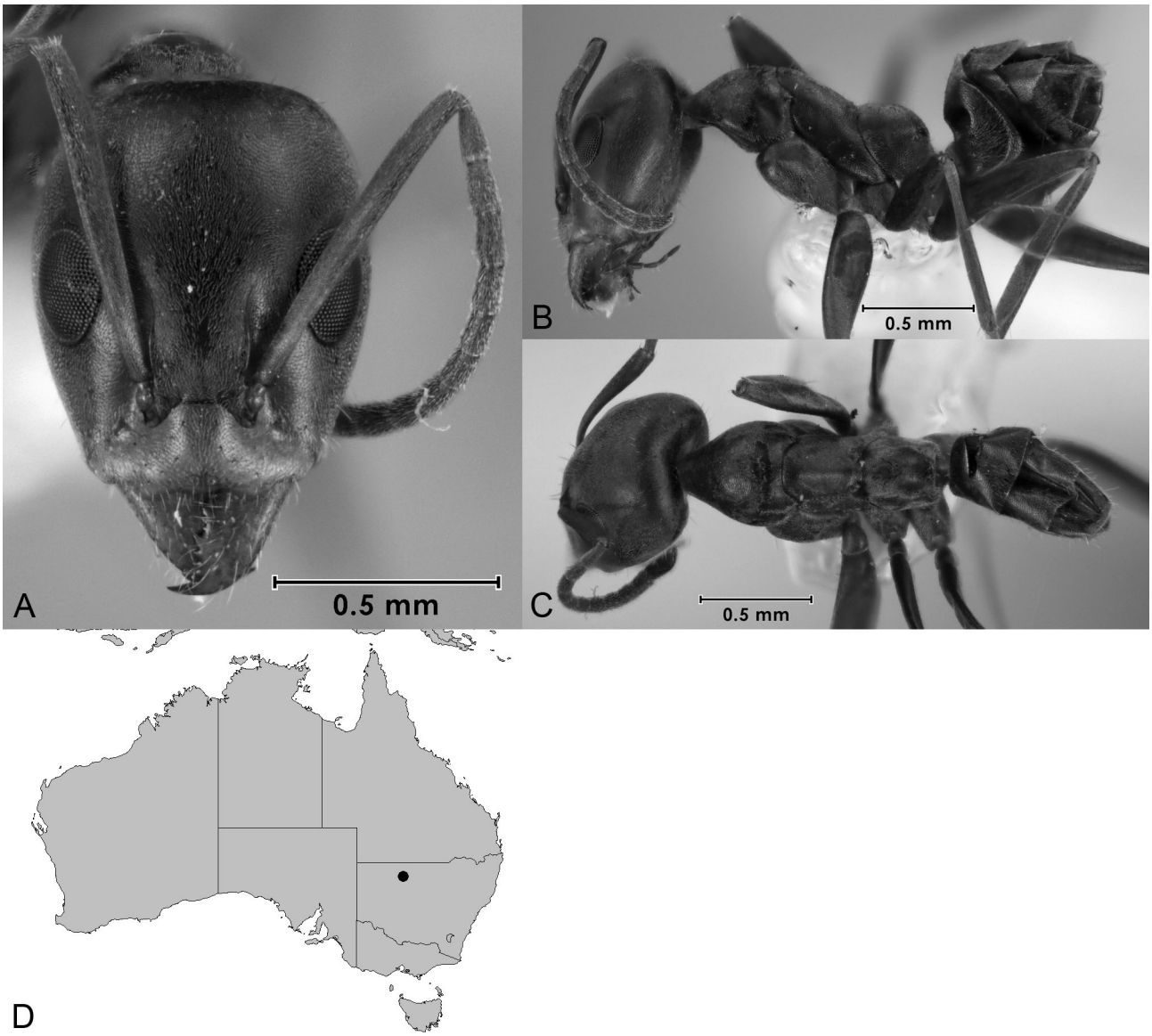


FIGURE 14. *Iridomyrmex atypicus* (holotype, Louth, Lake Mere, NSW, ANIC32-032735): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Worker Description. ***Head.*** Posterior margin of head planar to weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae present on sides of head in full-face view, or absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular. Frontal carinae convex; antennal scape surpassing posterior margin of head by 1–2 x its diameter. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin projecting as triangular spur; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae moderate in

number (6–12), short and bristly. Mesonotum evenly curved. Erect mesonotal setae moderate in number (6–12), short and bristly. Mesothoracic spiracles always inconspicuous; propodeal dorsum smoothly and evenly convex; placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae moderate in number (6-12), short and bristly. ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour dull brown, lighter around clypeus and lower genae. Colour of erect setae yellowish.

Measurements. *Worker* (n = 1)—CI 78; EI 32; EL 0.26; EW 0.21; HFL 1.14; HL 1.02; HW 0.80; ML 1.20; MTL 0.81; PpH 0.14; PpL 0.48; SI 100; SL 0.80.

Comments. Large, almost circular eyes, a relatively short antennal scape and a somewhat elongate head ensure that *I. atypicus* cannot be confused with any other *Iridomyrmex*. This taxon appears to have an oddly circumscribed distribution, with the only known specimens coming from near Lake Mere, New South Wales. Nothing further is known of this rare species.

Etymology. Latin: named for the highly distinctive nature of its appearance.

Iridomyrmex azureus Viehmeyer, stat. n.

(Fig. 15)

Iridomyrmex bicknelli var. *azureus* Viehmeyer, 1914: 41.

Types. Syntypes from Killalpaninna, South Australia (ANIC, 1 worker, examined; MHNG, 1 worker, examined; USNM, 1 worker; ZMHB, 2 workers).

Worker Description. ***Head.*** Posterior margin of head planar to weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Number of ocelli two, or ocelli absent; in full-face view, eyes set above midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular, or asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae convex; antennal scape surpassing posterior margin of head by 0.2–0.5 x its length. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin projecting as triangular spur; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae moderate in number to numerous (6 or more), short and bristly. Mesonotum straight. Erect mesonotal setae moderate in number (6-12), short and bristly. Mesothoracic spiracles always prominent as small, vertical protuberances; propodeal dorsum smoothly and evenly convex; placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae numerous (12 or more), short and bristly. ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest present. Colour foreparts medium to dark reddish-brown with weak to moderate bluish or pinkish iridescence, legs brown, gaster dark brown to black with greenish-yellow to purple or pink iridescence. Colour of erect setae pale, whitish.

Measurements. *Worker* (n = 5)—CI 81–87; EI 24–27; EL 0.25–0.27; EW 0.19–0.21; HFL 1.98–2.24; HL 1.17–1.32; HW 0.94–1.15; ML 1.66–1.88; MTL 1.47–1.68; PpH 0.20–0.23; PpL 0.61–0.65; SI 134–151; SL 1.40–1.55.

Comments. Because of its bluish or purplish iridescence, the brownish-red *I. azureus* would most easily be confused with *I. roseatus* or a small meat ant when seen in the field. However, unlike *I. roseatus* or meat ants, *I. azureus* lacks erect setae on its antennal scapes and tibiae. The distribution of this ant includes some of the driest habitat in Australia, most collections being taken in far inland South Australia and Western Australia. The species also occurs in New South Wales and the Northern Territory.

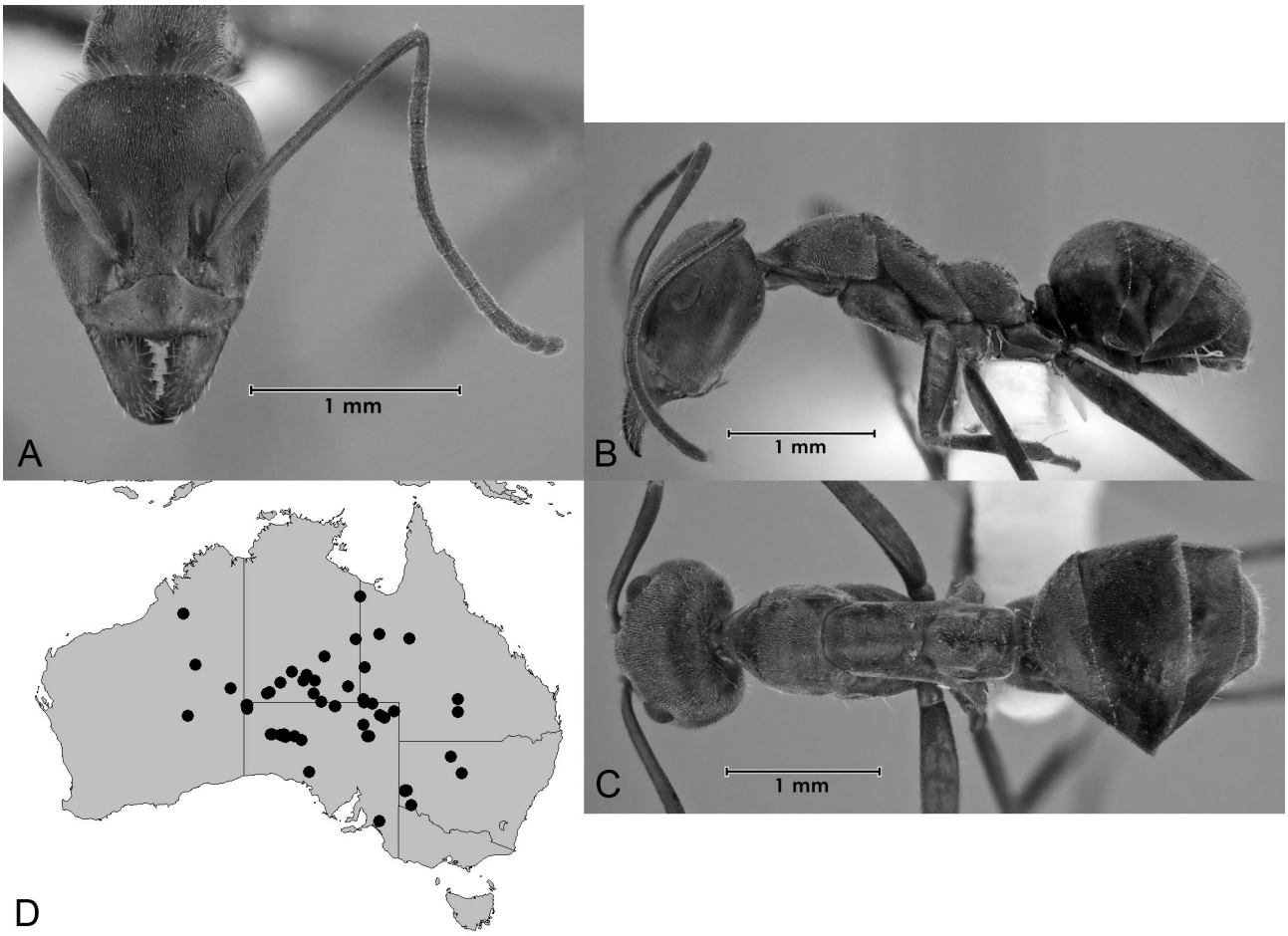


FIGURE 15. *Iridomyrmex azureus* (Coombah H.S., NSW, ANIC32-041190): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Iridomyrmex bicknelli **Emery**

(Fig. 16)

Formica gracilis Lowne, 1865a: 280 (preoccupied name and junior homonym of *Formica gracilis* Fabricius, 1804: 205 (now in *Pseudomyrmex*)). **New synonym.**
Iridomyrmex bicknelli Emery, 1898: 236, figs 6, 7.
Iridomyrmex bicknelli splendidus Forel, 1902: 468. **New synonym.**

Types. *Formica gracilis* Lowne: Syntypes from Sydney, New South Wales (BMNH, 4 workers (without locality data), examined). *Iridomyrmex bicknelli* Emery: Syntypes from Tasmania (MCSN, workers, examined). *Iridomyrmex bicknelli splendidus* Forel: Holotype worker from Perth, Western Australia (MHNG, examined) (2 queens from Yarloop, Western Australia and labelled as types are present in MHNG, but these specimens are not mentioned in the original description and are unlikely to be true types).

Worker Description. ***Head.*** Posterior margin of head strongly convex, or weakly convex; erect setae on posterior margin in full-face view set in a row; sides of head convergent anteriad; erect genal setae present on sides of head in full-face view. Ocelli absent; in full-face view, eyes set above midpoint of head capsule, or set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular, or asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae straight, or convex; antennal scape surpassing posterior margin of head by 0.2–0.5 x its length. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin projecting as triangular spur; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** pronotum weakly undulant or almost straight. Erect pronotal setae moderate in number to numerous (6 or more), short and bristly. Mesonotum sinuous, or straight. Erect mesonotal setae moderate in number (6-12), short and bristly. Mesothoracic spiracles always incon-

spicuous; propodeal dorsum smoothly and evenly convex, or straight and long (half as long again as length of propodeal declivity); placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae moderate in number (6–12), short and bristly. ***Petiole.*** Dorsum of node convex, or planar; node thin, scale-like, orientation more-or-less vertical, or thin, scale-like, orientated anteriad, or thick, orientated anteriad. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite, or absent on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour uniformly brown to black, commonly with greenish-yellow to bluish iridescence. Colour of erect setae pale brown.

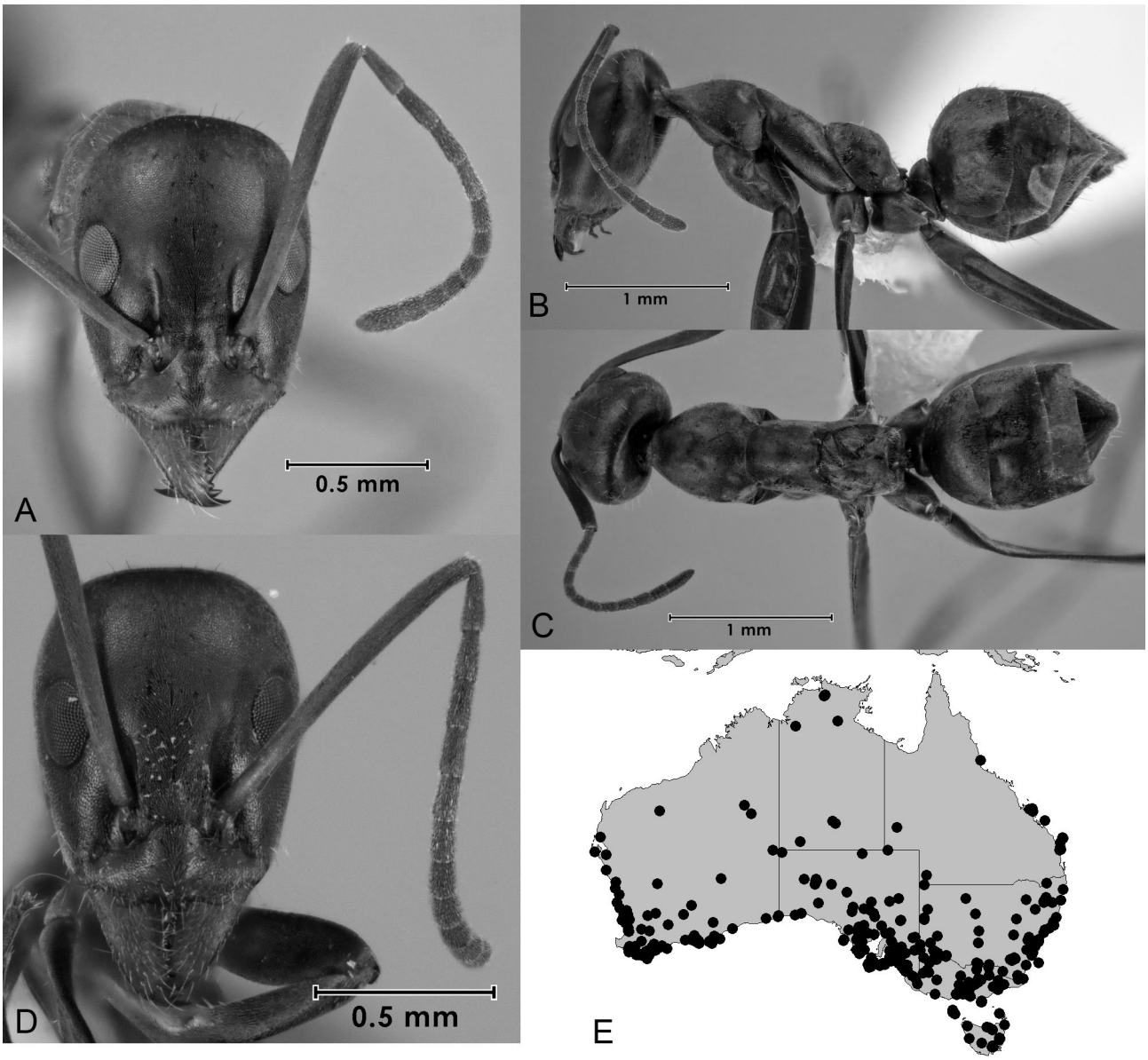


FIGURE 16. *Iridomyrmex bicknelli* with rounded posterior head margin (Barossa, Eden Valley, SA, ANIC32-023685): A. Front of head; B. Side of body; C. Top of body. *Iridomyrmex bicknelli* with flat posterior head margin (East Fremantle, WA, JDM32-000200); D. Front of head; E. Distribution of material examined

Measurements. *Worker* (n = 10)—CI 74–78; EI 28–34; EL 0.23–0.26; EW 0.14–0.21; HFL 1.23–1.68; HL 0.87–1.15; HW 0.68–0.88; ML 1.36–1.58; MTL 0.89–1.23; PpH 0.12–0.17; PpL 0.49–0.59; SI 127–144; SL 0.87–1.18.

Comments. *Iridomyrmex bicknelli* is one of the commonest Australian *Iridomyrmex*, workers being a familiar component of what is left of the natural environment in all manner of urban areas as well as a wide range of native

habitats. Nests can be found in virtually any location, even the seemingly barren footpaths of large cities. Workers can be distinguished from similar, greyish-black ants by the lack of erect setae on the antennal scapes and tibiae, their elongate and rather narrow head capsule that normally has a more-or-less convex posterior margin of the head, the short, bristly setae on the mesosomal and gastral dorsum and their bluish or greenish-yellow iridescence. Because of its ubiquity, *I. bicknelli* has attracted taxonomic attention from several early researchers. Although it was originally described by Lowne in 1865 (Lowne, 1865a), his name, (then) *Formica gracilis*, is preoccupied and thus cannot be used as a valid name. *Iridomyrmex bicknelli* as the next earliest name is here confirmed (ICZN, article 23.3.5). The subspecies *I. bicknelli splendidus* has no unique characters and here becomes a junior synonym of *I. bicknelli*. Nonetheless, there is a degree of variability in the phenotype that suggests disconcerting genetic distance among populations; ants in the southwest of Western Australia often possessing a more planar posterior margin of head when seen in full-face view than ants from other parts of Australia. In the latter case, the posterior margin of the head is usually distinctly convex. Ants from the eastern Australian states also tend to be larger on average. However, no clear-cut distinction can be made when phenotypes from all populations are compared. Preliminary molecular data (S. Cameron *et al*. unpublished) indicate that several populations within *I. bicknelli* as currently construed display deep genetic divergences, and when appropriately coupled with phenotypic variation may warrant species status. Pending completion of that work, *I. bicknelli* is tentatively maintained here as a single species.

Iridomyrmex bicknelli is of a timid disposition, and is one member of the genus that certainly does not deserve Andersen's (2002) general descriptor for *Iridomyrmex* spp. of 'tyrant ants'. The species appears to be most active in warmer temperatures, and this is one ant that seems to thrive in the highly insolated sandy coastal wastes adjacent to beaches.

Iridomyrmex bigi **Shattuck**

(Fig. 17)

Iridomyrmex bigi Shattuck, 1993a: 119, fig. 9.
Iridomyrmex variscapus Shattuck, 1993a: 141, fig. 9. **New synonym.**

Types: *Iridomyrmex bigi* Shattuck: Holotype worker from Henbury Crater, 24°35'S 133°09'E, Northern Territory (ANIC, ANIC32-007345, examined). Paratypes: same data as holotype (ANIC, ANIC32-007346, 19 workers, examined; ANIC, ANIC32-015003, 11 workers, examined; ANIC, ANIC32-015014, 12 workers, examined; BMNH, 3 workers; MCZC, 3 workers). *Iridomyrmex variscapus* Shattuck: Holotype worker from Sandringham, Queensland (ANIC, ANIC32-009175, examined). Paratypes: same data as holotype (ANIC, ANIC32-009176, 7 workers, examined; BMNH, 2 workers; MCZC, 2 workers).

Worker Description. ***Head.*** Posterior margin of head strongly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Number of ocelli two; in full-face view, eyes set above midpoint of head capsule; in profile, eye set anteriad of head capsule; eye elongate. Frontal carinae convex; antennal scape surpassing posterior margin of head by 1–2 x its diameter. Erect setae on scape present on outside of antennal scape only; prominence on anteromedial clypeal margin projecting as triangular spur; mandible regularly triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae numerous (12 or more), short and bristly. Mesonotum sinuous. Erect mesonotal setae numerous (12 or more), short and bristly. Mesothoracic spiracles always prominent as small, vertical protuberances; propodeal dorsum protuberant; placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle present as a bluntly defined right angle, the dorsal and declivitous propodeal faces never separated by a carina. Erect propodeal setae numerous (12 or more), short and bristly. ***Petiole.*** Dorsum of node acuminate; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour foreparts light brick-red to dark crimson, gaster brown with weak bluish to purplish iridescence in light-coloured specimens. Colour of erect setae light brown.

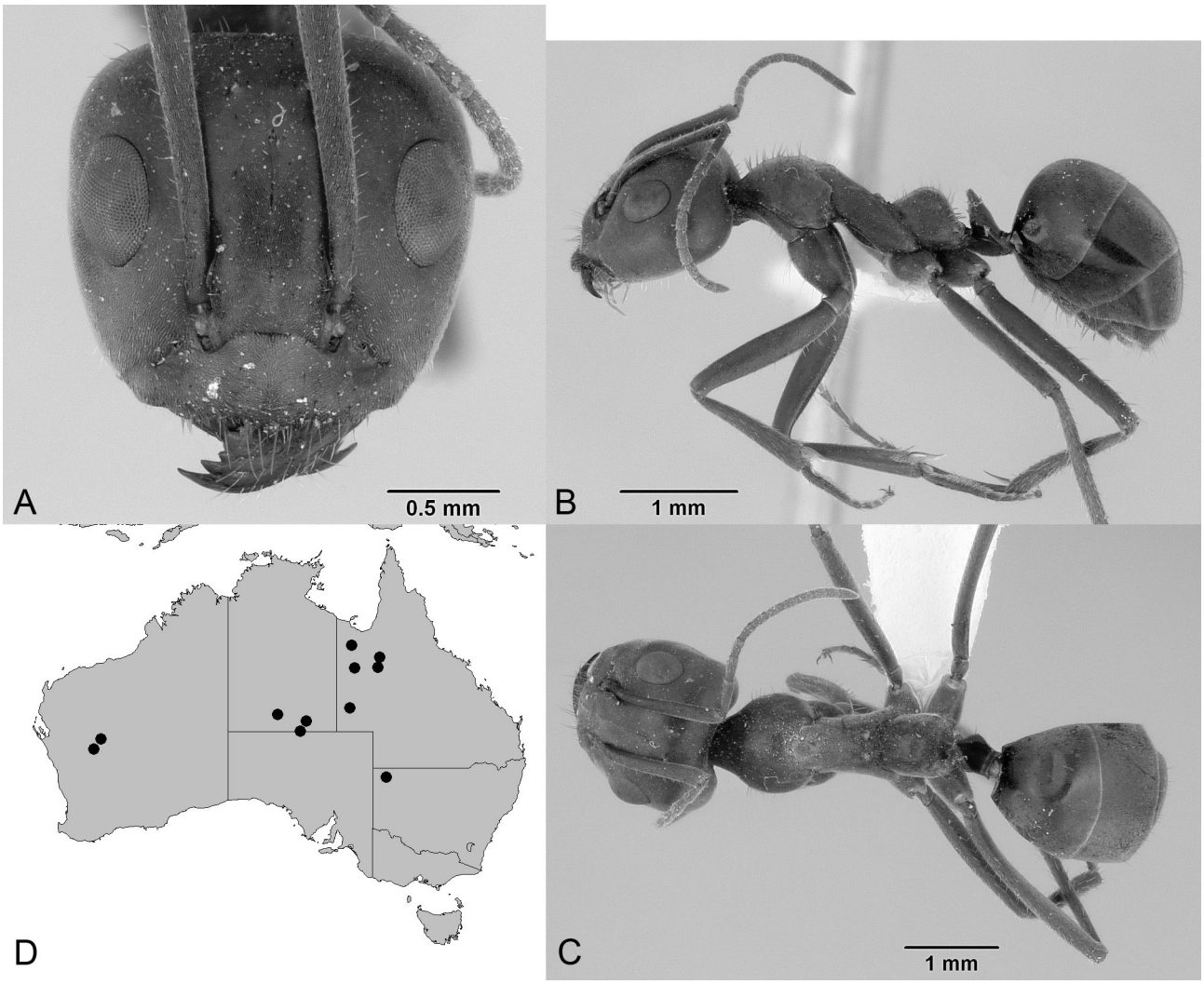


FIGURE 17. *Iridomyrmex bigi* (holotype, Henbury Crater, NT, ANIC32-007345): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined (A. Noble, www.antweb.org).

Measurements. *Worker* (n = 16)—CI 94–105; EI 30–37; EL 0.54–0.62; EW 0.28–0.36; HL 1.60–1.91; HW 1.50–1.96; ML 0.82–1.03; PpH 0.23–0.29; PpL 0.85–0.98; SI 78–97; SL 1.38–1.61.

Comments. *Iridomyrmex bigi* is a very odd-looking *Iridomyrmex*: the combination of the very large eye, pointed node and the general confinement of the erect setae to the anterior margin of the antennal scape make it impossible to confuse this with any other ant in the genus. However, clypeal and mesosomal characters and preliminary molecular data place this ant close to the meat ants (*I. purpureus* species-complex), albeit as a sister to this complex. Shattuck (1993b) separated the form *I. variscapus* from *I. bigi* on the basis of the paler ground colour of the head and mesosoma and the colour of the scape in workers. However, when the workers from these two taxa used in the revision of the *I. purpureus* group were revisited in the current project, the variability in colour was found to be in conformity with intraspecific variation seen in other *Iridomyrmex* species. The centre of the antennal scape is much lighter than its edges in both taxa, and the flagellum is generally paler than the scape. The workers of *I. variscapus*, all of which come from a single nest in Sandringham, Queensland, share the same structural and setae patterns as *I. bigi*, and the morphometric measurements and indices used by Shattuck all overlap with those of *I. bigi*. *Iridomyrmex variscapus* therefore becomes a junior synonym of *I. bigi* in this monograph.

This appears to be a rare species, and apart from one worker (without collection data) supplied by A. Andersen, no additional material has come to light since Shattuck's (1993b) revision.

***Iridomyrmex brennani* sp. n.**
(Figs 18, 93)

Types. Holotype worker from E. Kambalda, Western Australia, 7 February 1999, K. Brennan, on/by salt lake, JDM 992 (ANIC, ANIC32-053427). Paratypes: 5 workers, same data as holotype (ANIC); 2 workers from L. Acraman (Gawler Ra), South Australia, October 1972, P. J. M. Greenslade, salina to SE of lake (MCZC, ANIC32-042486); 1 worker from 9km NNE Buningonia Spring, Western Australia, 18-25 October 1978, T. F. Houston (BMNH, ANIC32-042718).

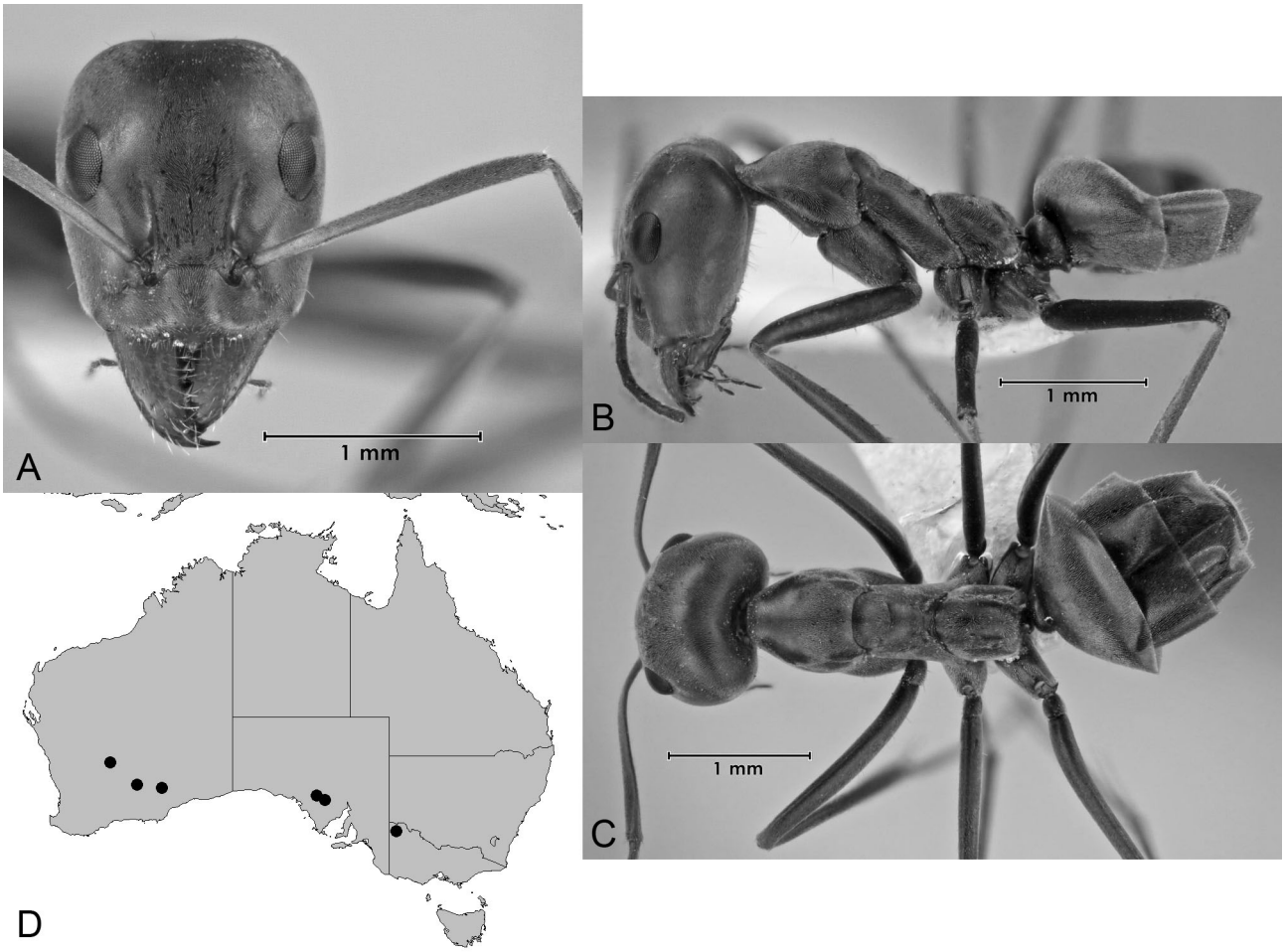


FIGURE 18. *Iridomyrmex brennani* (paratype, Lake Acraman, Gawler Ranges, SA, ANIC32-042486): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Worker Description. ***Head.*** Posterior margin of head weakly concave; erect setae on posterior margin absent; sides of head noticeably convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye elongate, or asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae straight; antennal scape surpassing posterior margin of head by approximately 3 x its diameter. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin projecting as triangular spur; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** pronotum weakly undulant or almost straight. Erect pronotal setae lacking or very minute (one or two tiny setae may be present). Mesonotum sinuous. Erect mesonotal setae sparse to absent. Mesothoracic spiracles prominent or inconspicuous; propodeal dorsum straight and long (half as long again as length of propodeal declivity); placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous

propodeal faces indicated, if at all, by an undulation. Erect propodeal setae sparse to absent. ***Petiole.*** Dorsum of node planar; node thick, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster absent on first gastral tergite; marginal erect setae of gaster absent on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour of genae and clypeal area brick-red, rest of body reddish-black. Colour of erect setae whitish.

Measurements. *Worker* (n = 2)—CI 84–85; EI 27–27; EL 0.34–0.35; EW 0.26–0.26; HFL 2.30–2.32; HL 1.52–1.55; HW 1.29–1.30; ML 2.02–2.11; MTL 1.72–1.77; PpH 0.26–0.26; PpL 0.77–0.79; SI 117–117; SL 1.51–1.53.

Comments. *Iridomyrmex brennani* is a rather handsome, medium-sized *Iridomyrmex* that has been collected rarely in the Kambalda district of Western Australia, near Lake Acraman, in the Gawler Range, South Australia and in the Murray Sunset National Park of north-western Victoria. It is superficially similar to *I. anceps*, but its almost glabrous pro- and mesonotum and variegated black-and-dark-reddish-brown body are distinctive. Terrestrial foragers only have been collected and it is commonly associated with salt lakes (A. Andersen, pers. comm.).

Etymology. Named in honour of Dr. Karl Brennan, who collected specimens of the ant in the Kambalda district while studying for his PhD at Curtin University of Technology.

Iridomyrmex brunneus Forel, stat. n.

(Fig. 19)

Iridomyrmex bicknelli brunneus Forel, 1902: 469.
Iridomyrmex gracilis fusciventris Forel, 1913: 188. **New synonym.**

Types. *Iridomyrmex bicknelli brunneus* Forel: Lectotype worker (here designated) from Kalgoorlie, Western Australia (MHNG, ANIC32-039031). Paralectotypes, same data as lectotype (MHNG, 7 workers; NHMB, 1 worker). *Iridomyrmex gracilis fusciventris* Forel: Syntypes from Mullewa, Western Australia (MHNG, 1 worker) and Sea Lake, Victoria (MHNG, 5 workers).

Worker Description. ***Head.*** Posterior margin of head weakly convex to planar, or planar to weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head straight or weakly convex; erect genal setae present on sides of head in full-face view, or absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set above midpoint of head capsule, or set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular, or asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae straight, or convex; antennal scape surpassing posterior margin of head by 0.2–0.5 x its length. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin projecting as blunt but distinct protuberance, or present as an indistinct swelling or undulation; mandible regularly triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** pronotum moderately and evenly curved over its length. Erect pronotal setae moderate in number to numerous (6 or more) and longest setae elongate, flexuous and/or curved. Mesonotum straight, or evenly curved. Mesothoracic spiracles always inconspicuous; propodeal dorsum smoothly and evenly convex, or straight and long (half as long again as length of propodeal declivity); placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae moderate in number to numerous (6 or more), short and bristly. ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientated anteriad. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest present. Colour foreparts tawny to dark reddish brown, upper vertex of head often darker than clypeal region and also mesosoma, legs same colour as mesosoma, but generally of a deeper shade, gaster dark brown. Colour of erect setae pale, whitish.

Measurements. *Worker* (n = 6)—CI 85–88; EI 27–28; EL 0.21–0.26; EW 0.16–0.20; HFL 1.26–1.56; HL 0.90–1.07; HW 0.76–0.94; ML 1.26–1.60; MTL 0.90–1.08; PpH 0.15–0.19; PpL 0.50–0.61; SI 122–133; SL 1.02–1.20.

Comments. Workers of *I. brunneus* are medium-sized brown ants that may be easily confused with several other species, most notably *I. minor* and *I. anceps*. The easiest way to distinguish workers of this ant is to check the

anteromedial clypeal process: in *I. brunneus* this is very weak to vestigial, whereas the process is a prominent triangle in both *I. minor* and *I. anceps*. Most *I. brunneus* workers also have erect genal setae (absent from many *I. minor* workers and almost all *I. anceps* workers). Characteristically, when a worker of *I. brunneus* is viewed in profile, the pronotum and mesonotum form an even curve, whereas the mesosomal outline in *I. minor* and *I. anceps* is less regular, being either more domed at the junction of the pronotum and mesonotum, or elongate and flattened (some populations of *I. minor*). *Iridomyrmex brunneus* is common and widespread throughout Australia. At least in Western Australia, workers are often seen foraging on the trunks of eucalypts or fallen timber. Populations of the ant can persist in settled areas, and label data indicates it will enter dwellings, mainly in country towns (in Alice Springs it has been recorded as a 'house pest').

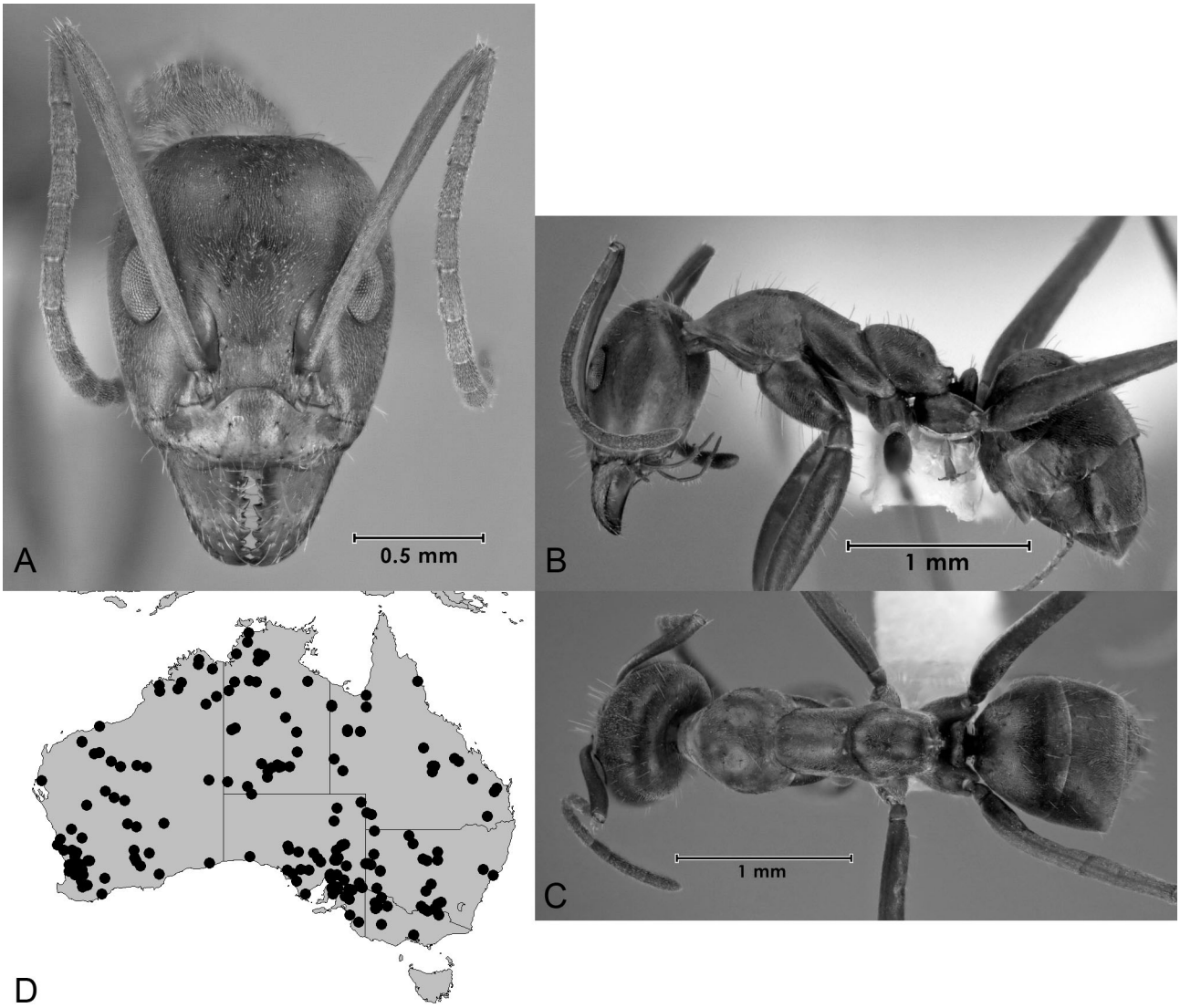


FIGURE 19. *Iridomyrmex brunneus* (Mairjimmy State Forest, NSW, ANIC32-038197): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Iridomyrmex calvus Emery

(Figs 20, 87, 88)

Iridomyrmex calvus Emery, 1914: 419 (lectotype designated by Shattuck, 1993b: 1313).
Iridomyrmex albitarsus Wheeler, W.M., 1927: 147. **New synonym.**
Iridomyrmex notialis Shattuck, 1993: 1318. **New synonym.**

Types. *Iridomyrmex calvus* Emery: Lectotype and paralectotypes (designated by Shattuck, 1993b: 1313) from Prony, New Caledonia (MCSN, 4 workers, examined); paralectotype from Tao (NHMB, 1 queen, Baroni Urbani

1977); paralectotypes from Canala (NHMB, 3 workers, Baroni Urbani 1977); paralectotypes from Prony, New Caledonia (NHMB, 13 workers, Baroni Urbani 1977); paralectotypes from Oubatche, New Caledonia (MHNB, 8 workers and 1 queen (Baroni Urbani 1977); MHNG, 6 workers). *Iridomyrmex albitarsus* Wheeler: Syntypes from Norfolk Island (MCZC, 22 workers, 2 queens, 8 males, examined; USNM, 3 workers; MVMA, 2 workers, 1 male). *Iridomyrmex notialis* Shattuck: Holotype worker from Port Adelaide, South Australia (ANIC, examined). Paratypes: same data as holotype (ANIC, BMNH, MCZC, 144 workers, examined).

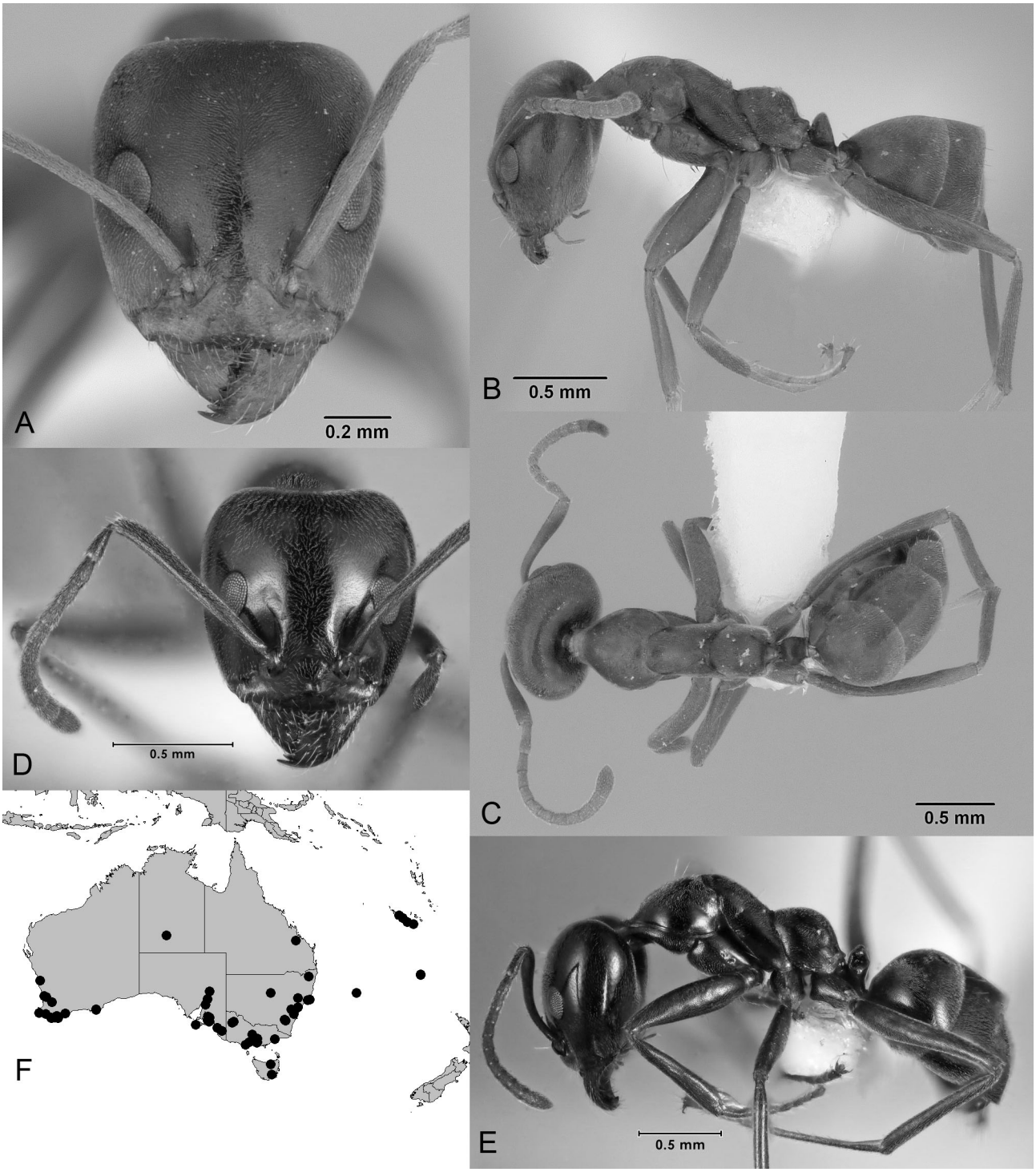


FIGURE 20. *Iridomyrmex calvus*, pale form (*notialis* paratype, Port Adelaide, South Australia, ANIC32-000043): A. Front of head; B. Side of body; C. Top of body. *Iridomyrmex calvus*, dark form (Mount Dzumac, New Caledonia, ANIC32-000039): D. Front of head; E. Side of body; F. Distribution of material examined.

Worker Description. ***Head.*** Posterior margin of head weakly concave; erect setae on posterior margin absent; sides of head noticeably convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Number of ocelli one (a minute ocellus), position of obsolete ocelli indicated by small pits only or pits lacking, or ocelli absent; in full-face view, eyes set at about midpoint of head capsule, or set below midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular, or asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae concave; antennal scape barely attaining posterior margin of head, or surpassing it by less than 1 x its diameter. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin always completely absent; mandible triangular with distinct angle between masticatory and basal margins; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae sparse (6 or fewer) and bristly. Mesonotum straight. Erect mesonotal setae sparse to absent. Mesothoracic spiracles prominent or inconspicuous; propodeal dorsum protuberant; placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae lacking or very minute (one or two tiny setae present). ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present or absent on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour honey-brown, with head a deeper shade. Colour of erect setae pale.

Measurements. *Worker* (n = 16)—CI 86–97; EI 22–28; EL 0.16–0.23; EW 0.10–0.16; HFL 0.85–0.87; HL 0.77–1.00; HW 0.68–0.96; ML 0.31–0.47; MTL 0.64–0.65; PpH 0.11–0.15; PpL 0.39–0.53; SI 84–99; SL 0.67–0.84.

Comments. *Iridomyrmex calvus* is known from the southern Australian mainland, Tasmania, Lord Howe Island, Norfolk Island and New Caledonia. This is the most broadly distributed species among its close relatives and one of the most widespread members of the genus. It has previously been considered as three separate but similar species, *I. calvus* from New Caledonia, *I. albitarsus* from Lord Howe and Norfolk islands, and *I. notialis* from Australia. *Iridomyrmex calvus* has never been clearly separated from the other forms and has been recognised largely on biogeographic grounds, although *I. albitarsus* has been reported as being smaller than *I. calvus*, with longer scapes, less erect pilosity and a much more rounded and less angular propodeum (Wheeler, 1927). *Iridomyrmex albitarsus* was also understood to differ from *I. notialis* in the lack of erect hairs on the pronotum and first gastral tergite and the generally darker body colour (Shattuck, 1993). However, a re-evaluation of the material belonging to these three forms has shown that while differences are present, there is also considerable variation among populations of these ants, especially within *I. notialis*, and no clear, consistent diagnostic differences could be found among the formerly recognised taxa. For example, while the pronotum and gaster lack erect hairs on workers from Lord Howe and Norfolk islands and workers generally have erect hairs on the mainland, the Australian populations show variation and glabrous individual are present, these being inseparable from the Lord Howe and Norfolk specimens. Body colour reveals a similar pattern, with populations from Lord Howe, Norfolk and New Caledonia being darker compared to the slightly lighter reddish brown colour of most Australian populations. However, overall body colour varies from light to dark reddish brown in Australia with some individuals being essentially the same colour as those from the islands to the east. Given the broad geographic range occupied by this taxon and the isolated nature of New Caledonia, Lord Howe Island and Norfolk Island relative to Australia, some level of differentiation would be expected, and while this has been noted by earlier studies, the level of this variation is relatively small, especially when compared to other species in the genus such as *I. dromus*. Because of the lack of clear diagnostic differences among these taxa, all are here considered to belong to a single taxon, *I. calvus*. The species can be distinguished from close relatives by virtue of its small size (HL less than or equal to 1.15mm), relatively short scape (exceeding posterior margin of the head by a maximum of 1 × its greatest diameter) and paucity of erect setae (fewer than 6) on the mesosoma.

Iridomyrmex cappoinclinus Shattuck

(Fig. 21)

Iridomyrmex cappoinclinus Shattuck, 1993b: 1315, figs 30, 31, 37.

Types. Holotype worker from 73km S of Alice Springs, 24°15'S 133°26'E, Northern Territory (ANIC, ANIC32-000052, examined). Paratypes: same data as holotype (ANIC, ANIC32-000053, 12 workers, examined; BMNH, 3 workers; TERC, 3 workers; MCZC, 3 workers).

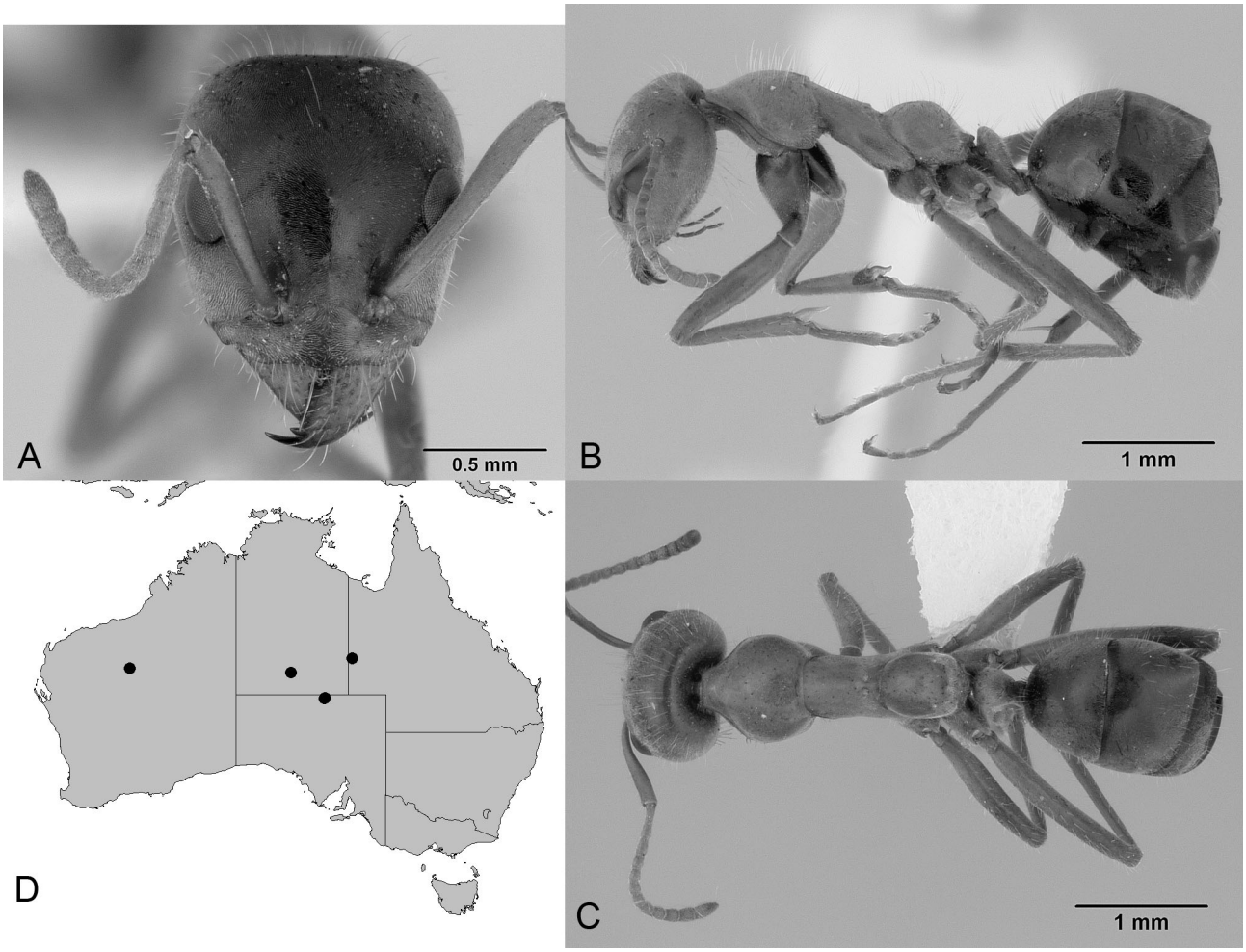


FIGURE 21. *Iridomyrmex cappoinclinus* (holotype, Alice Springs, NT, ANIC32-000052): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined (A. Noble, www.antweb.org).

Worker Description. ***Head.*** Posterior margin of head planar to weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae present on sides of head in full-face view. Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular. Frontal carinae concave; antennal scape surpassing posterior margin of head by 1-2 x its diameter. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin present as an indistinct swelling or undulation; mandible regularly triangular with oblique basal margin; long, curved setae on venter of head capsule present. ***Mesosoma.*** Pronotum weakly undulant or almost straight. Erect pronotal setae numerous (12 or more) and longest setae elongate, flexuous and/or curved. Mesonotum sinuous. Erect mesonotal setae numerous (12 or more) and elongate, flexuous and/or curved. Mesothoracic spiracles always prominent as small, vertical protuberances; propodeal dorsum smoothly and evenly convex; placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae numerous (12 or more) and elongate, flexuous and/or curved. ***Petiole.*** Dorsum of node convex, or planar; node thick, orientated anteriad. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour frons of head, coxae and gaster dark brown to blackish, other body parts brick-red. Colour of erect setae pale brown.

Measurements. *Worker* (n = 7)—CI 93–97; EI 25–27; EL 0.31–0.33; EW 0.18–0.20; HL 1.26–1.36; HW 1.21–1.30; ML 0.58–0.65; PpH 0.17–0.21; PpL 0.75–0.78; SI 87–90; SL 1.07–1.14.

Comments. *Iridomyrmex cappoinclinus* differs from other members of the *I. rufoinclinus* complex in its colour pattern; namely, mesosoma generally yellowish to reddish, but with a reddish-brown to blackish frons. The species has been collected in arid areas. The nest from which the type series was taken was in a low sand dune vegetated by *Triodia* and *Acacia*, and consisted of a single entrance in a slight depression. Two other nest collections have also been made, in each case in a sandy area vegetated by *Triodia* on one instance and by *Acacia* on the other occasion (see Shattuck, 1993b).

Iridomyrmex cephaloinclinus Shattuck

(Fig. 22)

Iridomyrmex cephaloinclinus Shattuck, 1993b: 1315, figs 32, 33, 37.

Types. Holotype worker from Pretty Pool (Caravan Park), Port Headland, 20°18'44"S 118°38'14"E, Western Australia (ANIC, ANIC32-000055, examined). Paratypes: same data as holotype (ANIC, ANIC32-000056, 72 workers, examined; BMNH, 3 workers; MCZC, 3 workers).

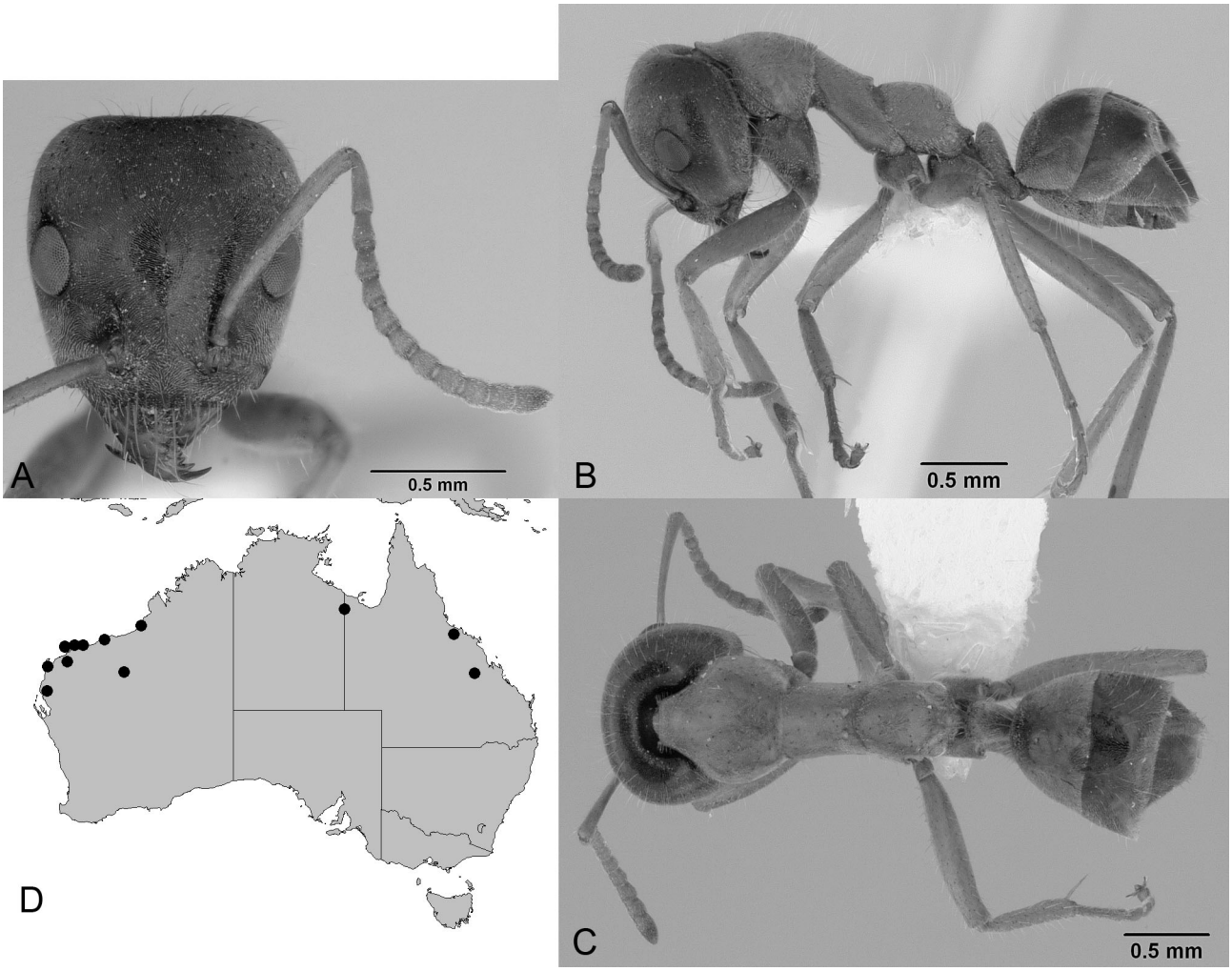


FIGURE 22. *Iridomyrmex cephaloinclinus* (holotype, Pretty Pool, Port Hedland, WA, ANIC32-000055): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined (A. Noble, www.antweb.org).

Worker Description. ***Head.*** Posterior margin of head weakly concave, or strongly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae present on sides

of head in full-face view. Number of ocelli one (a minute ocellus), position of obsolete ocelli indicated by small pits only or pits lacking; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye more-or-less circular, or semi-circular. Frontal carinae concave; antennal scape surpassing posterior margin of head by 1–2 x its diameter. Erect setae on scape present and abundant; prominence on anteromedial clypeal margin projecting as blunt but distinct protuberance; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule present. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae numerous (12 or more) and longest setae elongate, flexuous and/or curved. Mesonotum sinuous. Erect mesonotal setae numerous (12 or more) and elongate, flexuous and/or curved. Mesothoracic spiracles always prominent as small, vertical protuberances; propodeal dorsum straight and short (equal in length to propodeal declivity); placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. ***Petiole.*** Dorsum of node convex; node thick, orientated anteriad. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour head (except lower genae) and gaster blackish-brown, coxae brown, legs (some workers) cloudy orange-brown, lower genae, mesosoma and legs (some workers) brick-red. Colour of erect setae yellowish-white.

Measurements. *Worker* (n = 7)—CI 92–98; EI 25–27; EL 0.26–0.33; EW 0.16–0.19; HL 1.11–1.35; HW 1.05–1.32; ML 0.42–0.64; PpH 0.15–0.23; PpL 0.66–0.83; SI 82–89; SL 0.91–1.13.

Comments. As with other members of the *I. rufoinclinus* species-complex, *I. cephaloinclinus* is distinguished by colour pattern. In this case, the entire head capsule is reddish-brown to black, but the mesosoma is uniformly yellowish-red to reddish. Collections have been made at widely separated sites in Western Australia and Queensland, but the species appears to be morphologically fairly uniform across its range (see Shattuck, 1993b). Based on field observations by the first author, this large member of the *I. rufoinclinus* complex appears to be a solitary forager, unlike most dolichoderines.

Iridomyrmex chasei Forel

(Fig. 23)

Iridomyrmex chasei Forel, 1902: 467.
Iridomyrmex chasei concolor Forel, 1902: 467 (subspecies of *chasei* by Forel, 1907a: 289). **New synonym.**
Iridomyrmex chasei yalgooensis Forel, 1907a: 288. **New synonym.**

Types. *Iridomyrmex chasei* Forel: Lectotype worker (here designated) from Perth, Western Australia, Chase (MHNG, ANIC32-000054). Paralectotypes from Day Dawn, Western Australia (MCZC, 2 workers, examined) and Perth, Western Australia (MHNG, 35 workers, examined; NHMB, 6 workers). *Iridomyrmex chasei concolor* Forel: Syntypes from Kalgoorlie, Western Australia (ANIC, ANIC32-000034, 1 worker, examined; MHNG, 4 workers). *Iridomyrmex chasei yalgooensis* Forel: Syntypes from Day Dawn and Coolgardie, Western Australia (not located during this study); Geraldton, Western Australia (WAMP, 1 worker) and Yalgoo, Western Australia (ANIC, ANIC32-000032, 1 worker; MHNG, 2 workers; MVMA, 1 worker).

Worker Description. ***Head.*** Posterior margin of head strongly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae present on sides of head in full-face view, or absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set above midpoint of head capsule; in profile, eye set anteriad of head capsule; eye asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae straight; antennal scape surpassing posterior margin of head by 1-2 x its diameter. Erect setae on scape present and abundant, or absent, except at tip; prominence on anteromedial clypeal margin present as an indistinct swelling or undulation; mandible regularly triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum strongly inclined anteriorly. Erect pronotal setae moderate in number to numerous (6 or more) and longest setae elongate, flexuous and/or curved. Mesonotum sinuous, or straight. Erect mesonotal setae moderate in number (6-12), short and bristly, or sparse (6 or fewer) and bristly. Mesothoracic spiracles always inconspicuous; propodeal dorsum protuberant; placement of propodeal spiracle posteriad and near propodeal declivity, or mesad, more than its diameter away from propodeal declivity; propodeal angle present as a

bluntly defined right angle, the dorsal and declivitous propodeal faces never separated by a carina. Erect propodeal setae moderate in number (6-12), short and bristly. ***Petiole.*** Dorsum of node acuminate, or convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour foreparts variable in colour with shades of orange, red, brown or blackish-brown most frequent, alone or in combination, but with some mottling or infuscation usually evident, legs brown to blackish, gaster brown to black but without true iridescence (may have coppery reflections in some lights). Colour of erect setae pale brown.

Measurements. *Worker* (n = 19)—CI 84–94; EI 24–32; EL 0.19–0.23; EW 0.13–0.19; HFL 0.79–1.27; HL 0.71–1.03; HW 0.64–0.94; ML 0.85–1.34; MTL 0.57–1.14; PpH 0.10–0.23; PpL 0.37–0.60; SI 93–105; SL 0.65–0.90.

Comments. *Iridomyrmex chasei*, widely known for its large, populous nests, its pugnacity and its characteristic 'crushed ant' smell, is a familiar sight to many Australians living in temperate areas. The ant is particularly common in and around Perth, where it is occasionally reported to the Department of Agriculture as a garden nuisance. There, it has been popularly known in the past as the 'native odorous garden ant' (P. Davies, pers. comm.). Although the ant never nests indoors, wet weather or spilt food will infrequently bring foragers inside dwellings. This taxon is quite variable in appearance, and, to this point of time, it has been taken as an article of faith by myrmecologists that '*I. chasei*' and its subspecies '*concolor*' and '*yalgooensis*' represent a complex of several if not many species. In fact, many hours of close examination has failed to result in the detection of discernible morphological differences across all populations. Moreover, preliminary molecular data using the mitochondrial gene CO1 has also failed to detect strong divergence in populations, the large, orange red form '*I. chasei*' falling in between two samples of smaller, brownish '*I. concolor*' at the end of shallow twigs on a molecular phylogram (unpublished data). The position taken here is that *I. chasei* is a single 'good' species by all the indicators that can be marshalled at present. *Iridomyrmex chasei* is very similar to several close relatives; however, most specimens may be distinguished from *I. rufoniger* (usually a distinctly larger ant) and *I. fulgens* by the lack of erect setae on the hind tibiae, from *I. victorianus* by the more steeply vertical anterior pronotum and the lack of generalised blue-green iridescence on the gaster (coppery reflections may be present on the first gastral tergite), and from *I. gibbus* by the pronotal features described above, the more strongly concave posterior margin of the head and also the greater number of erect setae usually present on the pronotum in *I. chasei*. A few, very hirsute populations of *I. chasei* (mainly occurring in Western Australia) that possess erect setae on the scape and hind tibiae can be distinguished from the species *I. rufoniger* and *I. fulgens* by the lack of uniform greenish-yellow or greenish-blue iridescence on the gaster and, in the case of the very similar *I. victorianus*, also by the more steeply angled anterior pronotum. Also similar but smaller close relatives, such as *I. difficilis*, have a planar posterior margin of the head, seen in full-face view, compared with the distinctly concave posterior margin of the head in most *I. chasei* populations. *Iridomyrmex gumnos*, a very rare species, lacks pronotal setae entirely.

Iridomyrmex chasei is widespread throughout all mainland Australian states, although it is absent from Tasmania. While present in most ecosystems, it is generally replaced by other *Iridomyrmex* or by *Anonychomyrma* species in very cool, wet regions and in tropical rainforest. In drier areas, however, it is among the most conspicuous and abundant of all ant species. Single pitfall traps may contain more than 1000 workers. Even in the heart of large capital cities *I. chasei* shares the pavements and street verges with tramp species such as the Argentine (*Linepithema humile* (Mayr)) and Big-headed (*Pheidole megacephala* (Fabricius)) ants, while most rural paddocks also support large numbers of colonies. In the Perth region, ant activity for this species is most pronounced in spring and early summer, when enormous piles of soil from ephemeral nests connected by smaller nodes indicate the high point of the colony's annual cycle. In south-western Australia, nuptial flights appear to occur sporadically throughout the year in suitably humid and usually warm conditions, and involve vast streams of workers and numbers of winged queens and males moving purposefully from their nests up high man-made structures (fence-posts, pillars, walls, etc.) and tree-trunks, from whence the reproductives launch themselves into the air. This species is very common in sandy soils, and smooth pavers can be undermined or made hazardous to walk on because of the sand displaced by thousands of workers. Long tunnels in grassy lawns, up to half a centimetre deep below the soil surface, bear witness to the streams of myriads of foragers heading back to nest nodes, their crops filled with honeydew or nectar. *Iridomyrmex chasei* workers regularly work trees and shrubs near their nests, where they tend sap-sucking Hemiptera as well as gather nectar. This is a particularly aggressive species that will not hesitate to swarm

over and bite people who are gardening, hanging out washing or engaging in other activities in yards or on front lawns.

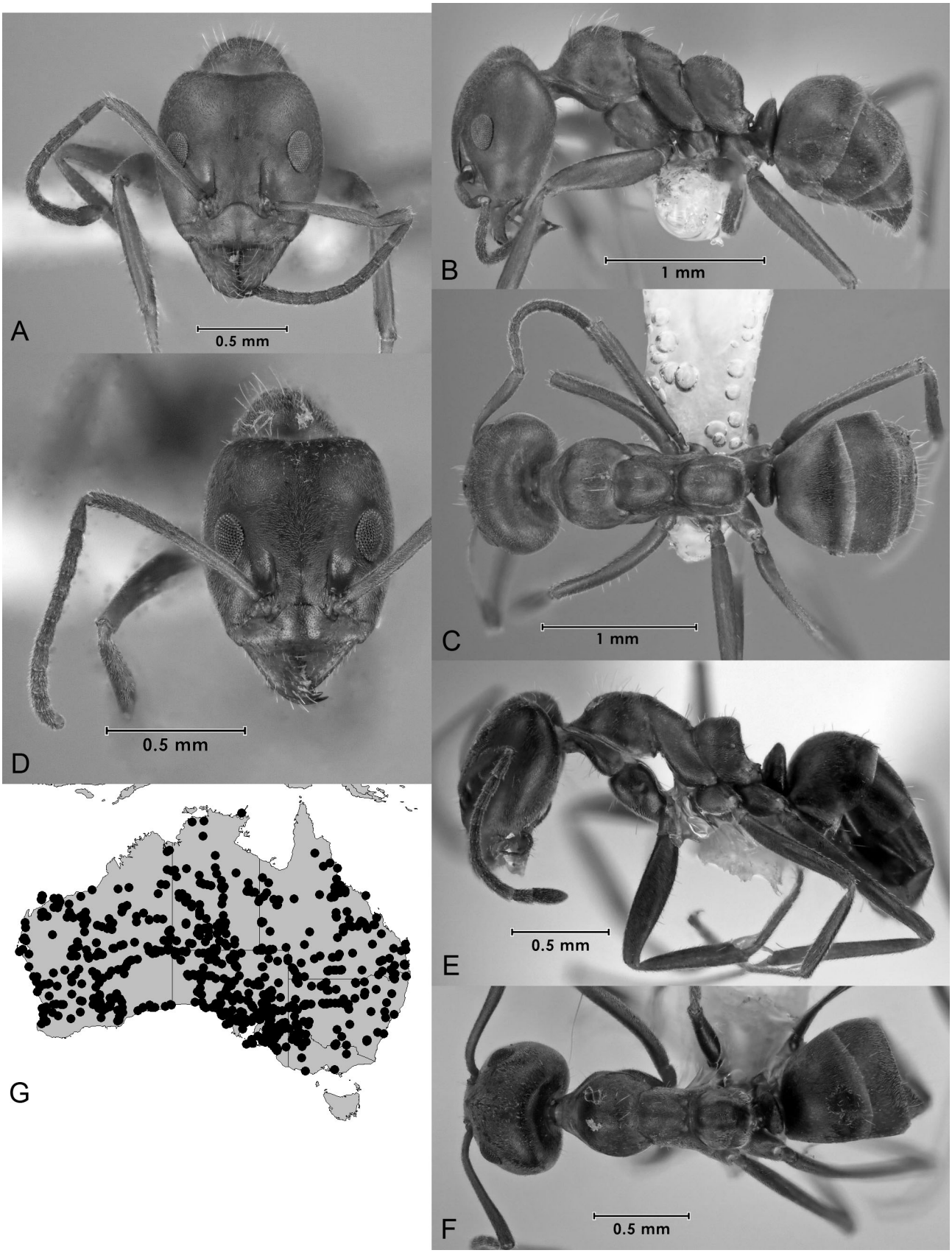


FIGURE 23. *Iridomyrmex chasei*, typical form (Oraparinna, SA, ANIC32-039051): A. Front of head; B. Side of body; C. Top of body. *Iridomyrmex chasei*, "*concolor*" form (Cravens Peak Station, Qld, ANIC32-036255): D. Front of head; E. Side of body; F. Top of body; G. Distribution of material examined.

***Iridomyrmex coeruleus* sp. n.**
(Fig. 24)

Types. Holotype worker from Manbulloo, SW Katherine, Northern Territory, 11 April 1978, P. J. M. Greenslade (ANIC, ANIC32-037512). Paratypes: 1 worker, same data as holotype (ANIC); 4 workers, same data as holotype except 7-11 April 1978 (ANIC, ANIC32-037513 (2 workers), ANIC32-037514 (2 workers)); 2 workers, same data as holotype except 9 April 1978 (MCZC, ANIC32-037511); 2 workers, same data as holotype except 20.x.1977 (BMNH, ANIC32-037508).

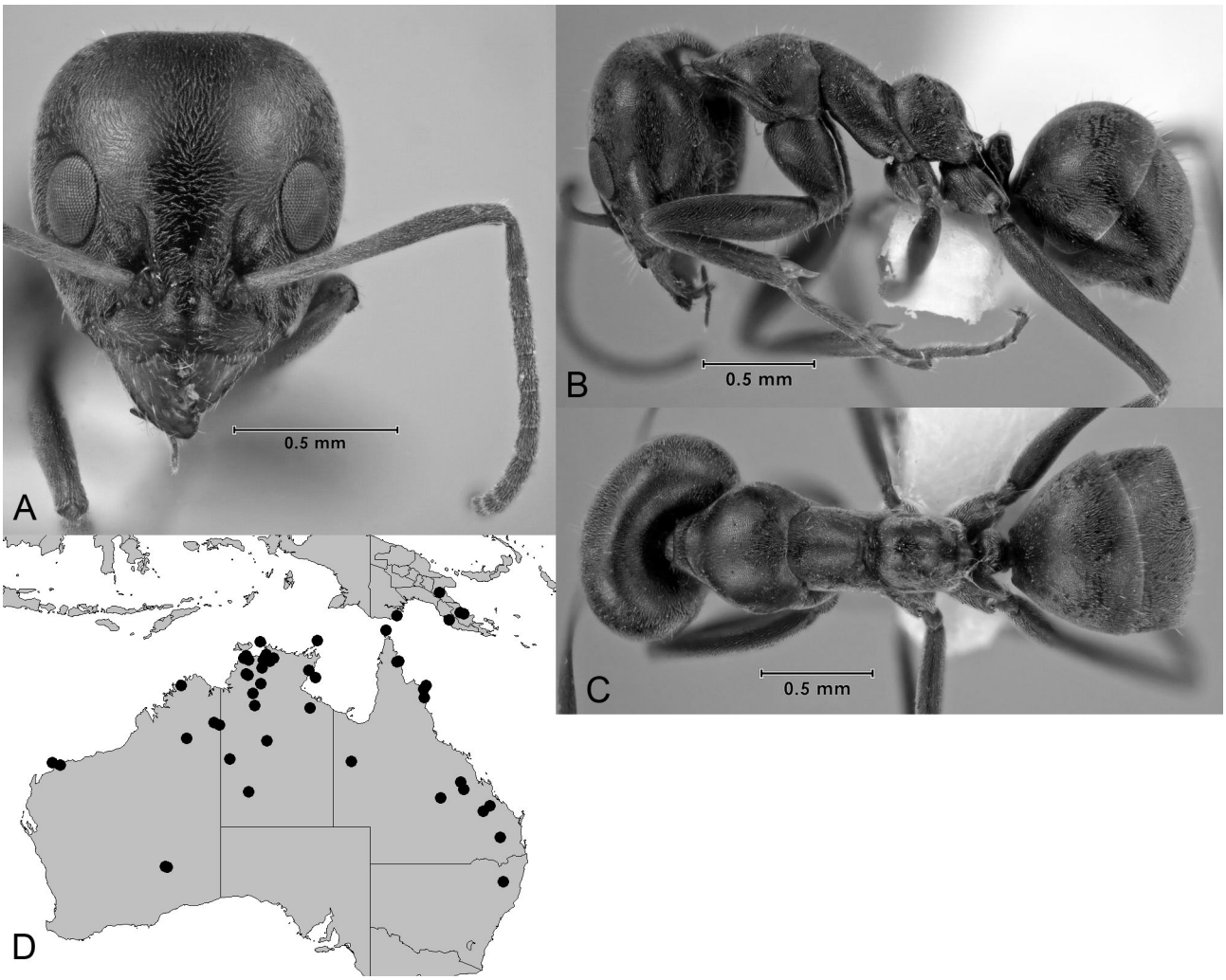


FIGURE 24. *Iridomyrmex coeruleus* (Rocky Islet, Great Barrier Reef, Qld, ANIC32-042760): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Worker Description. ***Head.*** Posterior margin of head planar to weakly concave; erect setae on posterior margin in full-face view, present in small aggregations on one or both sides of posterior margin of head, or in full-face view, present singly or as a couple of setae on either side of posterior margin of head; sides of head noticeably convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular. Frontal carinae convex; antennal scape not attaining posterior margin of head (some workers) or surpassing posterior margin of head by 1–2 x its diameter (most workers). Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin projecting as blunt but distinct protuberance; mandible regularly triangular with oblique basal margin; long, curved setae on venter of head capsule present. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae sparse (6 or fewer) to moderate in number (6–12), short and bristly. Mesonotum evenly curved. Erect mesonotal setae sparse (6 or fewer)

and bristly. Mesothoracic spiracles always inconspicuous; propodeal dorsum smoothly and evenly convex; placement of propodeal spiracle posteriad and near propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae sparse (6 or fewer) and bristly. ***Petiole.*** Dorsum of node convex; node thick, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour typically uniformly dark brown to black with generalized pale bluish-green to blue iridescence, but may be iridescence may be reduced to coppery reflections (northern Western Australia). Colour of erect setae yellow.

Measurements. *Worker* (n = 5)—CI 88–95; EI 26–29; EL 0.21–0.28; EW 0.17–0.20; HFL 0.87–1.14; HL 0.84–1.04; HW 0.74–0.98; ML 0.94–1.33; MTL 0.64–0.83; PpH 0.13–0.18; PpL 0.38–0.56; SI 91–99; SL 0.73–0.93.

Comments. *Iridomyrmex coeruleus* is a black to brownish species (lighter coloured populations are mainly outside Australia), with large eyes, broad head, short, bristly, whitish setae on the mesosoma, and antennal scapes that are paler than the head capsule. Most, but not all populations also possess an attractive blue sheen, hence the name. Others have a more coppery appearance. Specimens seen have fine, long, whitish setae on the underside of the head capsule. The presence of the long, gular setae and pale antennae will separate this species from *I. splendens* and *I. mjobergi*, the species with which it can be most easily confused, while the distinctly scalloped anterior clypeal margin and distinct anteromedial clypeal prominence separate it from *I. niger* and *I. hertogi*. *Iridomyrmex coeruleus* has a wide distribution throughout northern Australia, extending into New Guinea and the islands off Queensland, but is nowhere particularly common. Workers foraging on trees and vegetation have been collected by pan traps and sweeping.

Etymology. Latin: '*coeruleus*' (also '*caeruleus*')—'blue', referring to the blue iridescence seen in many workers.

Iridomyrmex conifer Forel

(Fig. 25)

Iridomyrmex conifer Forel, 1902: 463.

Types. Lectotype worker (here designated) from Perth, Western Australia, Chase (MHNG, ANIC32-017916, CASENT072061). Paralectotypes, same data as lectotype (MHNG, 4 workers).

Worker Description. ***Head.*** Posterior margin of head strongly concave; erect setae on posterior margin in full-face view set in a row, or present in small aggregations on one or both sides of posterior margin of head, or present singly or as a couple of setae on either side of posterior margin of head, or absent; sides of head noticeably convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular, or asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae convex; antennal scape surpassing posterior margin of head by 0.2-0.5 x its length. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin projecting as blunt but distinct protuberance; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum moderately and evenly curved over its length, or weakly undulant or almost straight. Erect pronotal setae moderate in number (6-12), short and bristly, or sparse (6 or fewer) and bristly, or lacking or very minute (one or two tiny setae may be present). Mesonotum sinuous. Erect mesonotal setae sparse (6 or fewer) and bristly, or sparse to absent. Mesothoracic spiracles always inconspicuous; propodeal dorsum protuberant; placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle present as a bluntly defined acute angle, the propodeal dorsum conical in shape. Erect propodeal setae sparse to absent. ***Petiole.*** Dorsum of node acuminate, or convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present or absent on first gastral tergite; marginal erect setae of gaster present on first tergite, or absent on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour reddish-brown to reddish black. Colour of erect setae pale yellowish.

Measurements. *Worker* (n = 21)—CI 95–105; EI 20–25; EL 0.23–0.29; EW 0.13–0.18; HL 1.08–1.35; HW 1.05–1.38; ML 0.53–0.77; PpH 0.27–0.44; PpL 0.63–0.85; SI 95–110; SL 1.13–1.35.

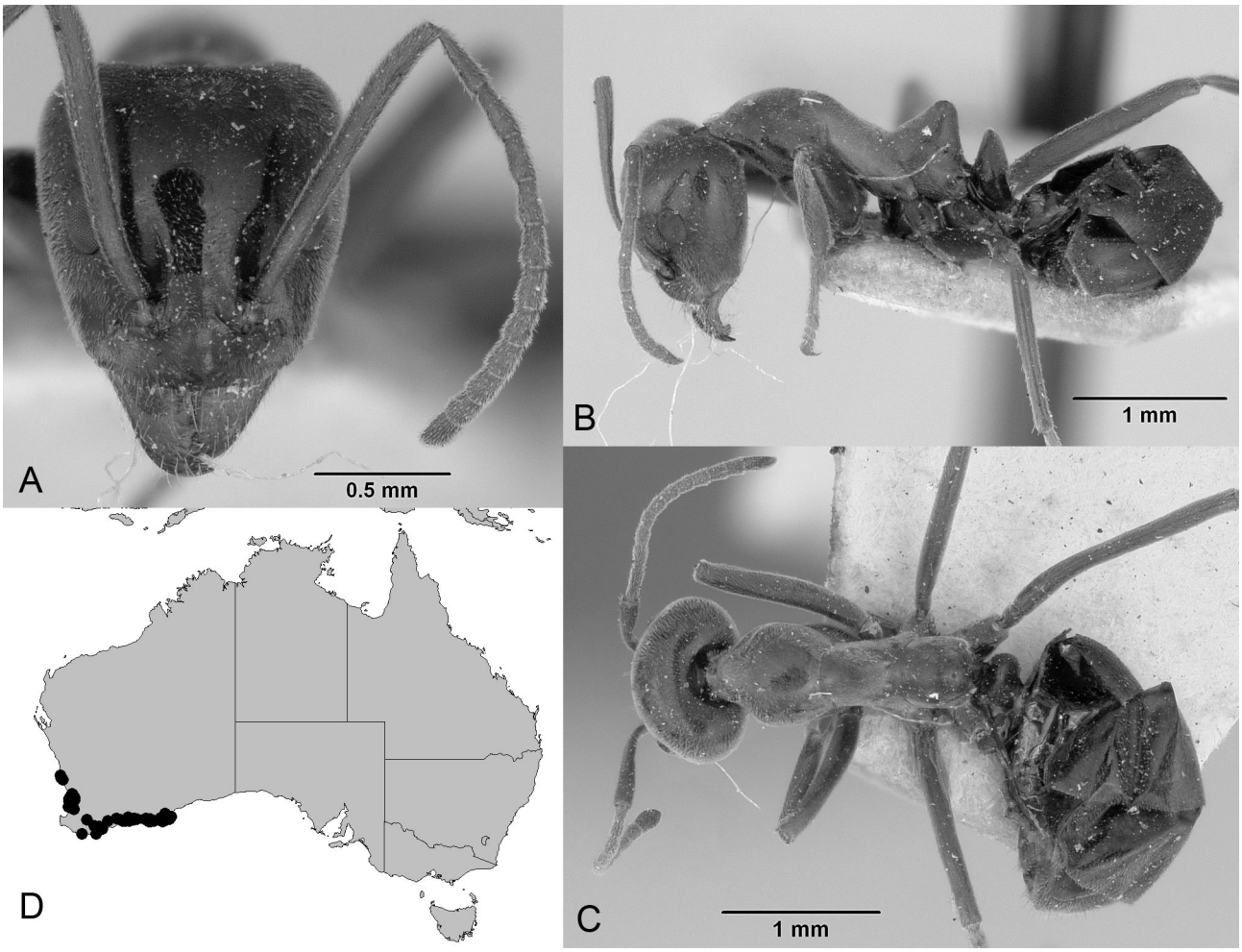


FIGURE 25. *Iridomyrmex conifer* (syntype, Perth, WA, ANIC32-017916): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined (A. Noble, www.antweb.org).

Comments. The *I. conifer* species-group (minus *I. alpinus*) was revised by Shattuck & McMillan in 1998. The separation of *I. conifer* and *I. turbineus* based on morphology is open to some debate, the character being used in the key proposed by the above authors (namely, erect mesosomal setae) exhibiting a variable pattern. The erect setae have two different characters, those found in *I. turbineus* being long and flexuous, whereas the erect setae found in ants here referred to *I. conifer*—where they occur at all—are short and stout. Worker samples held in the Curtin Ant Collection exhibit this variable pilosity: e.g., a worker of *I. conifer,* collected in *Banksia* sandplain just north of Perth, possesses more than six short, stout setae on the pronotum, while other workers from locations on the Swan Coastal Plain often possess a couple to half-a-dozen stout, erect mesonotal setae with or without accompanying pronotal setae. Ants collected at localities in the Darling Scarp or near the south coast tend to have a completely glabrous mesosoma. There also appear to be subtle differences in the appressed pilosity, although this feature has to be balanced against the often poor mounting and preservation of pinned workers, especially of older specimens: the Swan Coastal Plain ants have mainly smooth, straight setulae, whilst those from the uplands and south coast often have these setulae linked together in small skeins, giving the ant a more woolly appearance. The much more extensive ANIC holdings reveal the same pattern: pins of workers from Jurien Bay and Perth possess one or a few short to very short, stout, erect setae on the pronotum and/or mesonotum, whereas ants from the Darling Scarp and the south coast region have a completely glabrous mesosoma. A pin of three workers from Yallingup, near the extreme southern portion of the Swan Coastal Plain shows an intermediate pilosity pattern; in this case the many erect pronotal setae are short and rather stout, and less than the maximum diameter of the antennal scape, whereas the longest flexuous setae in *I. turbineus* are longer than the maximum antennal scape diameter.

The overall picture suggests the presence of three, possibly four separate or largely separate populations of south-western members of the *I. conifer* complex. *Iridomyrmex setoconus* (discussed below) has unique features,

and is easily recognisable. *Iridomyrmex turbineus* can be identified by the flexuous pronotal setae, which are usually numerous. Within *I. conifer*, there is a weaker signal of two populations, one found on or largely on the Swan Coastal Plain, and the other with a more extensive distribution in the Darling Range and along the south coast and in the southwest corner of Western Australia. In their revision of the *I. conifer* group, Shattuck and McMillan (1998) discuss the presence of two disjunct populations of *I. conifer*, but these only partially correspond to the biogeography implied here. The two authors also examined apparently variable traits within the taxon, namely the angle of the propodeum and the appearance of the erect and suberect gula setae, but were unable to find strong correlation consistent with genetic separation. The two authors of this current paper consider it would be highly desirable to examine the abovementioned variability in a future taxonomic project that selectively targets nest samples of *I. turbineus* and the two populations of *I. conifer* mentioned here (i.e., the hairy form and the glabrous form), using both morphological and molecular techniques.

Shattuck & McMillan (1998) discuss the unique nest construction to be observed for *I. conifer*. In winter, nests are constructed with an above ground thatched mound consisting of vegetation such as small twigs, grass, grass and cladodes of *Casuarina*, while summer nests are subterranean without an above ground mound. Underground nests are constructed within easy foraging distance (i.e., no greater than one metre from a food source), whereas winter mound nests may be up to 12 metres from food sources. The latter are always situated within a sunny position. The diet of the adult ants is mainly nectar and honeydew, with nectar being preferred when available. The ants will also scavenge arthropods, earthworms and small, dead vertebrates (Shattuck & McMillan, 1998).

Iridomyrmex continentis Forel, stat. n.

(Fig. 26)

Iridomyrmex mattiroloi continentis Forel, 1907a: 290.

Types. Syntypes from Denham and Kalgoorlie, Western Australia (MHNG, 2 workers, examined, 1 queen; WAMP, 1 worker).

Worker Description. ***Head.*** Posterior margin of head weakly convex to planar; erect setae on posterior margin in full-face view, present in small aggregations on one or both sides of posterior margin of head, or absent; sides of head noticeably convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae straight; antennal scape surpassing posterior margin of head by approximately 2 x its diameter. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin present as an indistinct swelling or undulation; mandible regularly triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae sparse to absent. Mesonotum evenly curved. Erect mesonotal setae sparse to absent. Mesothoracic spiracles always inconspicuous; propodeal dorsum tapered posteriad; placement of propodeal spiracle posteriad and near confluence of propodeal dorsum and propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae sparse (6 or fewer) and bristly. ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientated anteriad. ***Gaster.*** Non-marginal erect setae of gaster present or absent on first gastral tergite; marginal erect setae of gaster present on first tergite, or absent on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour medium to dark metallic brown, head and body with coppery reflections. Colour of erect setae brownish-yellow.

Measurements. *Worker* (n = 6)—CI 86–91; EI 29–32; EL 0.16–0.21; EW 0.13–0.17; HFL 0.77–1.13; HL 0.60–0.83; HW 0.52–0.71; ML 0.70–1.15; MTL 0.54–0.78; PpH 0.07–0.12; PpL 0.32–0.49; SI 101–118; SL 0.59–0.84.

Comments. *Iridomyrmex continentis* is a small-medium, rather nondescript brown ant that is frequently encountered in drier areas of Australia. The worker can easily be mistaken for that of *I. mjobergi*, a species with which it is often sympatric, but the slightly longer antenna and the posteriorly flattened propodeum, with the propodeal spiracle placed near the dorsum of the sclerite, will help identify this taxon. Collections have been made in pitfall traps and by hand.

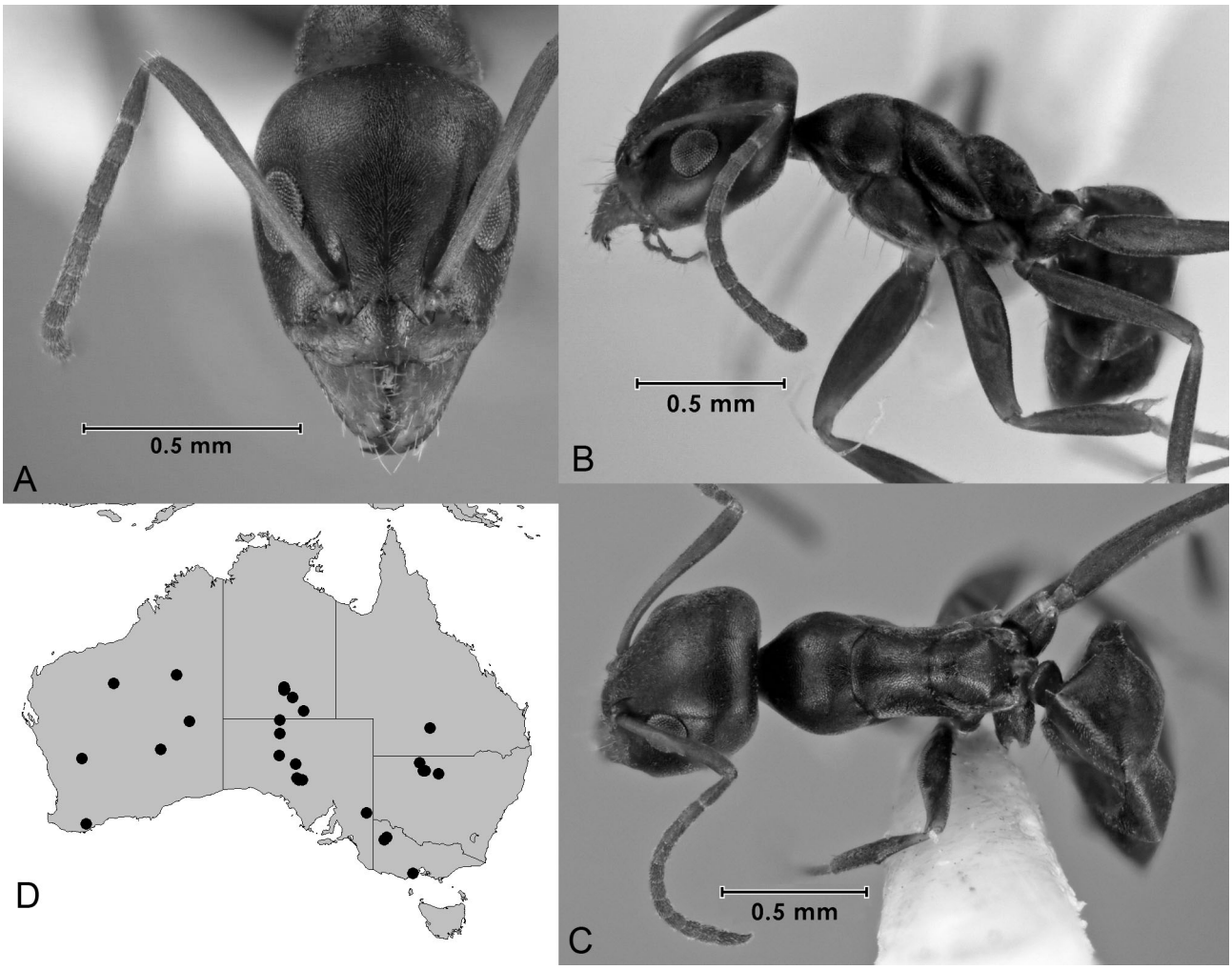


FIGURE 26. *Iridomyrmex continentis* (Alice Springs, NT, ANIC32-013632): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

***Iridomyrmex cuneiceps* sp. n.**
(Fig. 27)

Types. Holotype worker from 13mi. SW Mundiwindi, Western Australia, 26 April 1963, McInnes & Dowse (ANIC, ANIC32-041030). Paratypes: 5 workers, same data as holotype (ANIC); 4 workers from Kanka WH near Warburton, Western Australia, 3 October 1980, H. Heatwole (ANIC, ANIC32-037500, 2 workers; MCZC, ANIC32-037499, 2 workers).

Worker Description. ***Head.*** Posterior margin of head planar to weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular, or asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae convex; antennal scape surpassing posterior margin of head by approximately 2 x its diameter. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin projecting as blunt but distinct protuberance; mandible regularly triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae sparse (6 or fewer) and bristly. Mesonotum straight. Erect mesonotal setae sparse (6 or fewer) and bristly. Mesothoracic spiracles always inconspicuous; propodeal dorsum smoothly and evenly convex; placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae sparse (6 or fewer) and

bristly. ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour uniformly brown. Colour of erect setae pale yellow.

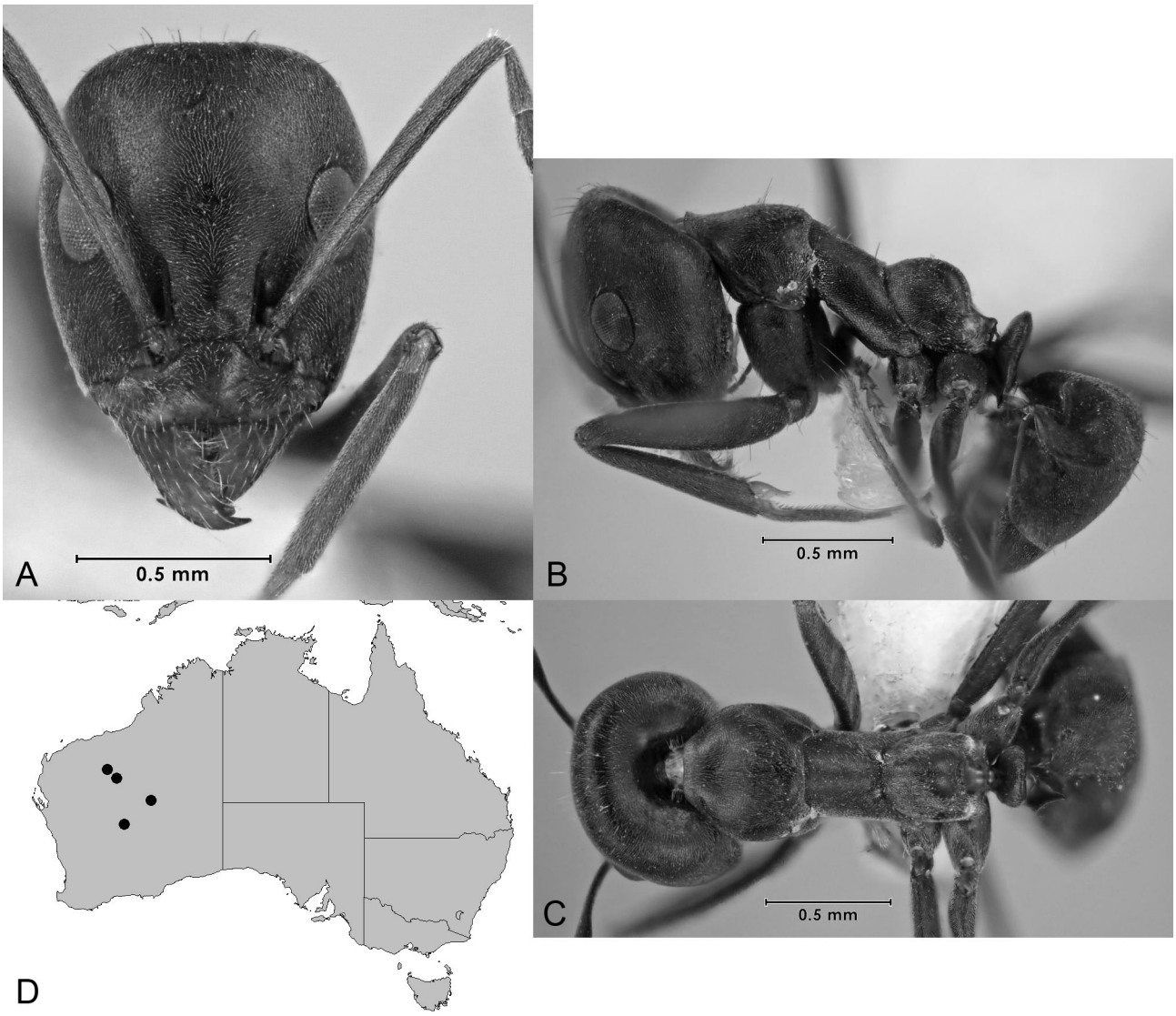


FIGURE 27. *Iridomyrmex cuneiceps* (Warburton, WA, ANIC32-037500): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Measurements. *Worker* (n = 2)—CI 86; EI 25-27; EL 0.24; EW 0.18-0.19; HFL 1.23-1.28; HL 1.03-1.09; HW 0.88-0.93; ML 1.20-1.24; MTL 0.90-0.95; PpH 0.18-0.20; PpL 0.47-0.54; SI 108-109; SL 0.94-1.02.

Comments. *Iridomyrmex cuneiceps* is a medium-sized, brown ant. The main feature that will enable it to be distinguished from *I. suchieri*, the species with which it is most likely to be confused, is the very thin vertex when the ant is seen in profile. In this respect it rather resembles *Camponotus perjurus* Shattuck & McArthur. Known populations of this uncommon ant appear to be confined to northern inland regions of Western Australia, although it may also occur in remote regions of the Northern Territory. The species has been collected by hand near Leinster, in a rocky, desolate area, by the first author of this paper.

Etymology. Latin: '*cuneus*'—'wedge' plus '*ceps*' derivative of '*caput*'—'head'.

***Iridomyrmex cupreus* sp. n.**
(Figs 28, 91)

Types. Holotype worker from Blanche Cup Spring, near Coward Spring, South Australia, 18 August 1977, edge of swamp (ANIC, ANIC32-037093). Paratypes: 6 workers from William Creek, South Australia, 23 July 1956, R. S. McInnes (ANIC, ANIC32-040968, 3 workers; MCZC, ANIC32-040947, 3 workers).

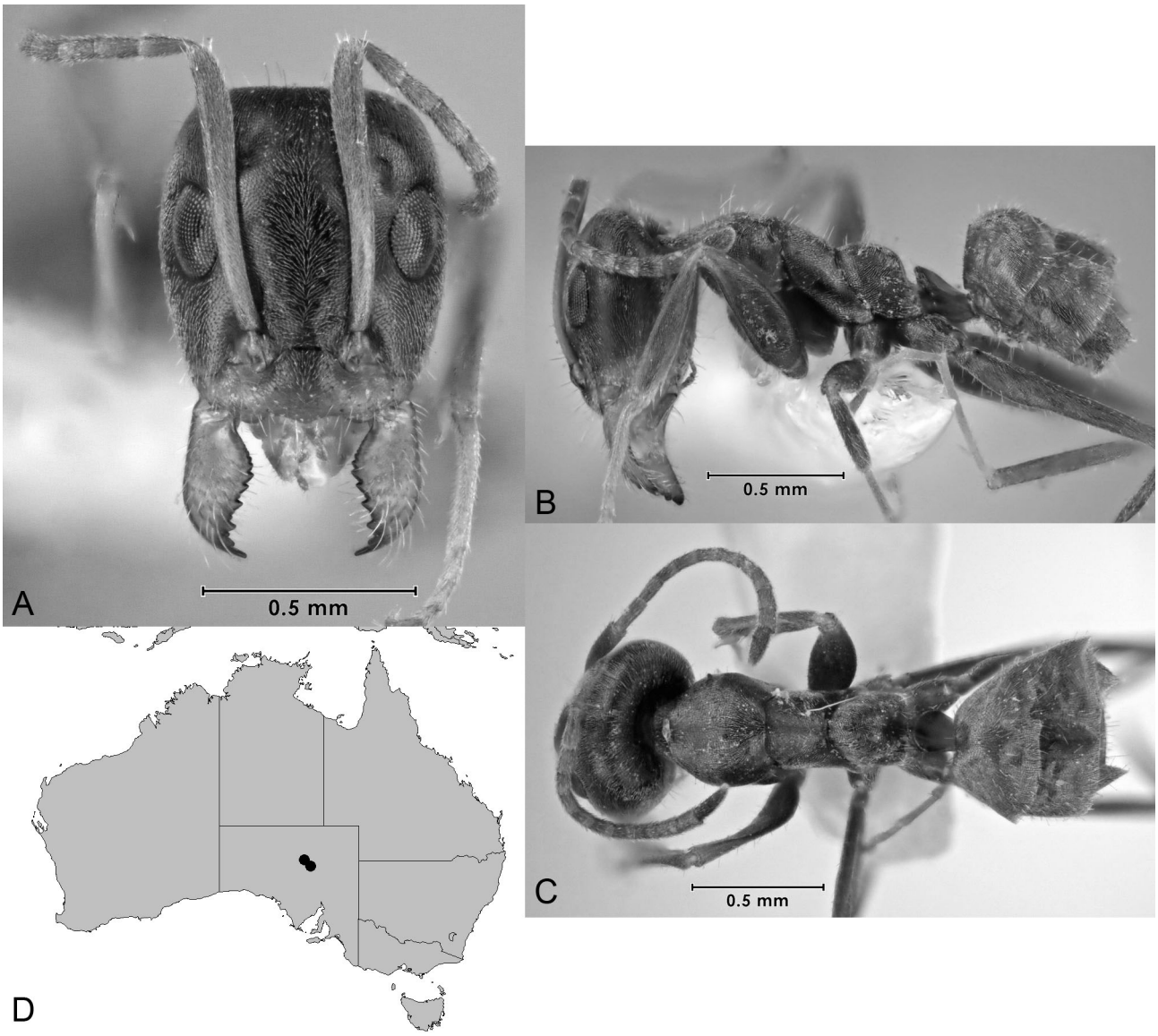


FIGURE 28. *Iridomyrmex cupreus* (holotype, Coward Springs, SA, ANIC32-037093): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Worker Description. ***Head.*** Posterior margin of head weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae present on sides of head in full-face view. Ocelli absent; in full-face view, eyes set below midpoint of head capsule; in profile, eye set anteriad of head capsule; eye asymmetrical, curvature of inner eye margin more pronounced than its outer margin and anterior sector of eye distinctly broader than its posterior sector. Frontal carinae convex; antennal scape surpassing posterior margin of head by 1-2 x its diameter. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin projecting as blunt but distinct protuberance; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae numerous (12 or more) and longest setae elongate, flexuous and/or curved, or numerous (12 or

more), short and bristly. Mesonotum sinuous, or straight. Erect mesonotal setae moderate in number (6-12), short and bristly. Mesothoracic spiracles always inconspicuous; propodeal dorsum smoothly and evenly convex; placement of propodeal spiracle posteriad and near propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae moderate in number (6-12), short and bristly. ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour uniformly dark chocolate, with dull coppery to bluish reflections. Colour of erect setae whitish.

Measurements. *Worker* (n = 2)—CI 86–88; EI 29–30; EL 0.20–0.21; EW 0.16–0.16; HFL 0.85–0.89; HL 0.80–0.83; HW 0.69–0.74; ML 0.97–1.01; MTL 0.60–0.65; PpH 0.11–0.14; PpL 0.41–0.42; SI 97–102; SL 0.70–0.72.

Comments. This is yet another rather physically undistinguished and very uncommon ant. The small-medium workers can mainly be distinguished from species like *I. splendens, I. mjobergi* and *I. coeruleus* by the presence of erect setae on the tibiae, the latter species having glabrous tibiae (all in all, *I. cupreus* is a rather hairy ant, but the erect setae are short, thus distinguishing this species from *I. spurcus*). The eye is slightly asymmetrical, and reminiscent of many workers of *I. dromus*. A handful of pins of this ant only are known, all collections having been made in the vicinity of Lake Eyre, South Australia.

Etymology. Latin: the name refers to the coppery appearance of the worker cuticle. Weak bluish reflections may also be seen in a few workers.

Iridomyrmex curvifrons sp. n.

(Figs 29, 92)

Types. Holotype worker from Gayndah (as Gandah) district, 25°50’S 151°52’E, Queensland, 19 May 1972, S. A. Harrington, under rock, ANIC Ants Vial 60.155 (ANIC, ANIC32-041774). Paratypes: 4 workers from Kogan, Queensland, 28 February 1988, N. Pierce, tending *J. evag. eubulus* (ANIC, 2 workers, MCZC, 2 workers, ANIC32-036495).

Worker Description. ***Head.*** Posterior margin of head planar to weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae present on sides of head in full-face view. Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular. Frontal carinae convex; antennal scape surpassing posterior margin of head by 0.2–0.5 x its length, or surpassing posterior margin of head by approximately 3 x its diameter. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin projecting as blunt but distinct protuberance; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae numerous (12 or more), short and bristly. Mesonotum sinuous. Erect mesonotal setae numerous (12 or more), short and bristly. Mesothoracic spiracles always inconspicuous; propodeal dorsum smoothly and evenly convex; placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae numerous (12 or more), short and bristly. ***Petiole.*** Dorsum of node acuminate, or convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour uniformly brown. Colour of erect setae yellow.

Measurements. *Worker* (n = 4)—CI 89–93; EI 22–25; EL 0.22–0.24; EW 0.16–0.18; HFL 1.27–1.49; HL 0.97–1.17; HW 0.86–1.08; ML 1.28–1.60; MTL 0.87–1.03; PpH 0.19–0.23; PpL 0.47–0.62; SI 101–107; SL 0.92–1.09.

Comments. Yet again this is another nondescript, medium-sized brown ant that is known from very few specimens, although it may prove to be locally common within a limited range. Workers can be identified by a combination of erect setae on the tibiae and genae (but absent from the antennal scapes) and broadly oval head when seen in full-face view. The species is likely to be close to *I. anceps*, with which it shares its uniform brown colour and short bristly setae on the mesosoma. All known specimens have been collected in south-east Queensland. Label

data indicates that *I. curvifrons* tends blue butterfly larvae (Lycaenidae: *Jalmenus eubulus* Miskin). One series was also taken from under a rock.

Etymology. Latin: '*curvus*' plus '*frons*', referring to the oval appearance of the head when seen in full-face view.

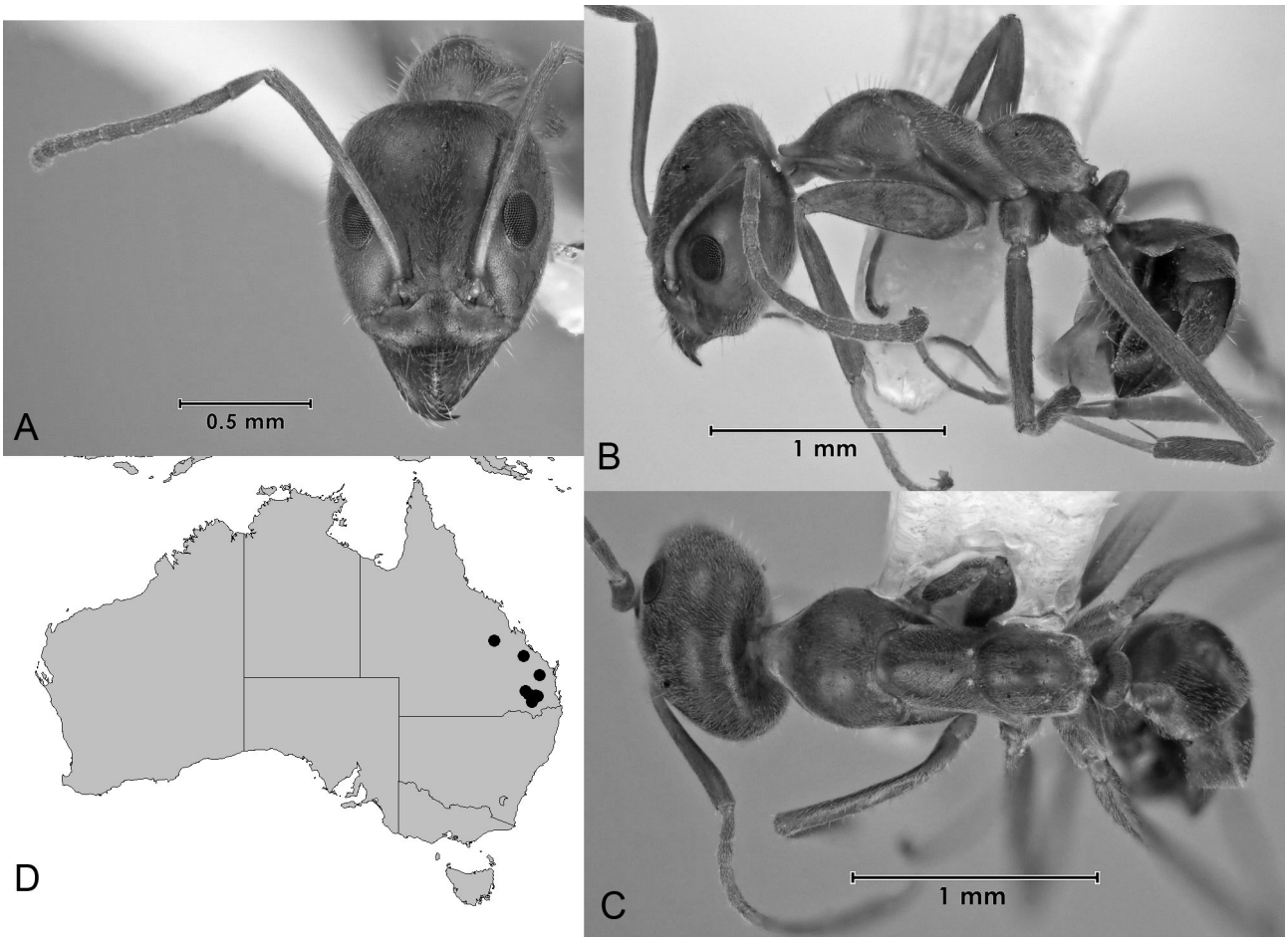


FIGURE 29. *Iridomyrmex curvifrons* (paratype, Kogan, Qld, ANIC32-036495): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Iridomyrmex cyaneus Wheeler

(Fig. 30)

Iridomyrmex cyaneus Wheeler, W.M., 1915a: 812.

Types. Syntypes from Flat Rock Hole (as Black Rock Hole), Musgrave Ranges, South Australia (SAMA, 1 worker, examined) and Moorilyanna, South Australia (SAMA, 1 worker, examined).

Worker Description. ***Head.*** Posterior margin of head weakly concave; erect setae on posterior margin absent; sides of head noticeably convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae convex; antennal scape barely attaining posterior margin of head, or surpassing it by less than 1 x its diameter. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin present as an indistinct swelling or undulation; mandible regularly triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum strongly inclined anteriorly. Erect pronotal setae lacking or very minute (one or two tiny setae may be present). Mesonotum evenly curved. Erect mesonotal setae lacking or very minute (one or two tiny setae present). Mesothoracic spiracles always incon-

spicuous; propodeal dorsum protuberant; placement of propodeal spiracle posteriad and near propodeal declivity; propodeal angle present as sharply defined angle, the dorsal and declivitous propodeal faces often separated by a carina. Erect propodeal setae lacking or very minute (one or two tiny setae present). ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster absent on first gastral tergite; marginal erect setae of gaster absent on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour uniformly brown to black, with bluish to pink iridescence throughout. Erect setae completely absent from almost all specimens seen.

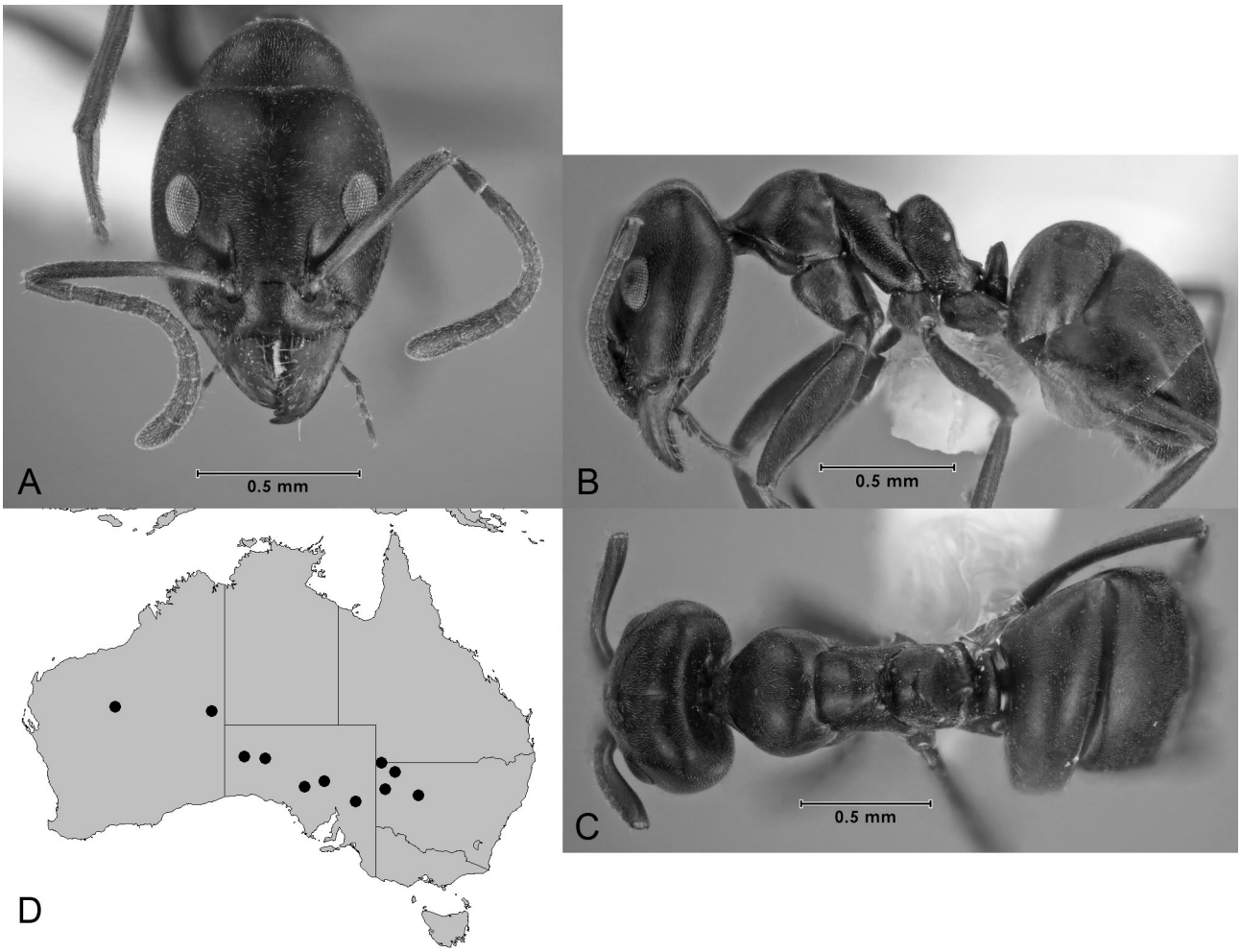


FIGURE 30. *Iridomyrmex cyaneus* (Koonamore, SA, ANIC32-039936): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Measurements. *Worker* (n = 5)—CI 88–94; EI 25–28; EL 0.17–0.19; EW 0.14–0.15; HFL 0.73–0.84; HL 0.71–0.84; HW 0.63–0.75; ML 0.82–1.00; MTL 0.51–0.62; PpH 0.11–0.15; PpL 0.34–0.44; SI 80–86; SL 0.54–0.62.

Comments. This striking little species cannot be mistaken for any other *Iridomyrmex*, its truncate and sharply declivitous propodeum and its metallic blue or pinkish sheen being a unique combination for the genus. Indeed, their iridescence, their compact form and their narrow node can lead to workers being mistaken for *Ochetellus*. However, they are distinguished from that genus by the clypeal protuberance and the more posterior position of the eyes on the head capsule. As regards other *Iridomyrmex*, the more extreme morphologies in *I. difficilis*, probably the species most closely related to this ant, strongly resemble those of *I. cyaneus*, but iridescence of any sort is always lacking in the former taxon. *Iridomyrmex cyaneus* is an ant of the dry, desert regions of the Australian interior, and has been recorded from Western Australia, South Australia and New South Wales. It has been collected in pitfall traps in mulga woodland over calcrete (Western Australia), but otherwise there are no ecological data on labels or in the original description.

***Iridomyrmex difficilis* sp. n.**
(Figs 31, 95)

Types. Holotype worker from 2km NNW Crossman, 32°45'S 116°34'E, Western Australia, 24 September 1981, I. D. Naumann & J. C. Cardale (ANIC, ANIC32-042124). Paratypes: 3 workers from Mt Magnet area, Western Australia, 15 May 1967, C. T. Mercovich, ANIC Ants Vial 63.233 (ANIC, ANIC32-032540); 3 workers from 16km NNW Gibson, 33°31'S 121°43'E, 17 November 1969, R. W. Taylor, ANIC Ants Vial 60.148 (ANIC, ANIC32-038317); 9 workers from Mt. Magnet area, Western Australia, 15 May 1967, C. T. Mercovich (ANIC, 7 workers, MCZC, 2 workers, ANIC32-040017). Note: A syntype of *I. mjobergi* from the Kimberley district, Western Australia, examined during this study actually belongs to this species. With the designation of another *I. mjobergi* syntype (from the same locality) as the lectotype for *I. mjobergi*, this specimen loses its type status (ICZN, article 73.2.2), and hence its name bearing function. Since this specimen is badly mounted and its features are poorly displayed (though still recognizable on close inspection), a new and better quality pinned worker has been chosen as a holotype to represent *I. difficilis*.

Worker Description. ***Head.*** Posterior margin of head weakly concave; erect setae on posterior margin in full-face view, present singly or as a couple of setae on either side of posterior margin of head, or absent; sides of head noticeably convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae straight; antennal scape barely attaining posterior margin of head, or surpassing it by less than 1 x its diameter. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin present as an indistinct swelling or undulation; mandible triangular with distinct angle between masticatory and basal margins; long, curved setae on venter of head capsule absent. ***Mesosoma.*** pronotum strongly inclined anteriorly. Erect pronotal setae sparse to absent. Mesonotum straight, or evenly curved. Mesothoracic spiracles always inconspicuous; propodeal dorsum protuberant, or straight and short (equal in length to propodeal declivity); placement of propodeal spiracle posteriad and near propodeal declivity; propodeal angle present as sharply defined angle, the dorsal and declivitous propodeal faces often separated by a carina, or present as a bluntly defined right angle, the dorsal and declivitous propodeal faces never separated by a carina. Erect propodeal setae lacking or very minute (one or two tiny setae present). ***Petiole.*** Dorsum of node acuminate, or convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present or absent on first gastral tergite; marginal erect setae of gaster present on first tergite, or absent on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour uniformly medium to blackish-brown. Colour of erect setae whitish.

Measurements. *Worker* (n = 9)—CI 85–92; EI 24–30; EL 0.13–0.16; EW 0.10–0.12; HFL 0.49–0.67; HL 0.55–0.68; HW 0.48–0.60; ML 0.57–0.78; MTL 0.36–0.49; PpH 0.08–0.12; PpL 0.26–0.36; SI 85–94; SL 0.44–0.54.

Comments. *Iridomyrmex difficilis*, as its name suggests, poses some taxonomic difficulties because of its bland yet variable morphology. Workers of southern populations tend to have a steeply ascending anterior pronotum and weakly truncate propodeum and often also have a few small setae on the posterior margin of the head and on the pronotum. Further north, workers tend to be glabrous with a strongly protuberant propodeum, while populations in the Torresian zone, also glabrous, often have only a moderately ascending pronotum and a truncate propodeum that may have a sharp or even slightly dentate propodeal angle. Intermediate forms that link the more distinctive phenotypes occur throughout the range of the species. Workers of this very small brown ant are most easily mistaken for small workers of *I. mjobergi*, which also have yellow mandibles. However, the antennal scape is always shorter in *I. difficilis* than in *I. mjobergi*, and, in full-face view, barely breaks the outline of the posterior margin of the head, if at all (see key). The metanotal groove is also stronger in *I. difficilis*. Glabrous specimens with a strongly rounded and protuberant propodeum are very similar to *I. gumnos*, but the latter has a strongly concave posterior margin of the head in full-face view, and the antennal scape exceeds the posterior margin of the head by approximately twice its greatest diameter. The closest relative to *I. difficilis* is likely to be *I. cyaneus*, but that ant has an iridescence always lacking in *I. difficilis* (see above).

Iridomyrmex difficilis is a very widespread, relatively common species, and has been recorded from all the mainland Australian states as well as on islands in the Torres Strait and off the Queensland coastline. The species is

capable of occupying a range of habitats, including rainforest, grassland, dry sclerophyll forest, acacia woodland and even paddocks, and is predominantly a ground forager that nests in soil. There is one series taken from a nest

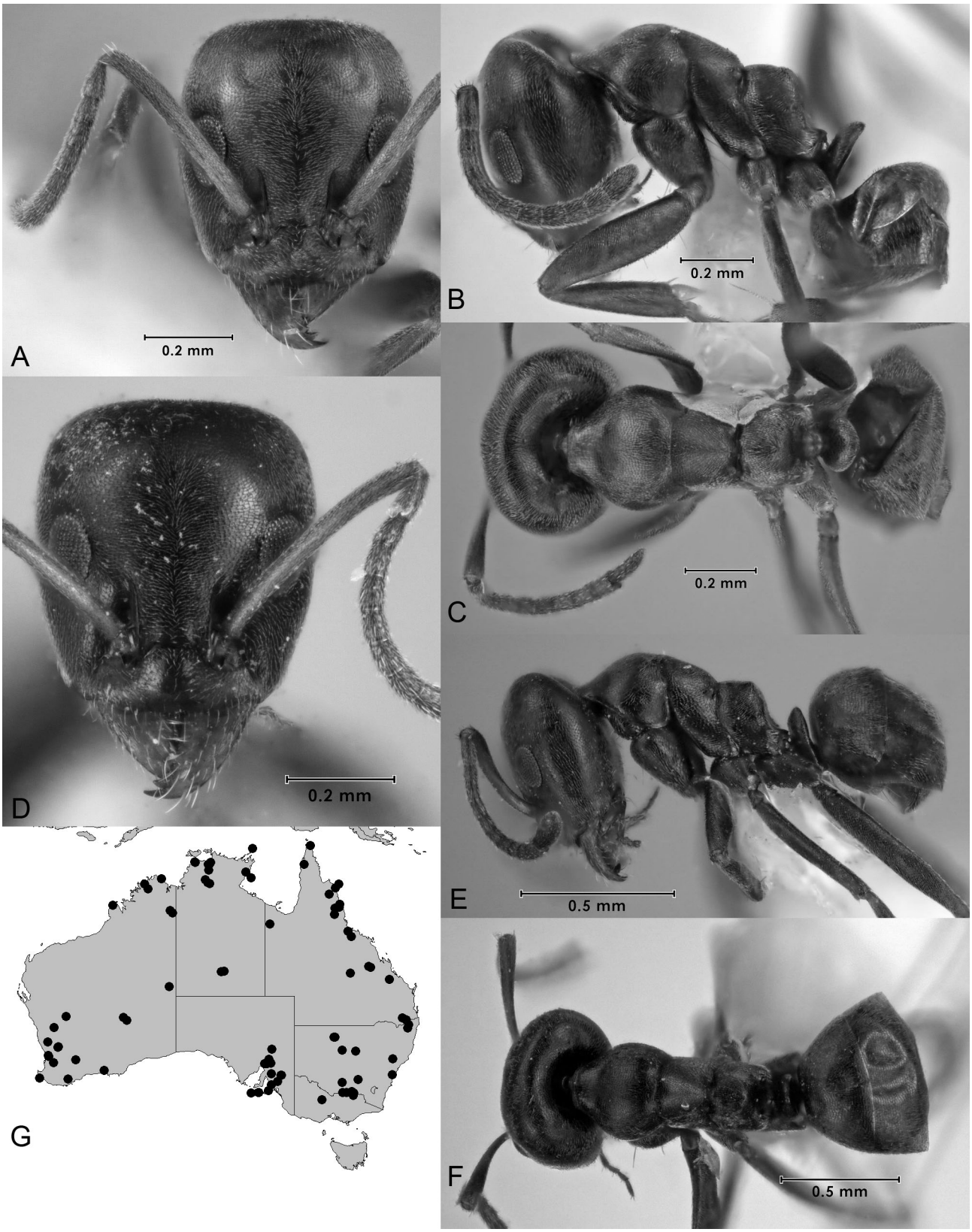


FIGURE 31. *Iridomyrmex difficilis*, pale form with rounded propodeum (Mount Webb, Qld, ANIC32-032094): A. Front of head; B. Side of body; C. Top of body. *Iridomyrmex difficilis*, dark form with angular propodeum (Darwin, NT, ANIC32-047320): D. Front of head; E. Side of body; F. Top of body; G. Distribution of material examined.

under a rock (Sevenhill, South Australia). While many, perhaps most records come from pitfall traps, specimens have also been collected by hand, from a berlesate and from sieved litter. Like many other *Iridomyrmex*, this species has been found tending the caterpillar of *Jalmenus evagoras* (Whiporie, New South Wales).

Etymology. Latin meaning 'troublesome' or 'difficult'.

Iridomyrmex discors Forel

(Fig. 32)

Iridomyrmex discors Forel, 1902: 464.
Iridomyrmex discors occipitalis Forel, 1907a: 294 (junior synonym of *discors* by Shattuck, 1996: 39).
Iridomyrmex discors occipitalis exilior Forel, 1907a: 294 (unavailable infrasubspecific name, see Taylor, 1986: 34).
Iridomyrmex discors aeneogaster Wheeler, W.M., 1915a: 811 (junior synonym of *discors* by Shattuck, 1996: 39).

Types. *Iridomyrmex discors* Forel: Lectotype worker (here designated) from Charters Towers, Queensland, Wiederkehr (MHNG, ANIC32-009844). Paralectotypes, same data as lectotype (MCZC, 1 worker, examined; MHNG, 5 workers; NHMB, 1 worker). *Iridomyrmex discors occipitalis* Forel: Syntypes from Northampton, Western Australia (ANIC, ANIC32-009845, 1 worker, examined; MCZC, 1 worker, examined; MHNG, 2 workers; WAMP, 1 worker). *Iridomyrmex discors aeneogaster* Wheeler: Holotype worker from Flat Rock Hole (as Black Rock Hole), Musgrave Ranges, South Australia (MCZC, examined). Paratypes: 1 worker, same data as holotype (ANIC, ANIC32-009848, examined).

Worker Description. ***Head.*** Posterior margin of head weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae present on sides of head in full-face view. Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular, or asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae convex; antennal scape surpassing posterior margin of head by 1–2 x its diameter. Erect setae on scape present and abundant; prominence on anteromedial clypeal margin projecting as triangular spur; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule present. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae numerous (12 or more) and longest setae elongate, flexuous and/or curved. Mesonotum sinuous. Erect mesonotal setae numerous (12 or more), short and bristly. Mesothoracic spiracles always prominent as small, vertical protuberances; propodeal dorsum protuberant; placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle present as a bluntly defined right angle, the dorsal and declivitous propodeal faces never separated by a carina. Erect propodeal setae numerous (12 or more) and elongate, flexuous and/or curved or short and bristly. ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest present. Colour foreparts uniformly orange to reddish-brown without iridescence in most workers (a very faint pinkish reflection may be discernible in a few cases), legs brown, gaster brown to black. Colour of erect setae pale yellow.

Measurements. *Worker* (n = 77)—CI 92–107; EI 20–26; EL 0.25–0.35; EW 0.15–0.23; HL 1.12–1.56; HW 1.09–1.63; ML 0.45–0.77; PpH 0.16–0.24; PpL 0.55–0.78; SI 76–100; SL 1.01–1.29.

Comments. *Iridomyrmex discors* has a strong resemblance to a small meat ant. Probably the most salient morphological character that places it outside of the *I. purpureus* group is the shorter anteromedian clypeal prominence, which in full-face view does not surpass the lateral lobes of the anterior margin of the clypeus. The relative scape length is also shorter than is the case in true meat ants. Another character, suggested by Shattuck (1993a), namely a differently shaped mesonotal outline, is variable and does not in fact apply to all workers: in some cases the mesonotal outline is sinuate and arched towards its junction with the pronotum, and is thus indistinguishable from that of a meat ant. The presence of two apparently discrete populations of *I. discors* in Australia (Shattuck, 1996) may suggest subtle genetic distinctions, but in his revisionary treatment, Shattuck was unable to discern any significant morphological differences. *Iridomyrmex discors* has also been associated with *I. obscurior*, the latter being described as a subspecies of *discors* but raised to species by Shattuck (1996), who nonetheless considered the two species belonged to the same species-group and were in fact the only members of that group. This paper takes the view that in all likelihood the apparent similarities between the two taxa are due to convergence (the appear-

ance of the head capsule and the anteromedian clypeal prominence is quite different in both species). Nonetheless, unpublished molecular data does suggest there could be a relatively close relationship between *I. mayri, I. obscurior* and relatives and the meat ants in the broader sense.

Meat ants do not prefer loose, sandy soils (Greenslade, 1974), but these sorts of soils are highly suitable habitat for *I. discors*, which appears to be an early pioneer after soil disturbance (Heterick, 2009). This species is a general predator/scavenger (Shattuck, 1996). The first author, as a child, often fed dead grasshoppers to *I. discors* workers on the footpath in front of his East Fremantle (Western Australia) house in order to examine their habits. The ants fed avidly on this prey, enlarging wounds, opening up abdomens and removing softer tissue, before finally carting the hollowed-out heads and thoraces back to their nests. As is the case with the more common meat ant species, mature nests may have multiple entrance holes (first author, pers. obs.). *Iridomyrmex discors* is particularly common in the Perth region in Western Australia, where it can frequently be found in sandy soils, even in street verges and between pavers in city blocks. Like its meat ant cousins it is also a pugnacious species, and workers will bite readily if the nest is threatened.

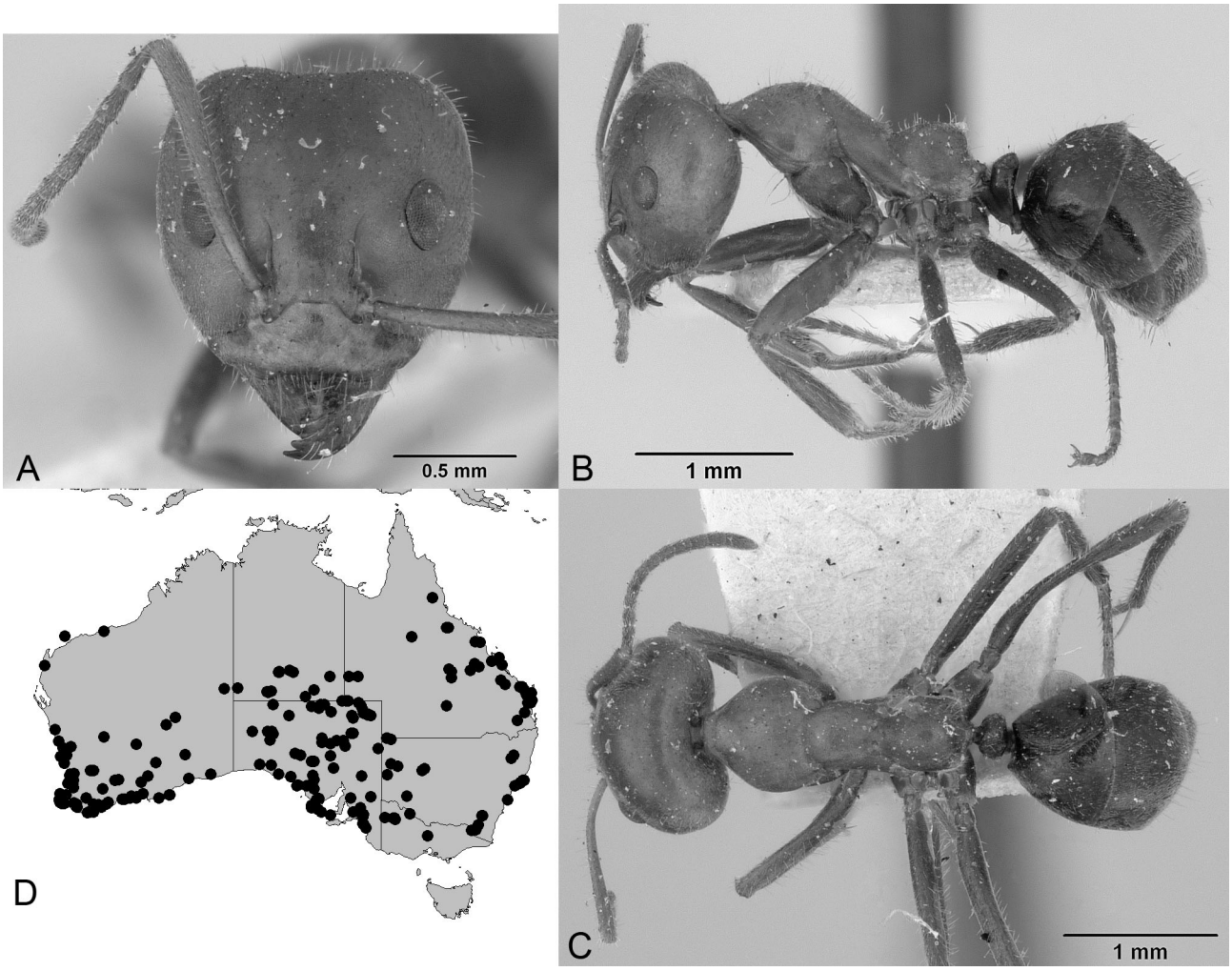


FIGURE 32. *Iridomyrmex discors* (syntype, Charters Towers, Qld, ANIC32-009844): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined (A. Noble, www.antweb.org).

Iridomyrmex dromus **Clark**

(Fig. 33)

Iridomyrmex dromus Clark, 1938: 374, fig. 12.

Types. Holotype worker from Reevesby Is., South Australia (MVMA). Paratypes: same data as holotype (ANIC, 5 workers, examined; MVMA, 5 workers).

Worker Description. ***Head.*** Posterior margin of head planar to weakly concave; erect setae on posterior margin in full-face view set in a row, or present in small aggregations on one or both sides of posterior margin of head, or present singly or as a couple of setae on either side of posterior margin of head; sides of head noticeably convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile eye set anteriad of head capsule; eye asymmetrical, curvature of inner eye margin more pronounced than its outer margin and anterior sector of eye distinctly broader than its posterior sector. Frontal carinae concave, or straight; antennal scape surpassing posterior margin of head by 0.2–0.5 x its length, or surpassing posterior margin of head by approximately 3 x its diameter. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin present as an indistinct swelling or undulation; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule present in some workers. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae moderate in number (6–12), short and bristly, or sparse to absent. Mesonotum sinuous, or straight, or evenly curved. Erect mesonotal setae sparse to absent. Mesothoracic spiracles always inconspicuous; propodeal dorsum smoothly and evenly convex; placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle present as a bluntly defined right angle, the dorsal and declivitous propodeal faces never separated by a carina, or weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae sparse to absent. ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present or absent on first gastral tergite; marginal erect setae of gaster present on first tergite, or absent on first tergite. ***General characters.*** Allometric differences between workers of same nest present. Colour of most workers depigmented yellow with darker head, but quite often mottled brown, while workers of other populations may be dark brown and even black. Colour of erect setae light brown.

Measurements. *Worker* (n = 46)—CI 79–92; EI 29–42; EL 0.18–0.35; EW 0.14–0.27; HFL 0.81–1.57; HL 0.61–1.03; HW 0.49–0.95; ML 0.80–1.44; MTL 0.54–1.12; PpH 0.09–0.20; PpL 0.31–0.58; SI 107–145; SL 0.63–1.20.

Comments. *Iridomyrmex dromus* is one of a small number of *Iridomyrmex* taxa that are genuinely problematic for the alpha taxonomist. The taxon is very widespread throughout Australia, and morphological examination reveals an uncomfortable array of variation, if this is to be considered a single species. Limited DNA analysis also reveals wide variation in several samples examined. Aside from the fact that the colour of the body can vary from very pale, depigmented yellow all the way through to coal-black, there are considerable differences in the size of the eyes (which can vary from medium-sized and slightly asymmetrical to enormous and protuberant), the length of the antennal scape (from extending to just beyond the posterior margin of the head to extending by at least half its length beyond that margin) and the shape of the propodeum (which varies from broadly protuberant to long and dorsally flattened). Relatively distinctive forms can be found in certain regions; for example, workers collected in the south-west of the continent tend to be pale and very small with narrow head and small eyes, whereas many taken from the mid-west of Western Australia are brown and large-eyed. Also brown and with short antennal scapes are specimens collected in the Simpson Desert and its environs in Queensland, northern New South Wales and South Australia. Perhaps the most spectacular morph is one collected from a variety of sites, but generally inland. This ant is honey-coloured, with very elongate scapes, large eyes and a flattened propodeum. However, none of these forms possesses discrete characters that enable it to be recognised as a unique taxon when all populations are considered: that is, intermediate forms connect the clusters of the more distinctive workers, and hours of examination have failed to identify diagnostic features unique to a particular morph. As a consequence, the position taken here is that *I. dromus* is genuinely polymorphic with respect to phenotype and also genetically variable. This position could change, if further molecular analysis reveals unacceptable genetic distance between given populations. However, if such is the case, then workers of the constituent species would have to be regarded as truly cryptic and possibly impervious to separation using morphological characters. For the present, the distinctly asymmetrical eyes placed near the margin of the head in full-face view, the oblique angle between the dorsal and declivitous propodeal surfaces, and the lack of erect or subdecumbent setae on the hind tibiae, sides of head and antennal scape serve to identify the species as understood here. Morphologically similar species include *I. cupreus* (erect setae on tibiae), *I. exsanguis* (sharp to blunt right angle between propodeal dorsum and propodeal declivity), *I. macrops* (erect setae on the tibiae and often the antennal scape) and *I. pallidus* (eyes placed away from sides of head in full-face view and subdecumbent setae on tibiae). *Iridomyrmex hartmeyeri* may also be confused with *I.*

dromus, but the latter always has some erect pilosity on the mesosomal dorsum, whereas this is usually lacking in the larger *I. hartmeyeri*.

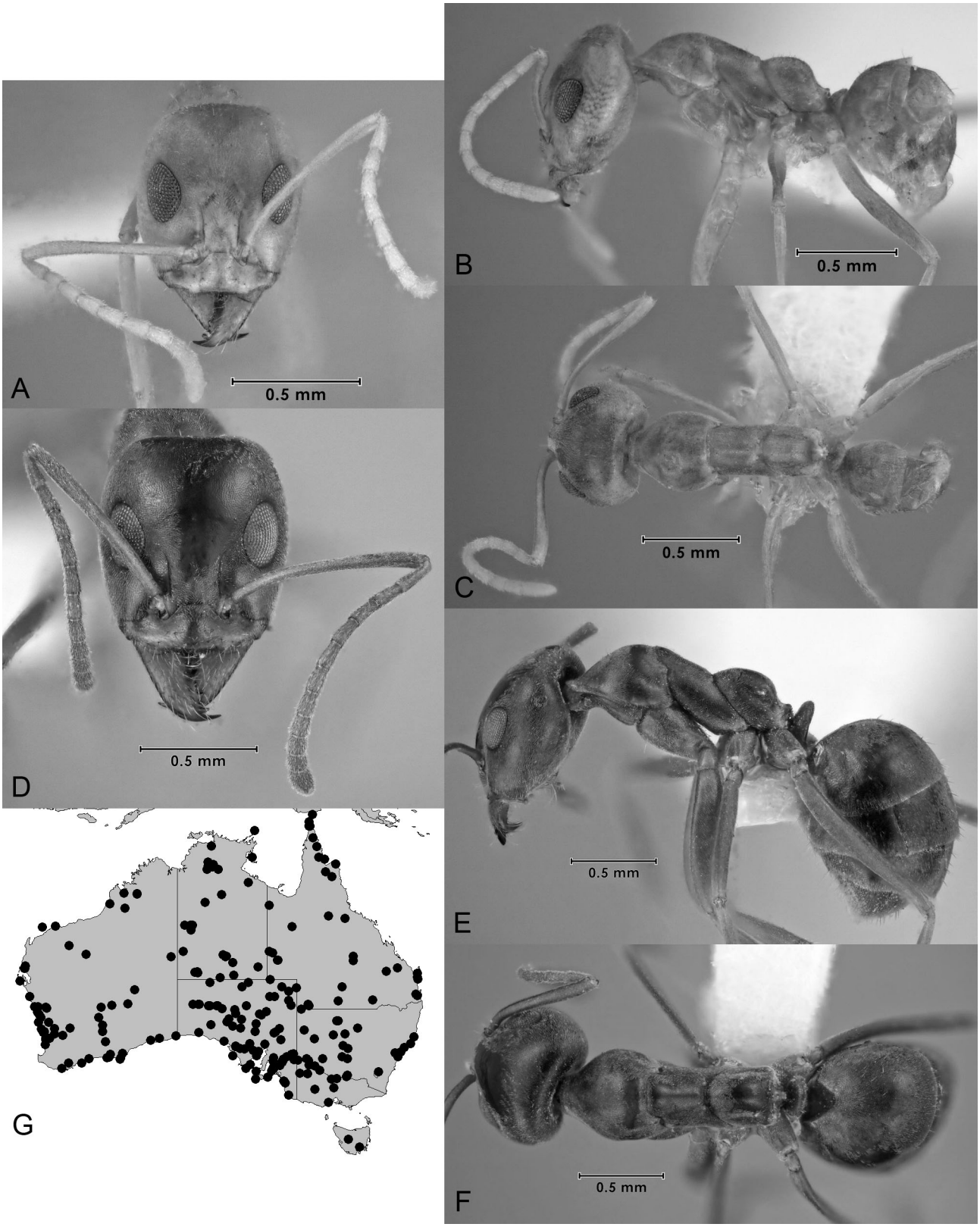


FIGURE 33. *Iridomyrmex dromus*, light form (Weipa, Qld, ANIC32-043311): A. Front of head; B. Side of body; C. Top of body. *Iridomyrmex dromus*, dark form (Pimba, SA, ANIC32-032725): D. Front of head; E. Side of body; F. Top of body; G. Distribution of material examined.

Iridomyrmex dromus is mainly nocturnal, and has been collected in a bewildering variety of habitats across Australia, ranging from desert and dry sclerophyll to rainforest litter (Tasmania). However, this species is absent from the northern tropics, where its niche is probably filled by *I. pallidus*. Although some workers have been collected from vegetation, most foraging is terrestrial, and pitfall trapping has been the main source of specimens. Workers move over the soil in loose columns, and are generally timorous.

Iridomyrmex elongatus sp. n.

(Figs 34, 92)

Types. Holotype worker from Kunoth Park near Alice Springs, Northern Territory, 3-6 February 1975, P. J. M. Greenslade, traps (ANIC, ANIC32-032498). Paratypes: 6 workers from 5mi. ENE Terhans Roadhouse, Western Australia, 15 October 1960, McInnes & Dowse (ANIC, ANIC32-041281, 3 workers; BMNH, ANIC32-041931, 3 workers); 2 workers, 2 queens and 2 males from 37mi. SW Mundiwindi, Western Australia, 27 April 1963, McInnes & Dowse (ANIC, ANIC32-041029, 1 worker, 1 queen, 1 male; MCZC, ANIC32-041029, 1 worker, 1 queen, 1 male).

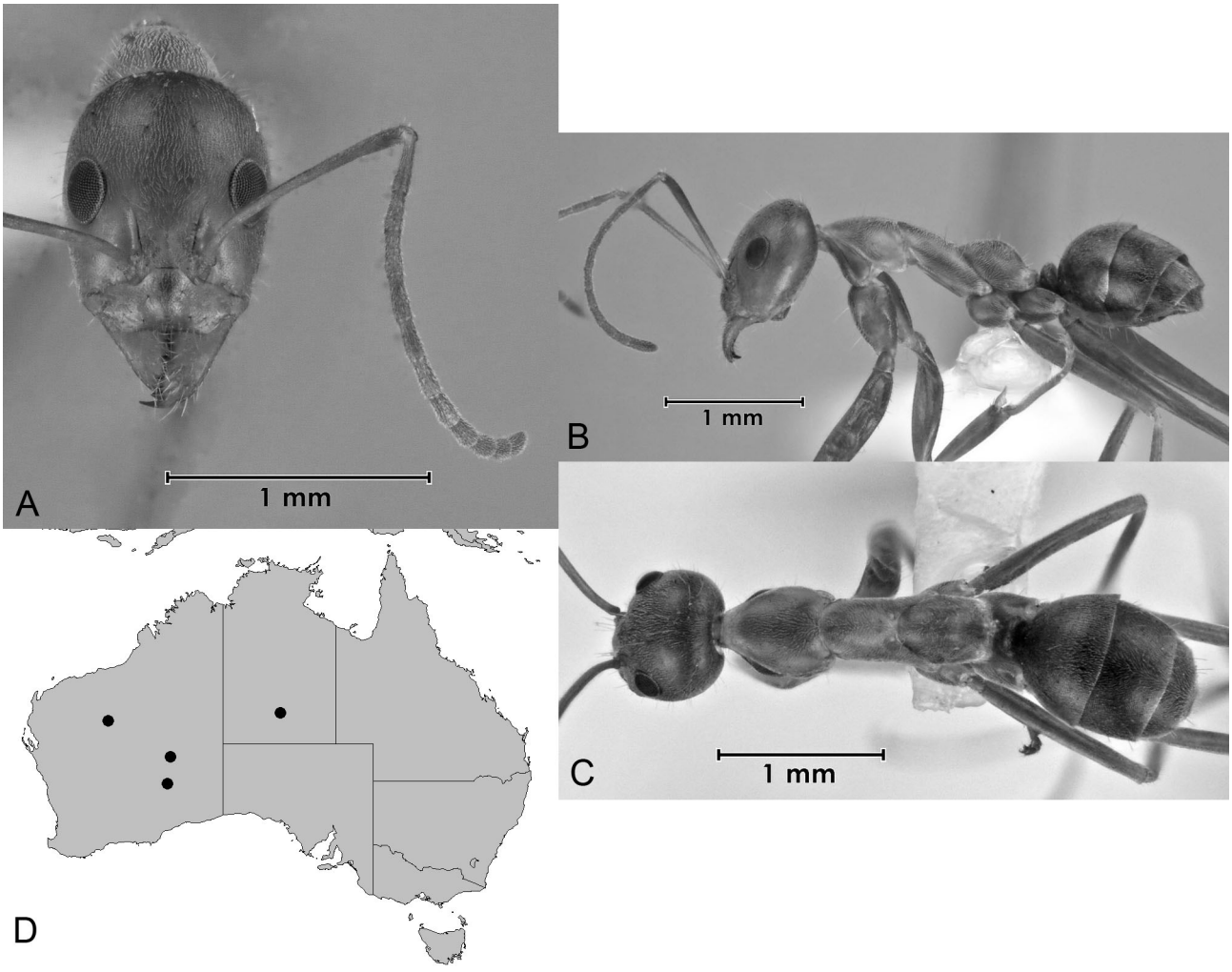


FIGURE 34. *Iridomyrmex elongatus* (holotype, Alice Springs, NT, ANIC32-032498): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Worker Description. ***Head.*** Posterior margin of head strongly convex; erect setae on posterior margin in full-face view, present in small aggregations on one or both sides of posterior margin of head; sides of head straight or weakly convex; erect genal setae present on sides of head in full-face view. Ocelli absent; in full-face view, eyes set

above midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular, or asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae convex; antennal scape surpassing posterior margin of head by at least 0.5 x its length. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin always completely absent; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum weakly undulant or almost straight. Erect pronotal setae moderate in number (6-12), short and bristly. Mesonotum evenly curved. Erect mesonotal setae sparse to absent. Mesothoracic spiracles always inconspicuous; propodeal dorsum straight and short (equal in length to propodeal declivity); placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle present as a bluntly defined acute angle, the propodeal dorsum conical in shape. Erect propodeal setae moderate in number (6-12), short and bristly. ***Petiole.*** Dorsum of node planar; node thick, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour of foreparts tawny orange-brown, gaster and legs brown to dark brown. Colour of erect setae pale yellow.

Measurements. *Worker* (n = 3)—CI 80–82; EI 29–30; EL 0.24–0.25; EW 0.19–0.20; HFL 1.71–1.74; HL 1.02–1.03; HW 0.82–0.85; ML 1.60–1.64; MTL 1.17–1.20; PpH 0.18–0.22; PpL 0.61–0.62; SI 151–154; SL 1.26–1.28.

Comments. The physical appearance of *I. elongatus* is suggestive of *I. bicknelli*, but the former is a brown ant and possesses erect setae on the hind tibiae (hind tibiae glabrous in *I. bicknelli*). However, a convex posterior margin of the head is common to both ants, and that feature, along with the erect hind tibial setae, is sufficient to characterise *I. elongatus*. This species has been collected in well separated sites in Western Australia and the Northern Territory. Pitfall trapped material indicates that it is a terrestrial forager, but few samples have been collected and nothing more is known of its biology.

Etymology. Latin: reference is made to the gracile appearance of the ant.

Iridomyrmex exsanguis Forel

(Fig. 35)

Iridomyrmex exsanguis Forel, 1907a: 296.

Types. Syntypes from Denham, Western Australia (MHNG, 1 queen, examined; worker(s), not located during this study).

Worker Description. ***Head.*** Posterior margin of head planar to weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex. Ocelli absent; in full-face view, eyes set above midpoint of head capsule; in profile, eye set anteriad of head capsule; eye asymmetrical, curvature of inner eye margin more pronounced than its outer margin and anterior sector of eye distinctly broader than its posterior sector. Frontal carinae concave, or straight; antennal scape surpassing posterior margin of head by 0.2–0.5 x its length. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin present as an indistinct swelling or undulation; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule present in some workers. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae moderate in number (6–12), short and bristly. Mesonotum evenly curved. Erect mesonotal setae sparse to absent. Mesothoracic spiracles always inconspicuous; propodeal dorsum straight and short (equal in length to propodeal declivity); placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle present as a bluntly defined right angle, the dorsal and declivitous propodeal faces never separated by a carina. Erect propodeal setae moderate in number (6–12), short and bristly. ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour pale, depigmented yellow, more rarely, brownish-yellow. Colour of erect setae pale yellow.

Measurements. *Worker* (n = 5)—CI 84–93; EI 36–39; EL 0.23–0.35; EW 0.16–0.24; HFL 0.95–1.48; HL 0.71–1.04; HW 0.60–0.97; ML 0.94–1.41; MTL 0.65–1.02; PpH 0.12–0.21; PpL 0.37–0.57; SI 110–125; SL 0.75–1.07.

Comments. Worker specimens of *I. exsanguis* can be hard to distinguish from those of *I. dromus*; the primary, and often the only distinguishing feature being the more truncate appearance of the propodeum in *I. exsanguis*. Lack of erect hind tibial setae distinguish it from *I. cupreus* and *I. macrops*, and the moderately abundant to abundant short, bristly, erect setae on the mesosomal dorsum easily separate it from *I. hartmeyeri*. Most workers are a depigmented yellow and of small-medium size, but workers taken in the far Kimberley are larger and darker coloured. In places like Carnarvon, Western Australia, nests of *I. exsanguis* and *I. dromus* can occur adjacent to one another. However, *I. exsanguis* has a slightly more restricted distribution than its sister taxon *I. dromus*, and has rarely been collected south of latitude 30°S in Western Australia (although it has been collected as far south as 32 km N of Renmark, South Australia). In the field, *I. exsanguis* appears to have a similar behaviour to *I. dromus*. Both ants are timid, and may block up their nests during the day. A small pile of spoil gives away the nest position. In Western Australia, the first author has found both species in sandy soil, particularly on dunes. Despite its generally nocturnal disposition, this species can be diurnally active in suitable conditions: at Hillston, New South Wales, Rev. Bede Lowery was able to attract the species to honey baits on mallee stems at 8 am in the morning.

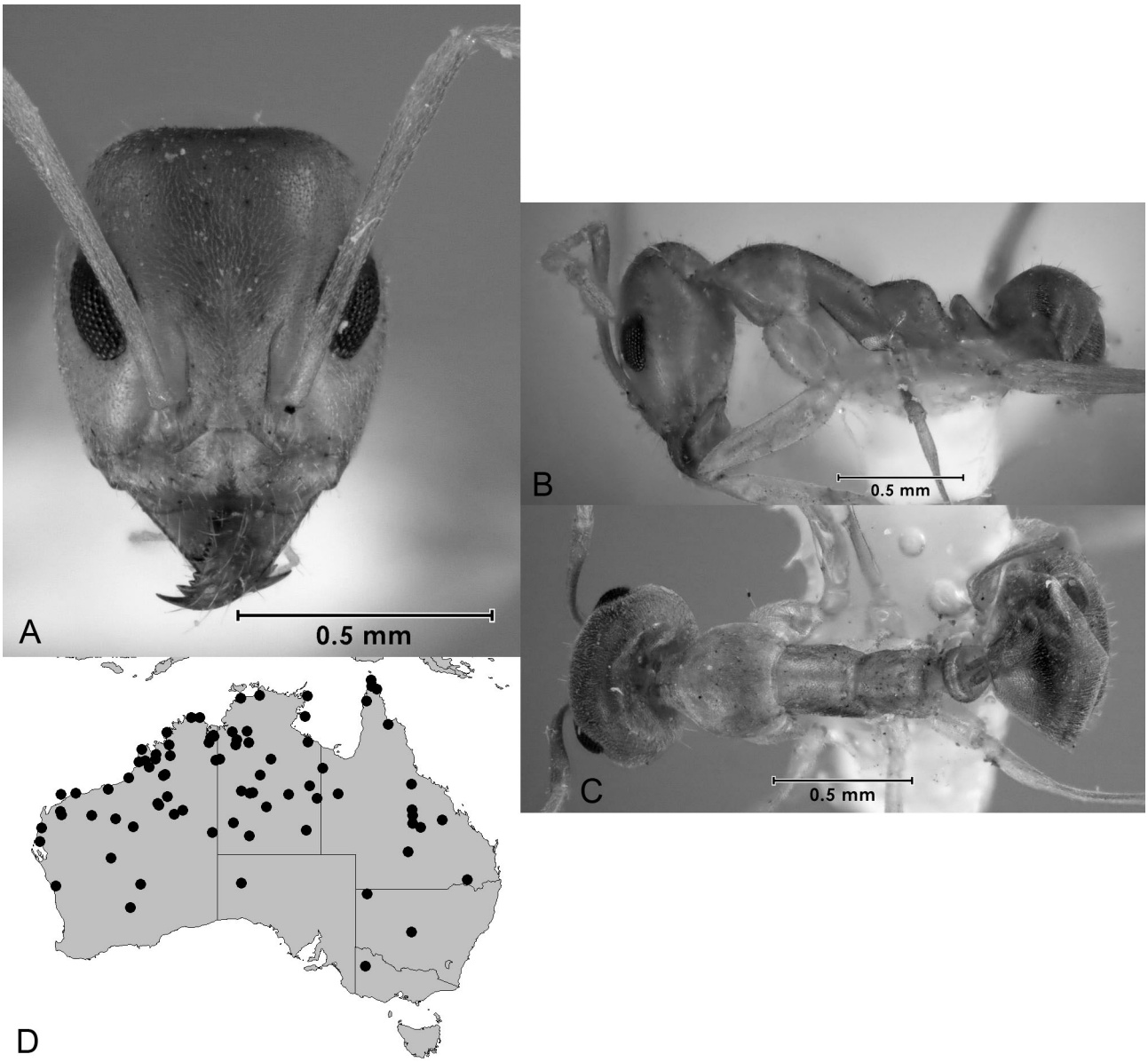


FIGURE 35. *Iridomyrmex exsanguis* (Round Hill Reserve, 40km NW Ebalong, NSW, ANIC32-038611): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

***Iridomyrmex fulgens* sp. n.**
(Fig. 36)

Types. Holotype worker from 1km E Curdimurka, 29°29'S 137°06'E, South Australia, 22 September 1972, J. E. Feehan, ANIC Ants Vial 16.69 (ANIC, ANIC32-059632). Paratypes: 2 workers, same data as holotype (ANIC, ANIC32-040922); 3 workers from c. 36km ESE Curdimurka, 29°36'S 137°26'E, South Australia, 21 September 1972, J. E. Feehan, ANIC Ants Vial 17.70 (ANIC, ANIC32-040930); 3 workers from c. 28km S Parachilna, 31°23'S 138°25'E, South Australia, 14 September 1972, J. E. Feehan, ANIC Ants Vial 16.58 (ANIC, ANIC32-040929); 3 workers (one with gaster detached and glued to point) from Curdimurka, South Australia, 2 October 1978, P. J. M. Greenslade (MCZC, ANIC32-039369); 2 workers from 50km NE Clifton Hills, South Australia, August 1975, Forrest (BMNH, ANIC32-039367).

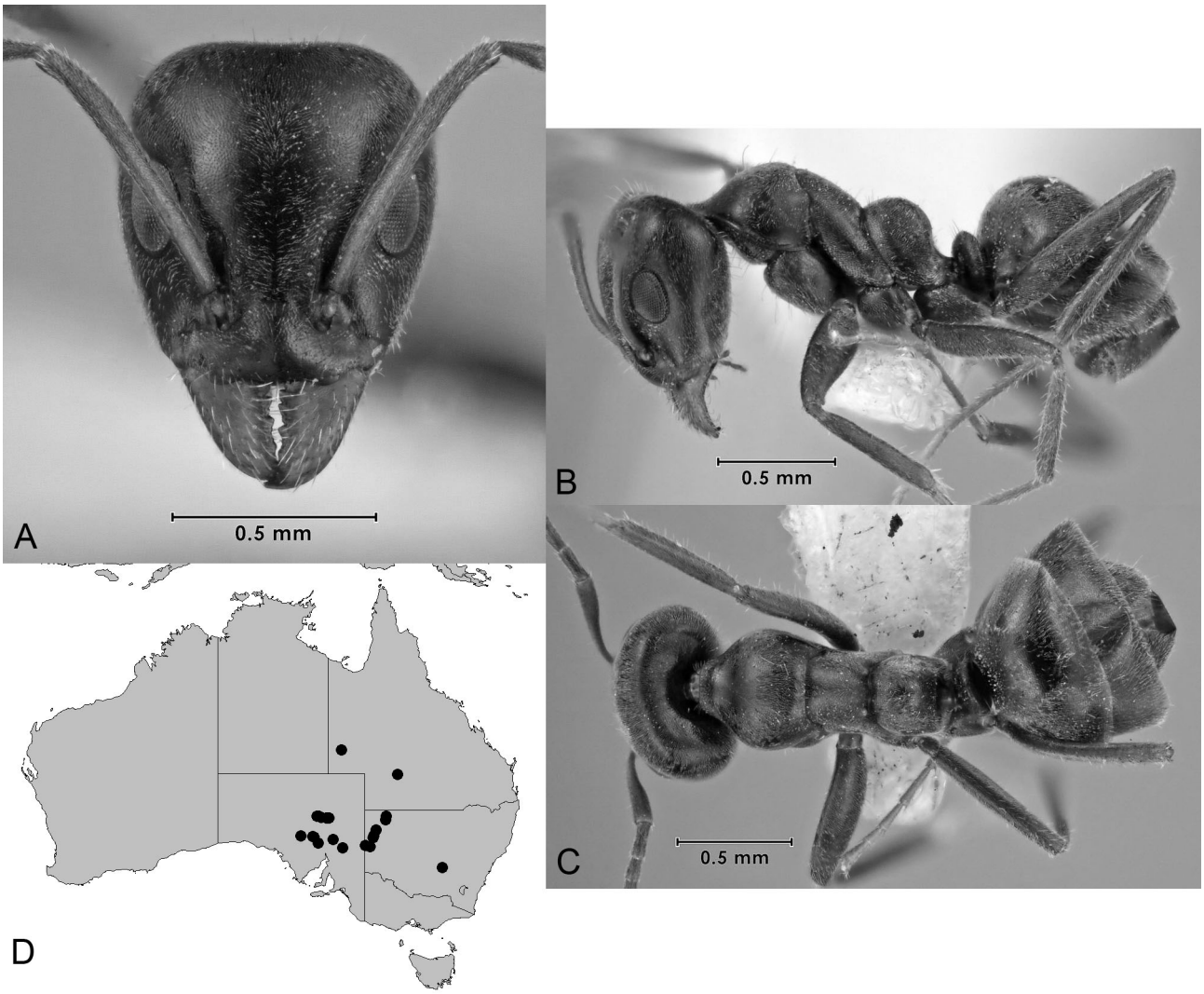


FIGURE 36. *Iridomyrmex fulgens* (Sandringham, Qld, ANIC32-037648): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Worker Description. ***Head.*** Posterior margin of head weakly concave, or strongly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae present on sides of head in full-face view, or absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae convex; antennal scape barely attaining posterior margin of head, or surpassing it by

less than 1 x its diameter. Erect setae on scape present and abundant, or present and sparse; prominence on anteromedial clypeal margin present as an indistinct swelling or undulation; mandible triangular with distinct angle between masticatory and basal margins; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum strongly inclined anteriorly, or moderately and evenly curved over its length. Erect pronotal setae numerous (12 or more) and longest setae elongate, flexuous and/or curved. Mesonotum straight, or evenly curved. Erect mesonotal setae moderate in number (6-12), short and bristly. Mesothoracic spiracles always inconspicuous; propodeal dorsum smoothly and evenly convex; placement of propodeal spiracle posteriad and near propodeal declivity, or mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae numerous (12 or more), short and bristly. ***Petiole.*** Dorsum of node convex, or planar; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour medium brown to dark chocolate, gaster with greenish-yellow to bluish iridescence. Colour of erect setae whitish-yellow.

Measurements. *Worker* (n = 4)—CI 91–94; EI 26–27; EL 0.18–0.22; EW 0.14–0.17; HFL 0.76–0.94; HL 0.75–0.85; HW 0.68–0.79; ML 0.91–1.06; MTL 0.57–0.67; PpH 0.14–0.17; PpL 0.40–0.44; SI 91–93; SL 0.64–0.73.

Comments. *Iridomyrmex fulgens* is a brown-to-dark-brown, shiny ant with a uniform morphology throughout its range. The combination of erect setae on antennal scape and hind leg and the mostly smooth sides of the head capsule, when the worker is in full-face view, is unique, and identifies this taxon. This is yet another species closely related to *I. rufoniger* that has a distribution mainly in drier inland areas, and records come from Queensland, New South Wales and South Australia (the state in which most specimens have been collected). Workers have been taken in pitfall traps, and one specimen from Marree, South Australia, was collected from under emu dung, but apart from this there are no ecological data for the species.

Etymology. Latin: 'brilliant' or 'splendid', as a reference to the shining brown foreparts and iridescent gaster in this species.

Iridomyrmex galbanus Shattuck

(Fig. 37)

Iridomyrmex galbanus Shattuck, 1993a: 121, fig. 10.

Types. Holotype worker from Minnipa, South Australia (ANIC, ANIC32-007353, examined). Paratypes: same data as holotype (ANIC, ANIC32-007354, 5 workers, examined; BMNH, 2 workers; MCZC, 2 workers).

Worker Description. ***Head.*** Posterior margin of head weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae present on sides of head in full-face view, or absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular. Frontal carinae convex; antennal scape surpassing posterior margin of head by approximately 3 x its diameter. Erect setae on scape present and abundant; prominence on anteromedial clypeal margin projecting as triangular spur; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule present in some workers. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae numerous (12 or more), short and bristly. Mesonotum sinuous. Erect mesonotal setae numerous (12 or more), short and bristly. Mesothoracic spiracles always prominent as small, vertical protuberances; propodeal dorsum smoothly and evenly convex; placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae numerous (12 or more), short and bristly. ***Petiole.*** Petiole dorsum of node acuminate; node thick, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour head orange, mesosoma brownish-orange, head and mesosoma with pink, green and yellow-green iridescence, gaster black with bright bluish-green and purple iridescence, legs brown. Colour of erect setae dark brown.

Measurements. *Worker* (n = 23)—CI 90–99; EI 17–21; EL 0.33–0.40; EW 0.21–0.26; HL 1.84–2.37; HW 1.68–2.31; ML 0.90–1.23; PpH 0.27–0.37; PpL 0.99–1.30; SI 87–103; SL 1.67–2.06.

Comments. *Iridomyrmex galbanus* shares with *I. viridiaeneus* greenish iridescence on the head capsule, but in the case of *I. galbanus* the head capsule is distinctly lighter in colour than the mesosoma (versus the same colour or only slightly lighter in *I. viridiaeneus*). *Iridomyrmex galbanus* is mainly confined to the Eyre Peninsula of South Australia, but scattered populations also occur in south-eastern South Australia and western Victoria. This species appears to favour certain soil types (Shattuck, 1993a).

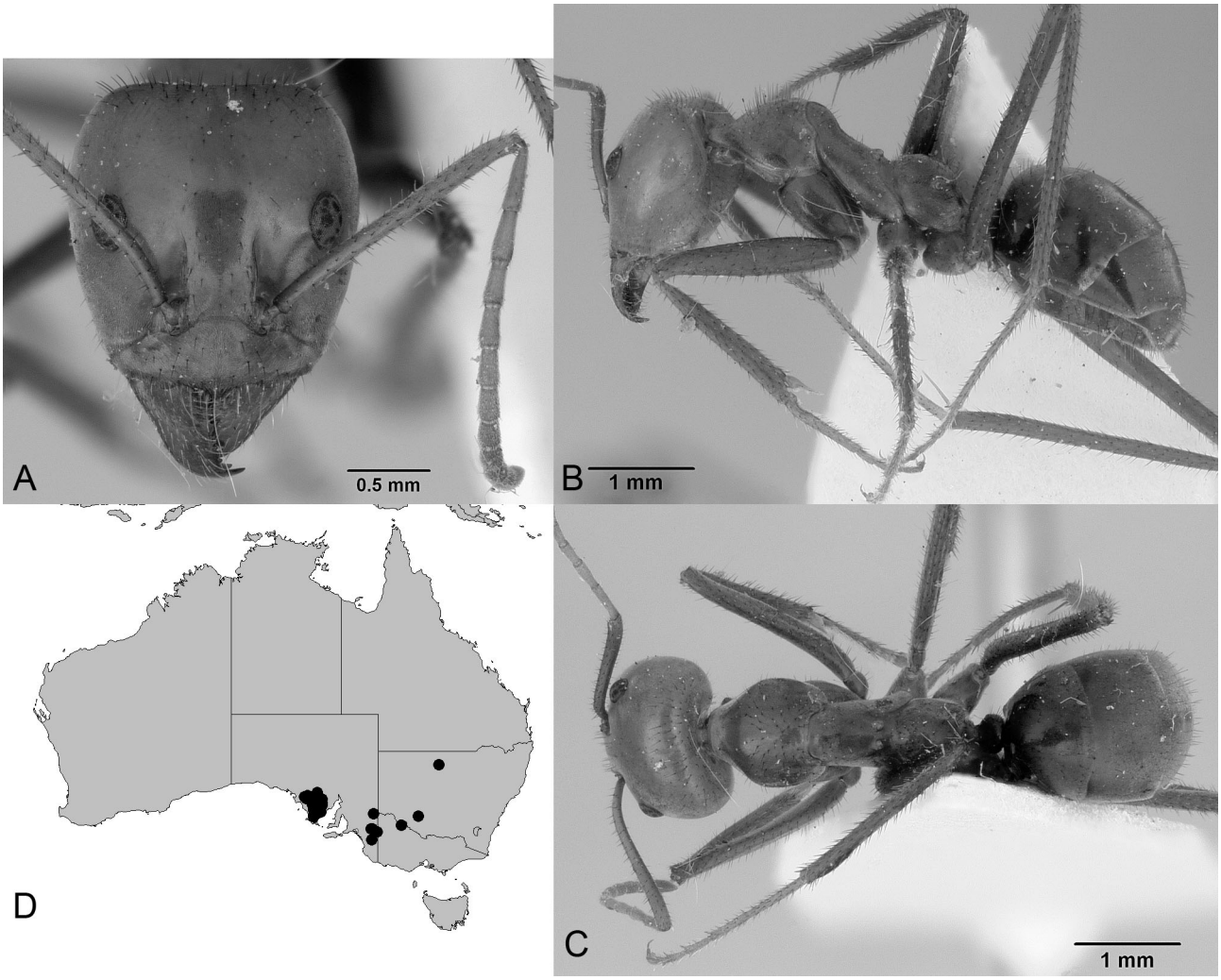


FIGURE 37. *Iridomyrmex galbanus* (holotype, Minnipa, SA, ANIC32-007353): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined (A. Noble, www.antweb.org).

Iridomyrmex gibbus sp. n.

(Fig. 38)

Types. Holotype worker from Tanami Desert, Northern Territory, 18 May 1986, P. J. M. Greenslade (ANIC, ANIC32-040524). Paratypes: 3 workers from Barrow Island, 20°43’29”S 115°28’19”E, Western Australia, 6 May 2006, S. Callan & R. Graham (ANIC, ANIC32-051681); 3 workers from 5km SE Anthony’s Lagoon, 18°00’S 135°34’E, Northern Territory, 14 October 1981, D. Davidson & S. Morton (MCZC, ANIC32-038711); 1 worker from Tanami Desert, Northern Territory, 20 May 1986, P. J. M. Greenslade (BMNH, ANIC32-040526).

Worker Description. ***Head.*** Posterior margin of head weakly concave; erect setae on posterior margin in full-face view, present in small aggregations on one or both sides of posterior margin of head; sides of head noticeably convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near

mandibular insertion). Ocelli absent; in full-face view, eyes set above midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular, or asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae convex; antennal scape surpassing posterior margin of head by 1-2 x its diameter. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin projecting as blunt but distinct protuberance; mandible regularly triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** pronotum strongly inclined anteriorly, or moderately and evenly curved over its length. Erect pronotal setae moderate in number (6-12), longest setae elongate, flexuous and/or curved. Mesonotum evenly curved. Erect mesonotal setae sparse (6 or fewer) and bristly. Mesothoracic spiracles always inconspicuous; propodeal dorsum protuberant; placement of propodeal spiracle posteriad and near propodeal declivity; propodeal angle present as a bluntly defined right angle, the dorsal and declivitous propodeal faces never separated by a carina. Erect propodeal setae sparse (6 or fewer) and bristly. ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour uniformly brown. Colour of erect setae yellowish-brown.

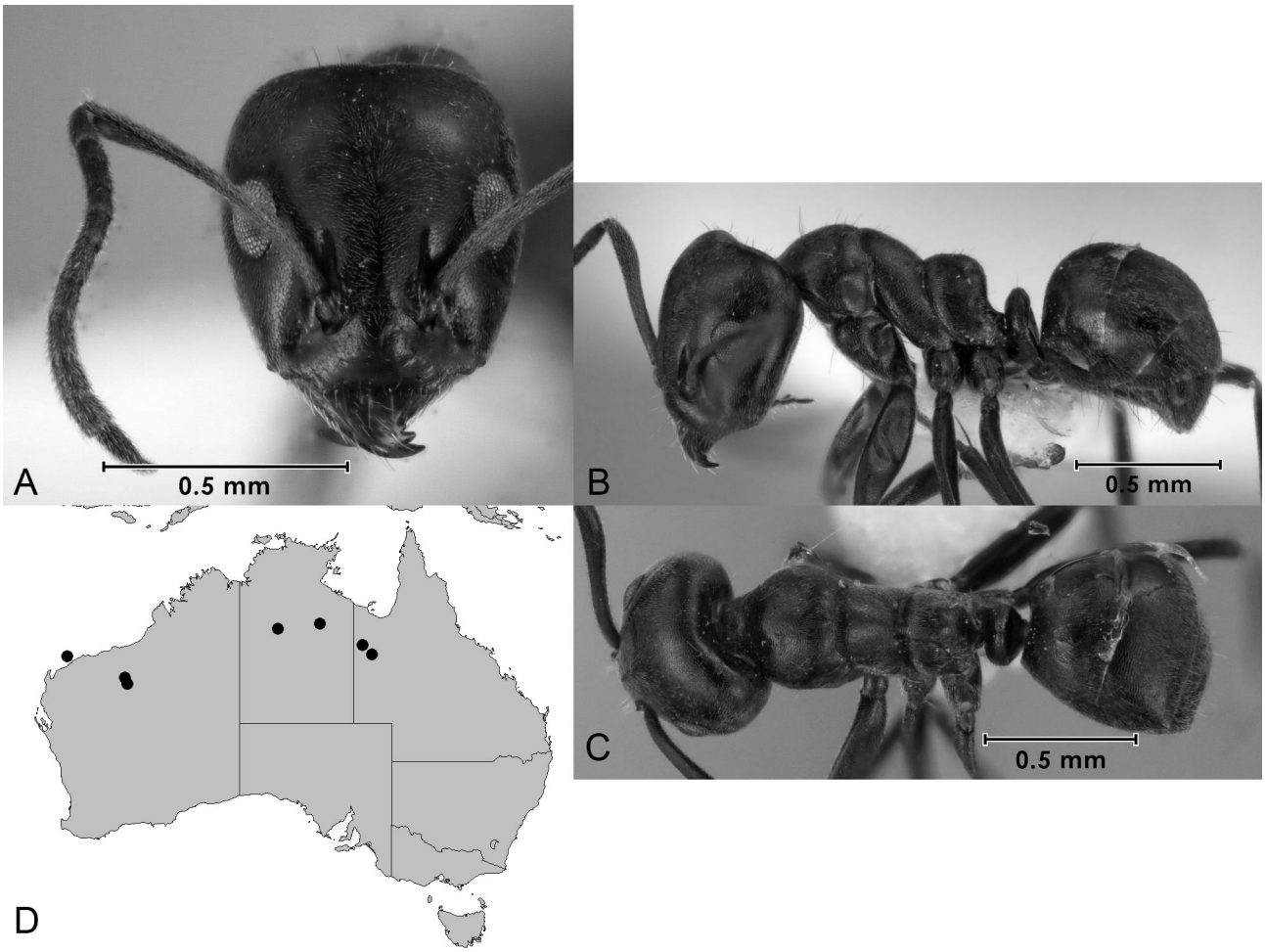


FIGURE 38. *Iridomyrmex gibbus* (paratype, Barrow Island, WA, ANIC32-051681): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Measurements. *Worker* (n = 6)—CI 90–92; EI 25–27; EL 0.16–0.17; EW 0.13–0.14; HFL 0.72–0.79; HL 0.67–0.72; HW 0.60–0.66; ML 0.75–0.85; MTL 0.54–0.58; PpH 0.13–0.15; PpL 0.36–0.39; SI 97–102; SL 0.61–0.65.

Comments. *Iridomyrmex gibbus* is morphologically close to the '*concolor'* morph of *I. chasei*, and very easily confused with *I. chasei* as a consequence. The distinguishing features are subtle, but in the Pilbara region of Western Australia, where the two species are sympatric, both are able to be recognised among pitfall-trapped material

by parataxonomists. These distinguishing features include the anterior pronotal angle (60° ≥ in *I. chasei*, versus 60° < in *I. gibbus*, whose mesosoma has a symmetrical appearance in profile); a more obviously concave posterior margin of the head when seen in full-face view in *I. chasei* (most workers) compared to *I. gibbus*, and, often, more erect pronotal setae (usually 10 ≥ in non-abraded specimens) in *I. chasei* than in *I. gibbus* (commonly 6 £). As with *I. chasei*, the propodeum is truncate. Finally, *I. gibbus* is always uniformly dull brown in colour, whereas *I. chasei* populations of all phenotypes often include lighter coloured morphs. Because of the ease with which *I. chasei* and *I. gibbus* can be confused, the distribution of the latter is uncertain. Most records have come from northern Western Australia, including Barrow Island, and there are two records from the Northern Territory and one from Queensland. Nothing is known of the biology of this species apart from the fact that it is a ground forager, but its colonies do not seem to be as populous as those of *I. chasei*, judging from the relative proportions of workers of both species occurring in pitfall traps.

Etymology. Latin: 'humpbacked'.

***Iridomyrmex gumnos* sp. n.**
(Fig. 39)

Types. Holotype worker from 50km S Olary, South Australia, 1977, Forrest (ANIC, ANIC32-040581). Paratypes: 1 worker, same data as holotype (ANIC); 3 workers from Nymagee, New South Wales, 3 November 1964 (ANIC, ANIC32-0040705).

Worker Description. ***Head.*** Posterior margin of head weakly concave, or strongly concave; erect setae on posterior margin in full-face view, present singly or as a couple of setae on either side of posterior margin of head, or absent; sides of head noticeably convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). In full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular, or asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae straight; antennal scape surpassing posterior margin of head by approximately 2 x its diameter. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin always completely absent; mandible regularly triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum strongly inclined anteriorly. Erect pronotal setae lacking or very minute (one or two tiny setae may be present). Mesonotum evenly curved. Erect mesonotal setae sparse to absent. Mesothoracic spiracles always inconspicuous; propodeal dorsum straight and short (equal in length to propodeal declivity); placement of propodeal spiracle posteriad and near propodeal declivity; propodeal angle present as a bluntly defined right angle, the dorsal and declivitous propodeal faces never separated by a carina. Erect propodeal setae lacking or very minute (one or two tiny setae present). ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster absent on first gastral tergite; marginal erect setae of gaster absent on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour Light brown. Colour of erect setae pale, yellowish.

Measurements. *Worker* (n = 3)—CI 93–94; EI 26–27; EL 0.18–0.18; EW 0.14–0.15; HFL 0.78–0.80; HL 0.73–0.76; HW 0.68–0.70; ML 0.88–0.89; MTL 0.55–0.58; PpH 0.15–0.16; PpL 0.40–0.41; SI 95–99; SL 0.64–0.69.

Comments. As with several other *Iridomyrmex* known only from one or two series, this taxon requires more material for a solid confirmation of its status as a *bona fide* species. The only known material is a single pin of two workers from 50 km S of Olary, South Australia, and one of three workers collected at Nymagee, New South Wales, 45 years ago. Apart from the characters used for a diagnosis—the absence of erect setae on the pronotum, the concave posterior margin of the head, the lack of iridescence on the gaster, and the antennal scape, which extends 2 × its diameter beyond the posterior margin of the head—the ant is unremarkable. In appearance, leaving aside the glabrous pronotum, the workers look pretty much like many workers of *I. chasei* or *I. victorianus*. Nothing is known about the ecology of the ant. The South Australian material was collected by PJM Greenslade in 1977. Nothing is known about how the three New South Wales workers were collected. Even the collector's name is lacking.

Etymology. Latin: 'nude'.

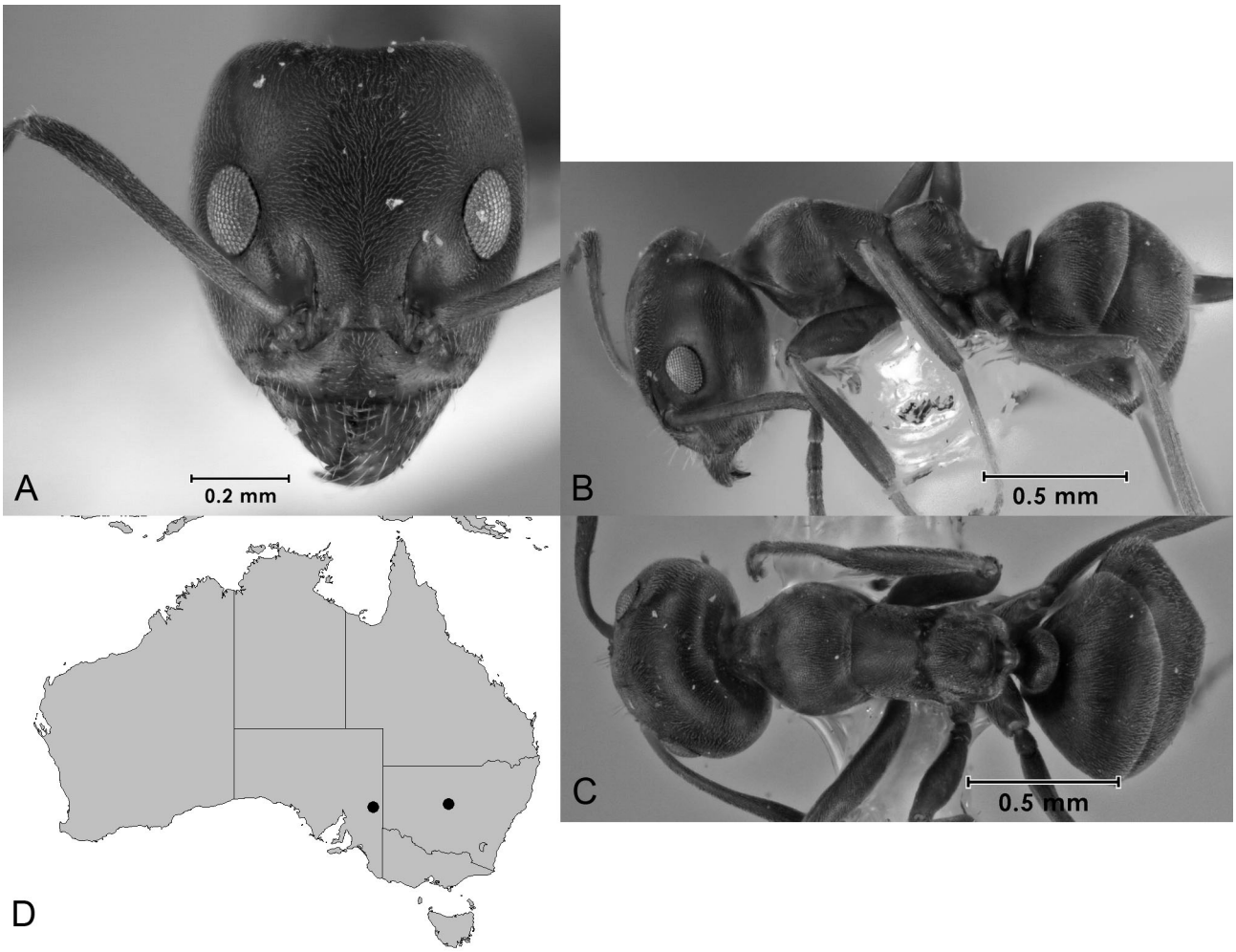


FIGURE 39. *Iridomyrmex gumnos* (paratype, Nymagee, NSW, ANIC32-040705): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Iridomyrmex hartmeyeri Forel

(Fig. 40)

Iridomyrmex hartmeyeri Forel, 1907a: 296.

Types. Syntypes from Day Dawn, Western Australia (ANIC, 1 worker, examined; MCZC, 1 worker, examined; MHNG, 2 workers; WAMP, 1 worker).

Worker Description. ***Head.*** Posterior margin of head weakly concave, or strongly concave; erect setae on posterior margin absent; sides of head noticeably convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set above midpoint of head capsule; in profile, eye set anteriad of head capsule; eye asymmetrical, curvature of inner eye margin more pronounced than its outer margin and anterior sector of eye distinctly broader than its posterior sector. Frontal carinae straight; antennal scape surpassing posterior margin of head by approximately 3 x its diameter. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin projecting as blunt but distinct protuberance; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum strongly inclined anteriorly. Erect pronotal setae lacking or very minute (one or two tiny setae may be present). Mesonotum sinuous, or straight. Erect mesonotal setae lacking or very minute (one or two tiny setae present). Mesothoracic spiracles always inconspicuous; propodeal dorsum protuberant, or smoothly and evenly convex; placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces

indicated, if at all, by an undulation. Erect propodeal setae lacking or very minute (one or two tiny setae present). ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present or absent on first gastral tergite; marginal erect setae of gaster present on first tergite, or absent on first tergite. ***General characters.*** Allometric differences between workers of same nest present. Colour of foreparts uniformly pale yellow to medium ochre, gaster brown in darker specimens. Colour of erect setae where present, pale yellowish.

Measurements. *Worker* (n = 10)—CI 88–93; EI 32–38; EL 0.28–0.40; EW 0.21–0.29; HFL 1.07–2.00; HL 0.88–1.33; HW 0.78–1.20; ML 1.15–2.00; MTL 0.77–1.44; PpH 0.17–0.30; PpL 0.44–0.75; SI 106–126; SL 0.86–1.43.

Comments. *Iridomyrmex hartmeyeri* is a pale yellowish to dull orange ant, with large, asymmetrical compound eyes. The workers can be of a reasonable size, their proportions approaching those of a small meat ant in some populations. The large size, indented posterior margin of the head, glabrous hind tibia and glabrous or near glabrous mesosomal dorsum set this species aside from similar ants. Like close relatives, this ant is largely nocturnal. It has a generally very broad distribution over much of the Australian continent, but avoids the wetter south-west and south-east corners.

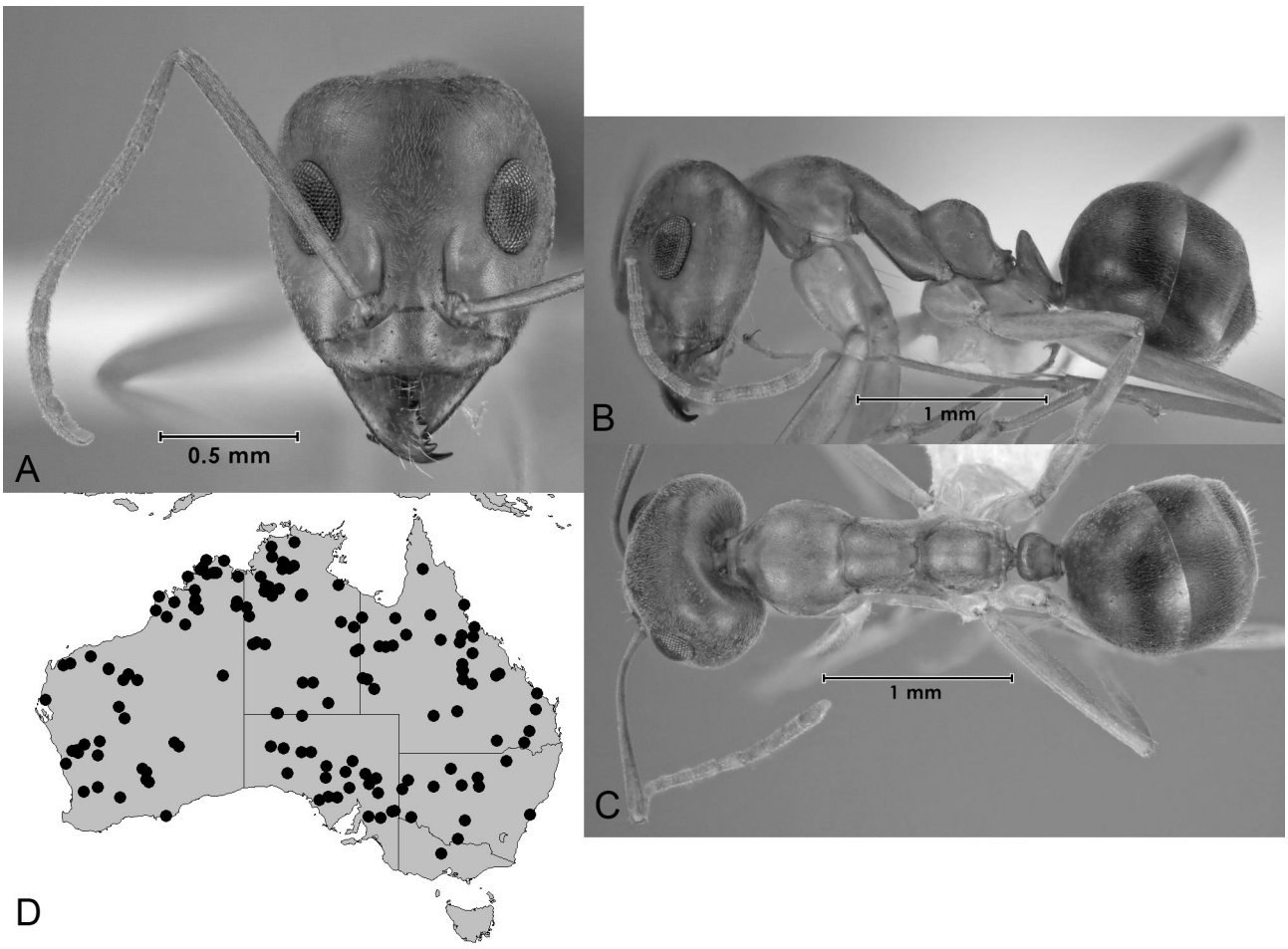


FIGURE 40. *Iridomyrmex hartmeyeri* (Cravens Peak Station, Qld, ANIC32-036832): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Iridomyrmex hertogi **sp. n.**

(Figs 41, 94)

Types. Holotype worker from Kakadu National Park, Arnhem escarpment near Round Jungle, Northern Territory, July 1993, H. Reichel (ANIC, ANIC32-047828). Paratypes: 1 worker, same data as holotype (ANIC).

Worker Description. ***Head.*** Posterior margin of head planar to weakly concave; erect setae on posterior margin absent; sides of head noticeably convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae straight; antennal scape barely attaining posterior margin of head, or surpassing it by less than 1 x its diameter. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin present as an indistinct swelling or undulation; mandible regularly triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae lacking or very minute (one or two tiny setae may be present). Mesonotum evenly curved. Erect mesonotal setae lacking or very minute (one or two tiny setae present). Mesothoracic spiracles always inconspicuous; propodeal dorsum straight and short (equal in length to propodeal declivity); placement of propodeal spiracle posteriad and near propodeal declivity, or mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae lacking or very minute (one or two tiny setae present). ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster absent on first gastral tergite; marginal erect setae of gaster present on first tergite, or absent on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour dark grey-brown. Colour of erect setae whitish (clypeus and coxae).

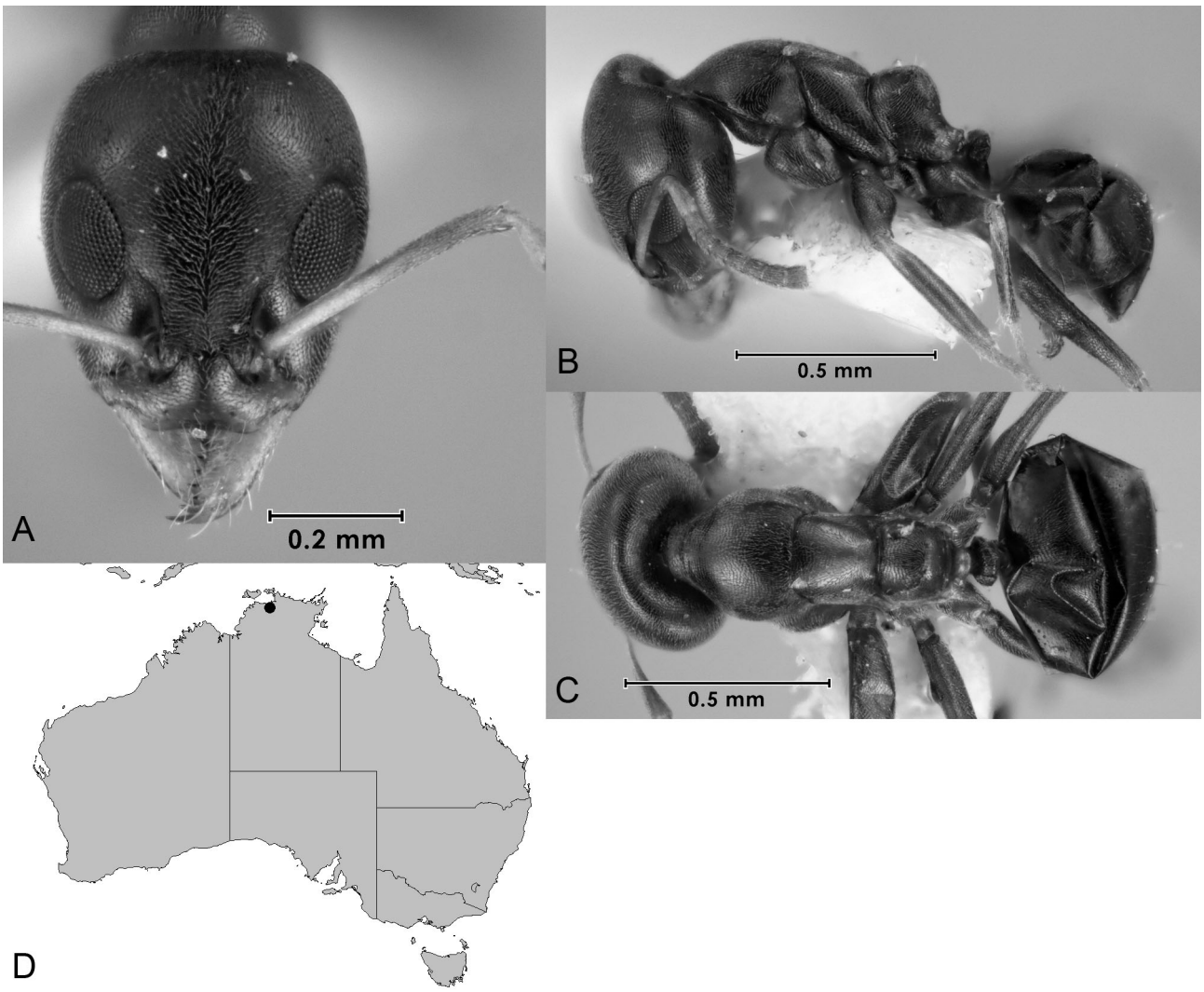


FIGURE 41. *Iridomyrmex hertogi* (holotype, Kakadu National Park, NT, ANIC32-047828): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Measurements. *Worker* (n = 2)—CI 85–86; EI 36–37; EL 0.18–0.19; EW 0.14–0.15; HFL 0.53–0.55; HL 0.59–0.60; HW 0.51–0.51; ML 0.71–0.72; MTL 0.40–0.40; PpH 0.11–0.11; PpL 0.29–0.29; SI 87–90; SL 0.44–0.46.

Comments. *Iridomyrmex hertogi* appears to be confined to the Northern Territory, and is only known from one collection. This very small species can be confused with two other sympatric *Iridomyrmex*, most notably, the small northern workers of *I. mjobergi*. However, the antennal scape is very short in *I. hertogi*, barely attaining the posterior margin of the head, or falling short of it (SI ≤ 90) (exceeding the posterior margin of head by at least its width in *I. mjobergi* (SI ≥ 90)), and the antennal scape is distinctly lighter in colour than the head capsule (approximately the same colour in *I. mjobergi*). The mesosoma is also glabrous (generally with a few to several erect setae in small, northern *I. mjobergi*). A second species, *I. difficilis*, is readily differentiated from *I. hertogi* by the latter's much larger eye (EI ≈ 0.30 versus EI < 0.30) and by the appearance of the antennal scape, which is noticeably lighter in colour than the head capsule in *I. hertogi* (approximately the same colour in *I. difficilis*). *Iridomyrmex hertogi* however, appears to have as its nearest relative another very small *Iridomyrmex*; *I. niger*, known only from much further south, is almost identical in morphology and can only be separated on the basis of its larger size and smaller eye (i.e., EI 31–33, compared with EI 36–37 in *I. hertogi*, and HL of 0.62–0.76mm and HW of 0.59–0.60mm compared with HL of 0.59–0.60mm and HW of 0.51mm in *I. hertogi*). Nothing is known about the habits or ecology of *I. hertogi*.

Etymology. Named in honour of Mr Tony Hertog (TERC) who first alerted our attention to this species.

Iridomyrmex hesperus Shattuck

(Figs 42, 86)

Iridomyrmex hesperus Shattuck, 1993b: 1316, figs 24, 25, 38.

Types. Holotype worker from Coalmine Beach, Walpole-Nornalup National. Park, 34°59'S 116°44'E, Western Australia (ANIC, ANIC32-000058, examined). Paratypes: 1 worker, same data as holotype (ANIC, ANIC32-000057, examined); 1 worker from Junana Rock, 9km NW Mt. Ragged, Western Australia (ANIC, ANIC32-000010, examined).

Worker Description. ***Head.*** Posterior margin of head planar to weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae present on sides of head in full-face view. Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular. Frontal carinae concave; antennal scape surpassing posterior margin of head by 1–2 x its diameter. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin present as an indistinct swelling or undulation; mandible regularly triangular with oblique basal margin; long, curved setae on venter of head capsule present. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae numerous (12 or more), short and bristly. Mesonotum straight. Erect mesonotal setae numerous (12 or more), short and bristly. Mesothoracic spiracles always prominent as small, vertical protuberances; propodeal dorsum protuberant; placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle present as a bluntly defined right angle, the dorsal and declivitous propodeal faces never separated by a carina. Erect propodeal setae numerous (12 or more), short and bristly. ***Petiole.*** Dorsum of node convex; node thick, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Colour anterior of head capsule and mesosoma pale orange with some brown infuscation, head, gaster and legs brown. Colour of erect setae yellowish brown.

Measurements. *Worker* (n = 3)—CI 91–92; EI 27–28; EL 0.30–0.31; EW 0.17–0.17; HL 1.18–1.23; HW 1.08–1.13; ML 0.53–0.58; PpH 0.20–0.23; PpL 0.69–0.74; SI 89–91; SL 0.98–1.03.

Comments. *Iridomyrmex hesperus* is an uncommon member of the *viridigaster* complex. The ant is confined to Western Australia and can be distinguished from other members of the complex by its lack of iridescence, its hairy mesosoma, the presence of erect setae on the hind tibiae and its relatively elongate antennal scape. For other details of its distribution and biology see Shattuck (1993b).

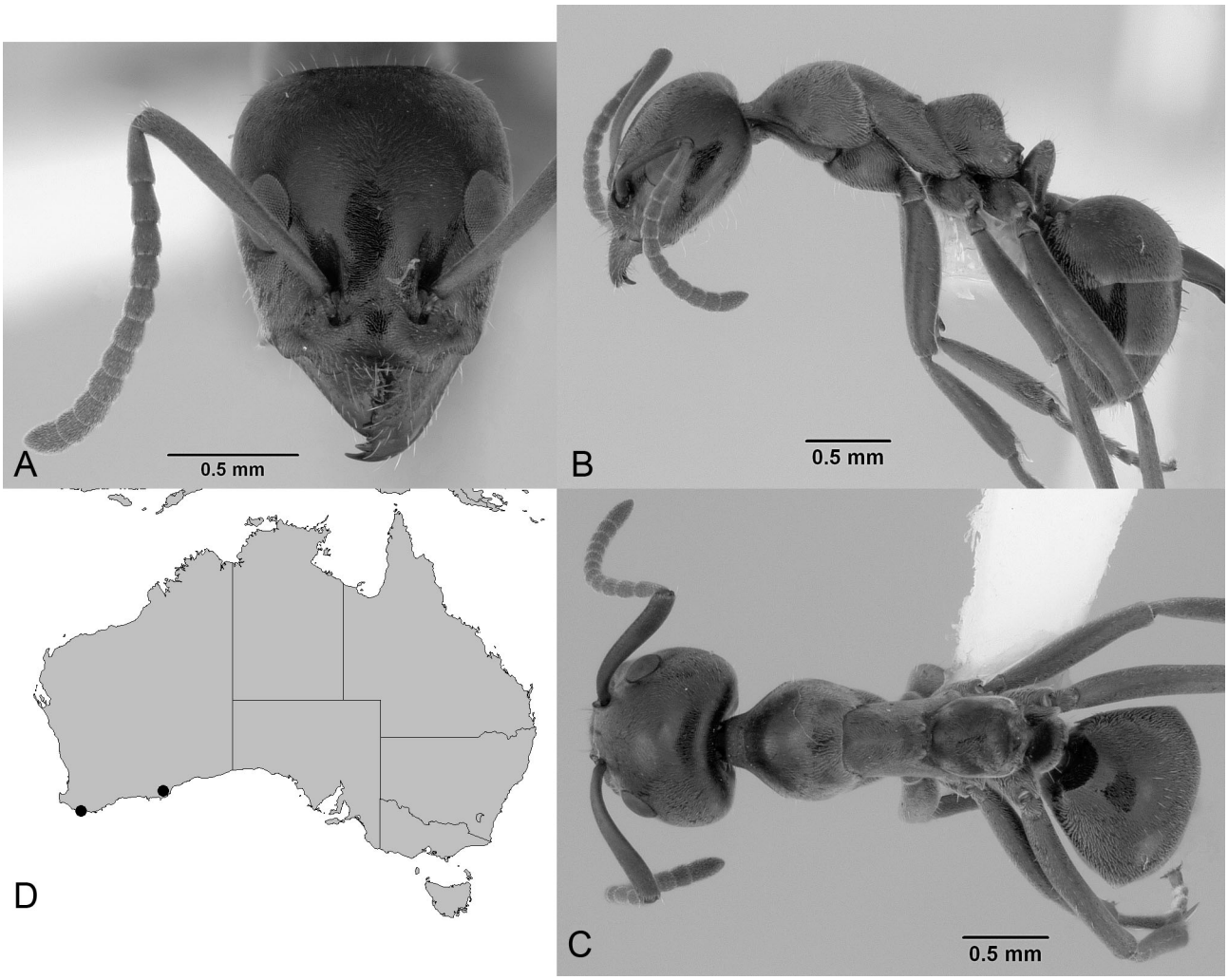


FIGURE 42. *Iridomyrmex hesperus* (holotype, Walpole-Nornalup National Park, WA, ANIC32-000058): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined (A. Noble, www.antweb.org).

Iridomyrmex infuscus sp. n.

(Fig. 43)

Types. Holotype worker from Black Mt., 35°16’59”S 149°05’12”E, Australian Capital Territory, 17–24 December 1996, N. J. Barnett, 575m (ANIC, ANIC32-029750).

Worker Description. ***Head.*** Posterior margin of head planar to weakly concave; erect setae on posterior margin absent; sides of head noticeably convex. Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye elongate. Frontal carinae straight; antennal scape barely attaining posterior margin of head, or surpassing it by less than 1 x its diameter. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin always completely absent; mandible regularly triangular with oblique basal margin; long, curved setae on venter of head capsule present. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae numerous (12 or more), short and bristly. Mesonotum straight. Erect mesonotal setae numerous (12 or more), short and bristly. Mesothoracic spiracles always prominent as small, vertical protuberances; propodeal dorsum protuberant; placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle present as a bluntly defined right angle, the dorsal and declivitous propodeal faces never separated by a carina. Erect propodeal setae numerous (12 or more), short and bristly. ***Petiole.*** Dorsum of node planar; node thin, scale-like, orientated anteriad. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour of most of head, mesonotum, propodeum,

node, gaster chocolate, lateral clypeus, lower genae and pronotum infuscated reddish-orange. Colour of erect setae whitish.

Measurements. *Worker* (n = 1)—CI 95; EI 25; EL 0.28; EW 0.22; HFL 1.19; HL 1.15; HW 1.10; ML 1.50; MTL 0.83; PpH 0.25; PpL 0.62; SI 81; SL 0.89.

Comments. Despite the fact that *I. infuscus* is known from the holotype only, it cannot be mistaken for any of its close relatives. The straight frontal carinae separate it from similar species that lack iridescence and have a hairy mesosoma and erect setae on the hind tibiae. It is known from the ACT only.

Etymology. Latin: '*infuscus*'—'dark brown' or 'blackish'.

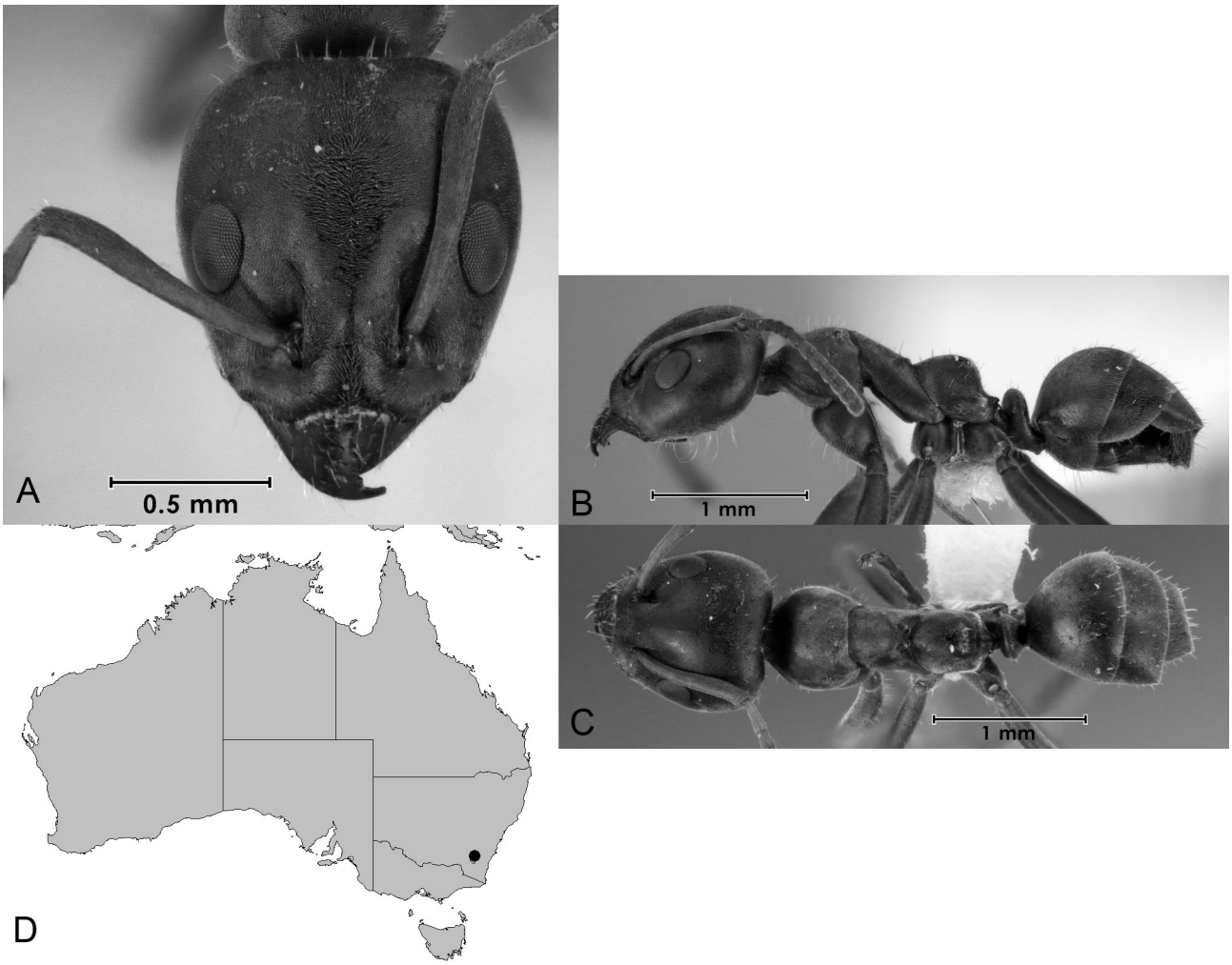


FIGURE 43. *Iridomyrmex infuscus* (holotype, Black Mountain, ACT, ANIC32-029750): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Iridomyrmex innocens Forel

(Fig. 44)

Iridomyrmex innocens Forel, 1907a: 292.
Iridomyrmex argutus Shattuck, 1993b: 1312, figs 8, 9, 36 (junior synonym of *innocens* by Heterick, 2009: 56).
Iridomyrmex occiduus Shattuck, 1993b: 1312, figs 8, 9, 36 (junior synonym of *innocens* by Heterick, 2009: 56).

Types. *Iridomyrmex innocens* Forel: Syntypes from Midland, Western Australia (not located during this study); Mount Helena (as Lion Mill), Western Australia (MHNG, 3 workers, 3 queens, 12 males, examined; WAMP, 1 worker (missing head), 1 queen, 1 male, examined); New South Wales (NHMB, 2 workers, 1 queen); Yalgoo, Western Australia (museum unknown, worker(s)); Yarloop, Western Australia (MHNG, 1 worker, examined).

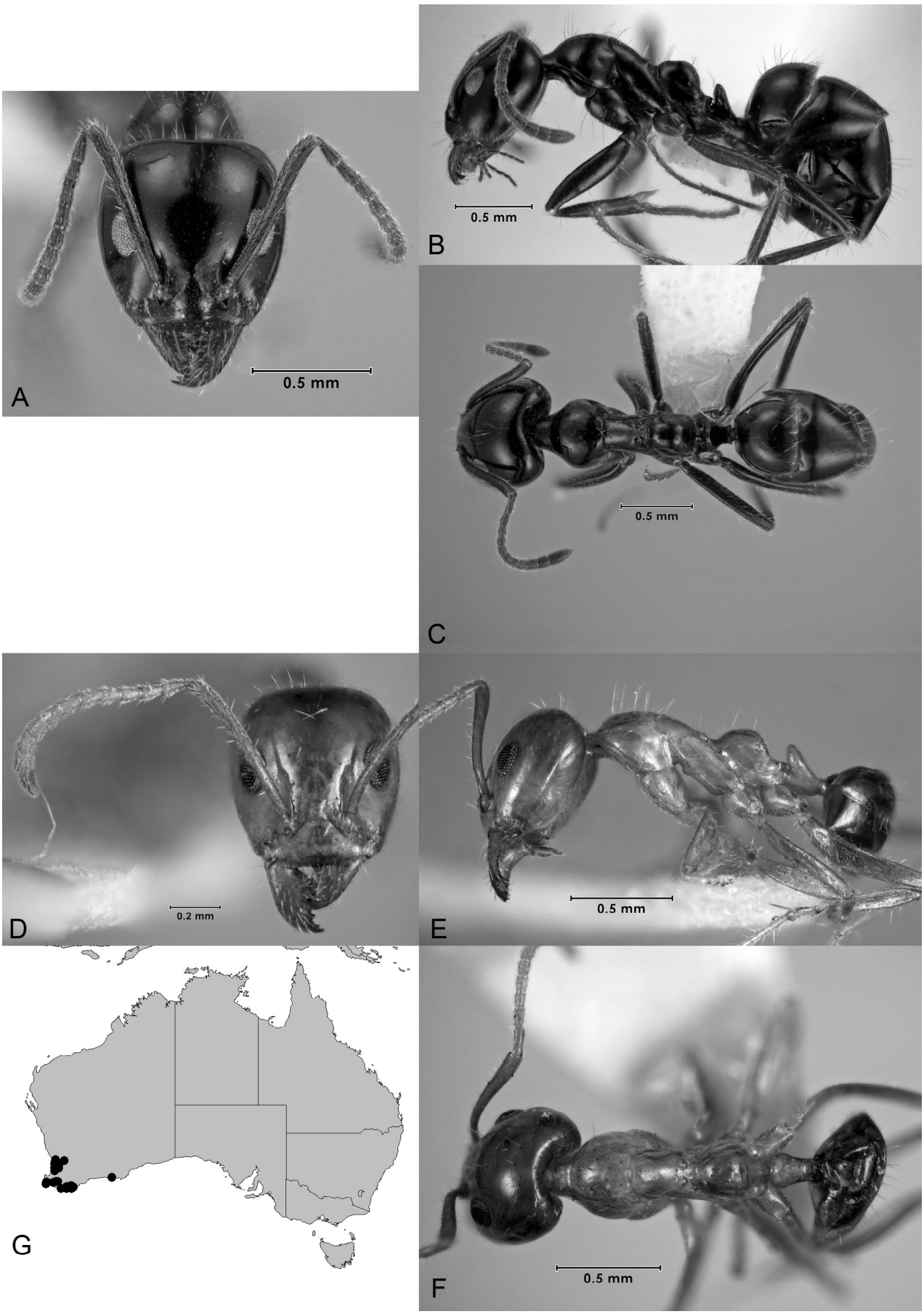


FIGURE 44. *Iridomyrmex innocens*, dark form (Mount Barker, WA, ANIC32-030662): A. Front of head; B. Side of body; C. Top of body. *Iridomyrmex innocens*, pale form (*argutus* holotype, Dwellingup, WA, ANIC32-000046): D. Front of head; E. Side of body; F. Top of body; G. Distribution of material examined.

Iridomyrmex argutus Shattuck: Holotype worker from Dwellingup, Western Australia (ANIC, ANIC32-000046, examined). Paratype, 1 worker, same data as holotype (ANIC, ANIC32-000047, examined). *Iridomyrmex occiduus* Shattuck: Holotype worker from Jarrahdale, Western Australia (ANIC, ANIC32-000094, examined). Paratypes: same data as holotype (ANIC, ANIC32-000035, 29 workers, 3 queens, 6 males, examined; ANIC, ANIC32-000033, 12 workers, 7 queens, 4 males, examined; BMNH, workers; MCZC, workers).

Worker Description. ***Head.*** Posterior margin of head planar to weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae present on sides of head in full-face view. Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular, or asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae concave; antennal scape surpassing posterior margin of head by 1–2 x its diameter. Erect setae on scape present and abundant; prominence on anteromedial clypeal margin always completely absent; mandible regularly triangular with oblique basal margin; long, curved setae on venter of head capsule present. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae moderate in number (6–12), longest setae elongate, flexuous and/or curved. Mesonotum straight. Erect mesonotal setae moderate in number (6–12), long, often curved. Mesothoracic spiracles prominent or inconspicuous; propodeal dorsum protuberant; placement of propodeal spiracle posteriad and near propodeal declivity; propodeal angle present as a bluntly defined right angle, the dorsal and declivitous propodeal faces never separated by a carina. Erect propodeal setae moderate in number (6–12), long, often curved. ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour shining yellowish-brown to brown, head and gaster may be darker than mesosoma. Colour of erect setae pale, whitish.

Measurements. *Worker* (n = 22)—CI 91–99; EI 23–28; EL 0.17–0.21; EW 0.10–0.17; HL 0.70–0.90; HW 0.64–0.89; ML 0.28–0.42; MTL 0.59–0.75; PpH 0.09–0.19; PpL 0.33–0.48; SI 86–99; SL 0.61–0.78.

Comments. *Iridomyrmex innocens* is a very shiny, usually black or dark brown species, although pale workers can occur (*I.* '*argutus*'). The combination of the shining cuticle with only superficial reticulation and many long, erect setae on the mesosoma is unique for this species within the *I. calvus* complex. Note that *I. argutus* and *I. occiduus*, discussed by Shattuck (1993b), have been synonymized under the name *I. innocens* in Heterick (2009). (In his 2009 monograph, Heterick pointed out that one of two workers of *I. argutus* with the same collection data as the type material, but not discussed by Shattuck (1993b), possesses setae on the venter of the head capsule, the main character used by the latter author to distinguish *I. occiduus* (setae present) from *I. argutus* (setae absent)). These workers are held in the Curtin Ant Collection (JDM Collection). In other workers nominally of *I. occiduus* the setae on the venter of the head capsule were found by Heterick to number between two and over a dozen. The remaining distinguishing character used by Shattuck, namely, the slightly darker head capsule found in *I. argutus* compared with uniform colouration of head and mesosoma in light-coloured specimens of *I. occiduus*, was considered by Heterick to be very subtle and difficult to sustain, given the small number of *I. argutus* workers discussed by Shattuck in his work (i.e., two workers). Heterick also examined a syntype queen of *I. innocens*, held at WAM, and found its non caste-specific features to be identical with those of *I. argutus* and *I. occiduus*. On these grounds the latter two species were synonymised by Heterick under *I. innocens*. This ant is confined to south-west Western Australia, but is reasonably common in higher rainfall areas of the Darling Ranges.

Iridomyrmex lividus Shattuck

(Fig. 45)

Iridomyrmex lividus Shattuck, 1993a: 125, fig. 12.

Types. Holotype worker from Cambrai, South Australia (ANIC, ANIC32-007720, examined). Paratypes: same data as holotype (ANIC, ANIC32-007719, 20 workers, examined; ANIC, ANIC32-015068, 24 workers, examined; ANIC, ANIC32-015072, 24 workers, examined; ANIC, ANIC32-014994, 27 workers, examined; BMNH, 11 workers; MCZC, 11 workers).

Worker Description. ***Head.*** Posterior margin of head planar to weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae absent from sides of head in

full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set above midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular. Frontal carinae convex; antennal scape surpassing posterior margin of head by approximately 2 x its diameter. Erect setae on scape present and abundant; prominence on anteromedial clypeal margin projecting as triangular spur; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule present. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae numerous (12 or more), short and bristly. Mesonotum sinuous. Erect mesonotal setae numerous (12 or more), short and bristly. Mesothoracic spiracles always prominent as small, vertical protuberances; propodeal dorsum protuberant; placement of propodeal spiracle posteriad and near propodeal declivity, or mesad, more than its diameter away from propodeal declivity; propodeal angle present as a bluntly defined right angle, the dorsal and declivitous propodeal faces never separated by a carina, or weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae numerous (12 or more), short and bristly. ***Petiole.*** Dorsum of node acuminate; node thick, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour head, appendages and mesosoma reddish-brown to blackish-brown with blue or purple iridescence, gaster chocolate to black with variable blue, greenish, pink or purple iridescence. Colour of erect setae brown.

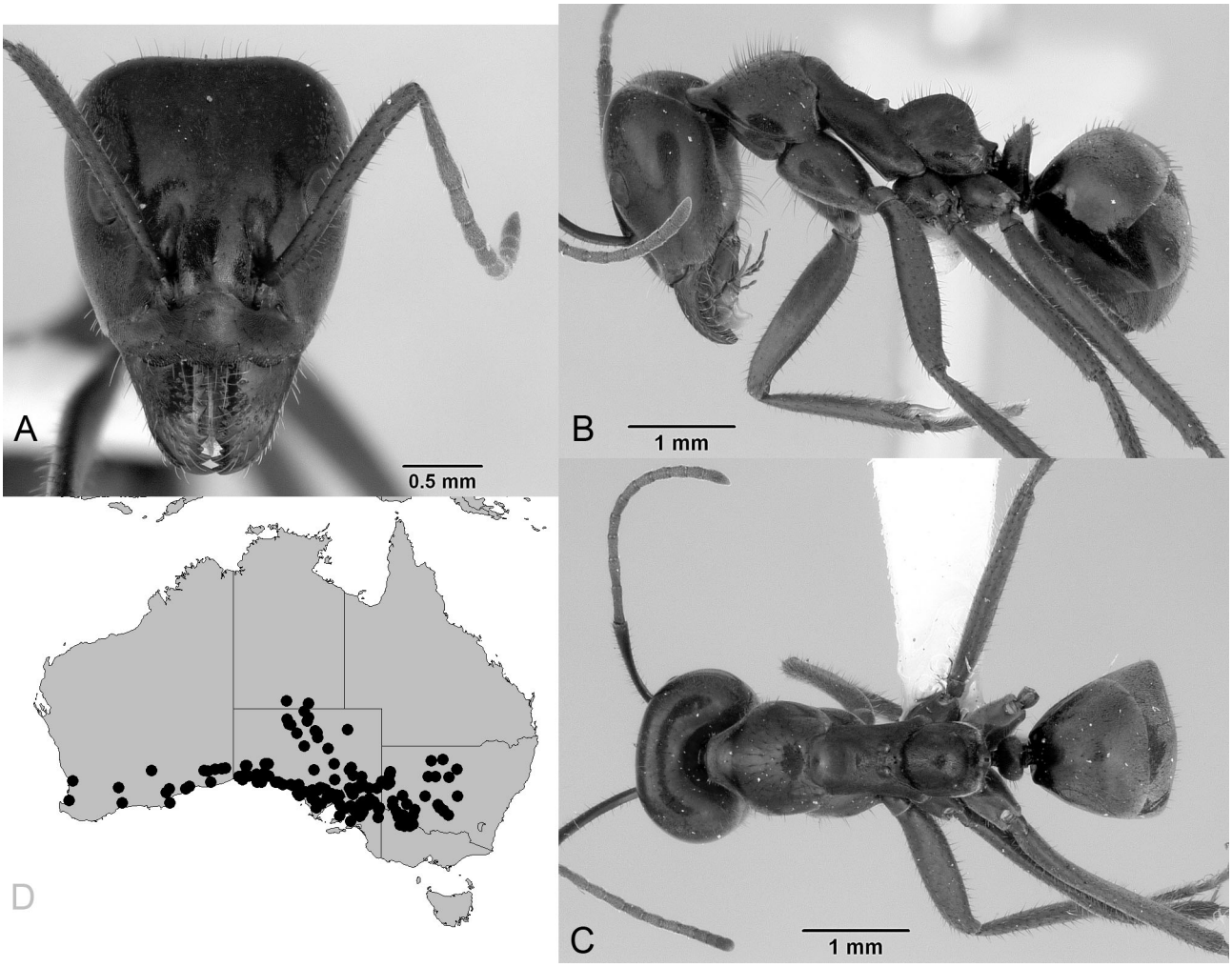


FIGURE 45. *Iridomyrmex lividus* (holotype, Cambrai, SA, ANIC32-007719): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined (A. Noble, www.antweb.org).

Measurements. *Worker* (n = 31)—CI 87–99; EI 17–22; EL 0.31–0.38; EW 0.19–0.23; HL 1.75–2.15; HW 1.58–2.12; ML 0.77–1.02; PpH 0.23–0.38; PpL 0.82–1.13; SI 85–101; SL 1.51–1.84.

Comments. The range of *I. lividus* overlaps with the closely related *I. purpureus*. In general, fresh worker material can be distinguished by its dark colour and strong blue iridescence. However, faded specimens can be quite difficult to separate from western samples of *I. purpureus*, in particular. The rather more angulate form of the propodeum in most *I. lividus* is a helpful character (this sclerite is more rounded in many *I. purpureus*), but must be used with caution as it is not universal. In the field, the small, single entrance hole to the *I. lividus* nest contrasts with the large mound made by its close relative. Biochemically, this ant shares the frequencies of several allozyme alleles with those of *I. purpureus* (Halliday, 1979, 1981) although there are differences in competitive abilities between the two species (Greenslade, 1987).

Iridomyrmex longisoma sp. n.

(Fig. 46)

Types. Holotype worker from Hope Valley, 31°12’30”S 115°47’30”E, Western Australia, 7 May 2006, B. E. Heterick, sclerophyll woodland on white sand (ANIC, ANIC32-053429). Paratypes: 2 workers, same data as holotype (ANIC); 3 workers from Lancelin, 3101’S 115°20’E, Western Australia,15 July 2000, M. Jacobs, heathland: white sand (ANIC, ANIC32-053430); 6 workers from Stirling Ranges, Gold Holes, Western Australia, c. 250m, 28 October 1969, R. W. Taylor (ANIC, 2 worker; BMNH, 2 workers; MCZC, 2 workers; ANIC32-041840).

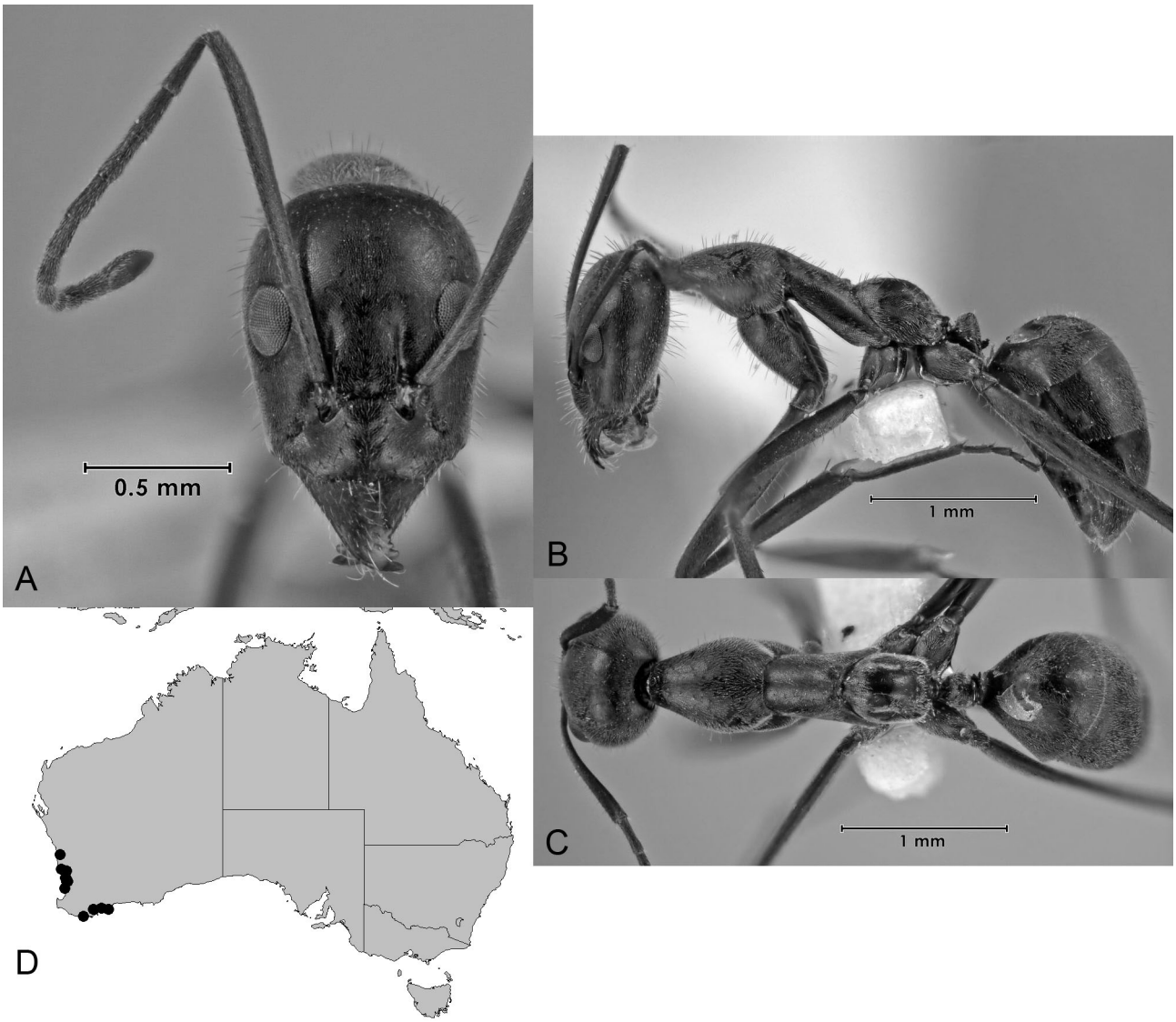


FIGURE 46. *Iridomyrmex longisoma* (paratype, Stirling Range, Gold Holes, WA, ANIC32-041840): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Worker Description. ***Head.*** Posterior margin of head strongly convex; erect setae on posterior margin in full-face view set in a row; sides of head straight or weakly convex; erect genal setae present on sides of head in full-face view. Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular. Frontal carinae convex; antennal scape surpassing posterior margin of head by at least 0.5 x its length. Erect setae on scape present and abundant, or present and sparse; prominence on anteromedial clypeal margin present as an indistinct swelling or undulation; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum weakly undulant or almost straight. Erect pronotal setae numerous (12 or more), short and bristly. Mesonotum sinuous, or straight. Erect mesonotal setae numerous (12 or more), short and bristly. Mesothoracic spiracles always inconspicuous; propodeal dorsum smoothly and evenly convex; placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae numerous (12 or more), short and bristly. ***Petiole.*** Dorsum of node acuminate; node thick, orientated anteriad. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour uniformly medium to dark chocolate with very weak yellow-green, bluish and/or purple iridescence. Colour of erect setae light brown.

Measurements. *Worker* (n = 2)—CI 79–80; EI 29–29; EL 0.23–0.24; EW 0.19–0.20; HFL 1.89–1.99; HL 1.01–1.07; HW 0.81–0.85; ML 1.62–1.73; MTL 1.38–1.47; PpH 0.15–0.20; PpL 0.56–0.61; SI 150–153; SL 1.23–1.30.

Comments. *Iridomyrmex longisoma* superficially resembles *I. bicknelli*, with which it often occurs. Despite the surface similarities, however, the two ants are probably not closely related: *I. longisoma* has much longer hind tibiae, hirsute antennal scapes (glabrous in *I. bicknelli*), an elongate pronotal sclerite, and a broadly rounded occiput (narrowly rounded in *I. bicknelli*). This species also resembles a small *I. mayri*, an eastern taxon, but lacks the erect hind tibial setae found in that species and its close relatives. This ant is only found in south-western Western Australia, and appears to be confined to the coast. Known nests have been made directly into sandy soil, and are identical to those of *I. bicknelli*. Like the latter ant, *I. longisoma* seems to favour coastal habitats, including vegetated sand-dunes near the ocean, but is less common. Also, as with *I. bicknelli*, this is a timorous species.

Etymology. Latin: longus—'long' plus Greek: soma—'body'

Iridomyrmex luteoclypeatus sp. n.

(Fig. 47)

Types. Holotype worker from Cooper Ck. 13km NEbyN Etadunna Homestead, South Australia, 28°38'S 138°42'E, 16 September 1972, J. Feehan, ANIC Ants Vial 15.165 (ANIC, ANIC32-038975). Paratypes: 1 worker, same data as holotype (ANIC); 4 workers from 1km W Emu Camp, Victoria Desert, South Australia, 6 October 1976, P. J. M. Greenslade (ANIC, ANIC32-038991, 2 workers; ANIC, ANIC32-038992, 2 workers); 1 worker from Emu Camp, Victoria Desert, South Australia, 5 October 1976, P. J. M. Greenslade (MCZC, ANIC32-038979); 1 worker from Emu Camp, Victoria Desert, South Australia, 7 October 1976, P. J. M. Greenslade (BMNH, ANIC32-038989).

Worker Description. ***Head.*** Posterior margin of head weakly convex to planar; erect setae on posterior margin in full-face view, present in small aggregations on one or both sides of posterior margin of head, or in full-face view, present singly or as a couple of setae on either side of posterior margin of head; sides of head noticeably convex, or straight or weakly convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set above midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular, or asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae concave, or straight; antennal scape surpassing posterior margin of head by 0.2–0.5 x its length. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin projecting as blunt but distinct protuberance; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum weakly undulant or almost straight. Erect pronotal setae sparse (6 or fewer) and bristly. Mesonotum evenly curved. Erect mesonotal setae sparse (6 or fewer) and bristly. Mesothoracic spiracles always inconspicuous; propodeal dorsum straight and long (half as long again as length of propodeal declivity); placement of propodeal spiracle mesad, more than its

diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae sparse (6 or fewer) and bristly. ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present or absent on first gastral tergite; marginal erect setae of gaster present on first tergite, or absent on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour mandibles and lower clypeal region yellow, legs pale brown, rest of ant medium to dark brown with pale bluish to purple iridescence. Colour of erect setae yellow.

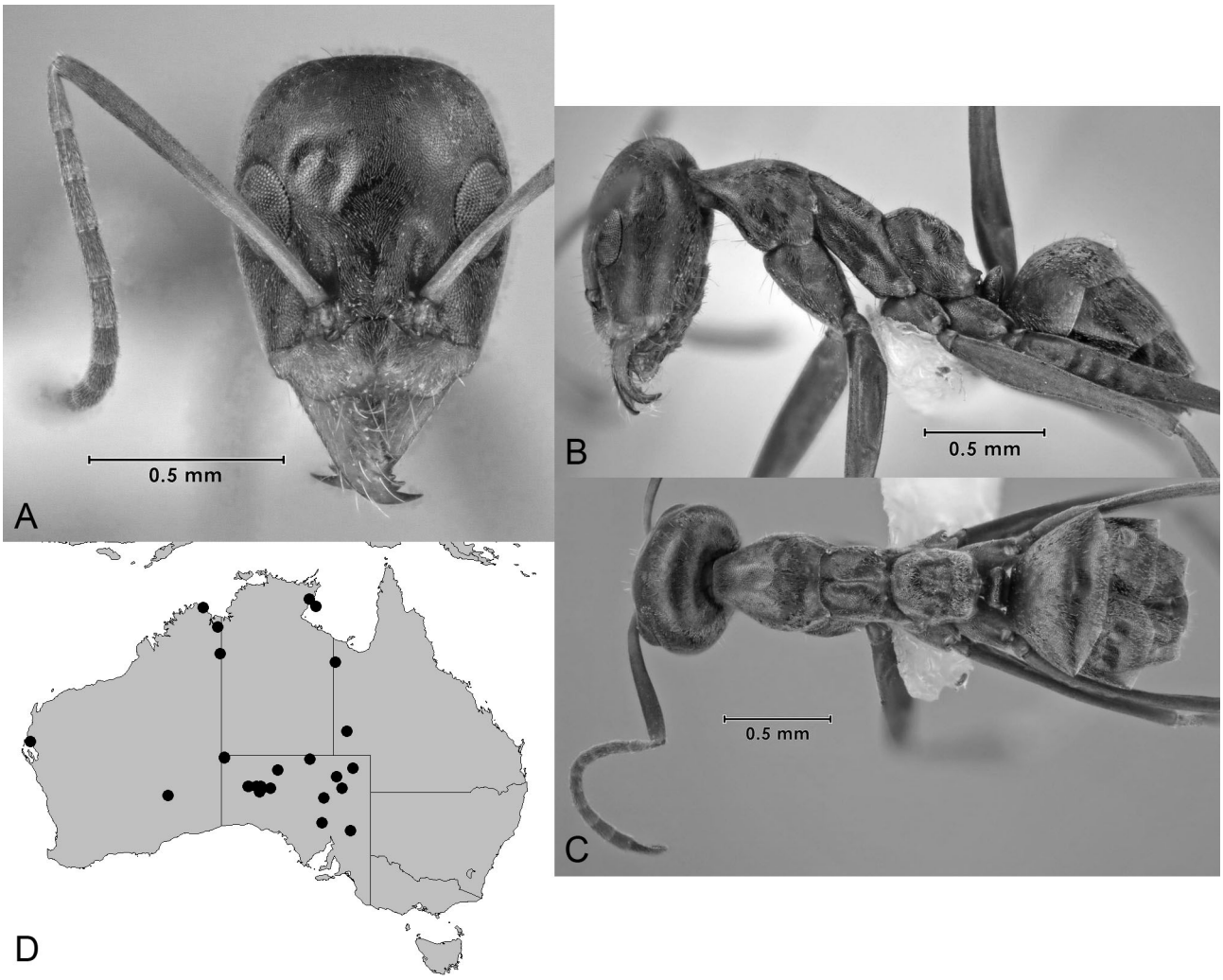


FIGURE 47. *Iridomyrmex luteoclypeatus* (Clifton Hills, SA, ANIC32-038995): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Measurements. *Worker* (n = 4)—CI 79–82; EI 34–35; EL 0.24–0.26; EW 0.18–0.19; HFL 1.31–1.38; HL 0.87–0.92; HW 0.72–0.74; ML 1.18–1.26; MTL 0.95–0.99; PpH 0.14–0.16; PpL 0.47–0.51; SI 124–129; SL 0.89–0.95.

Comments. Workers of *I. luteoclypeatus* are very similar to those of *I. bicknelli*, and collection material has certainly been confused with that species in the past. Nonetheless, the two species can be distinguished by dint of the appearance of the posterior margin of the head (weakly to strongly convex in *I. bicknelli*, planar in *I. luteoclypeatus*) and the sides of the head when the ant is seen in full-face view (convergent towards the mandibles in *I. bicknelli* and parallel or weakly convex in *I. luteoclypeatus*). *Iridomyrmex luteoclypeatus* workers are also a dull brown, whereas those of *I. bicknelli* are generally very dark brown or black with bluish to yellowish-green iridescence. This species is generally distributed in the dry centre of Australia from extreme north-eastern Western Australia to extreme western Queensland and south throughout South Australia, and has recently been identified from a

worker collected in a sand dune in Carnarvon on the mid-west coast in Western Australia. Thus far, no samples have been taken in New South Wales, Victoria or Tasmania. The ant forages diurnally, but nothing else is known about it.

Etymology. Latin: '*luteus*' 'yellow' plus '*clypeatus*' 'shield-shaped'; referring to the large yellow sectors on the clypeus in typical workers of this species.

***Iridomyrmex macrops* sp. n.**
(Figs 48, 91)

Types. Holotype worker from 5km W Broken Hill, New South Wales, 15 September 1974, P. J. M. Greenslade (ANIC, ANIC32-038004). Paratypes: 4 workers from 55km S Balladonia, 32°50'S 123°31'E, Western Australia, 241m, 2 April 1992, S. Shattuck (ANIC, 2 workers, MCZC, 1 worker, BMNH, 1 worker, ANIC32-038653); 1 worker from Gluepot Reserve, 6.2km E Gluepot Homestead, 33°45'44"S 140°11'19"E, South Australia, 26 November–6 December2000, pitfalls, clearing with mainly *Acacia* sp. and a few mallees (ANIC, ANIC32-031277); 1 worker from 10km E Mt. Ive Homestead, South Australia, 22 October 1980, P. J. M. Greenslade (ANIC, ANIC32-038106); 1 worker from Koonamore, South Australia, 24–27 February 1973, P. J. M. Greenslade, pitfall traps) (ANIC, ANIC32-038125).

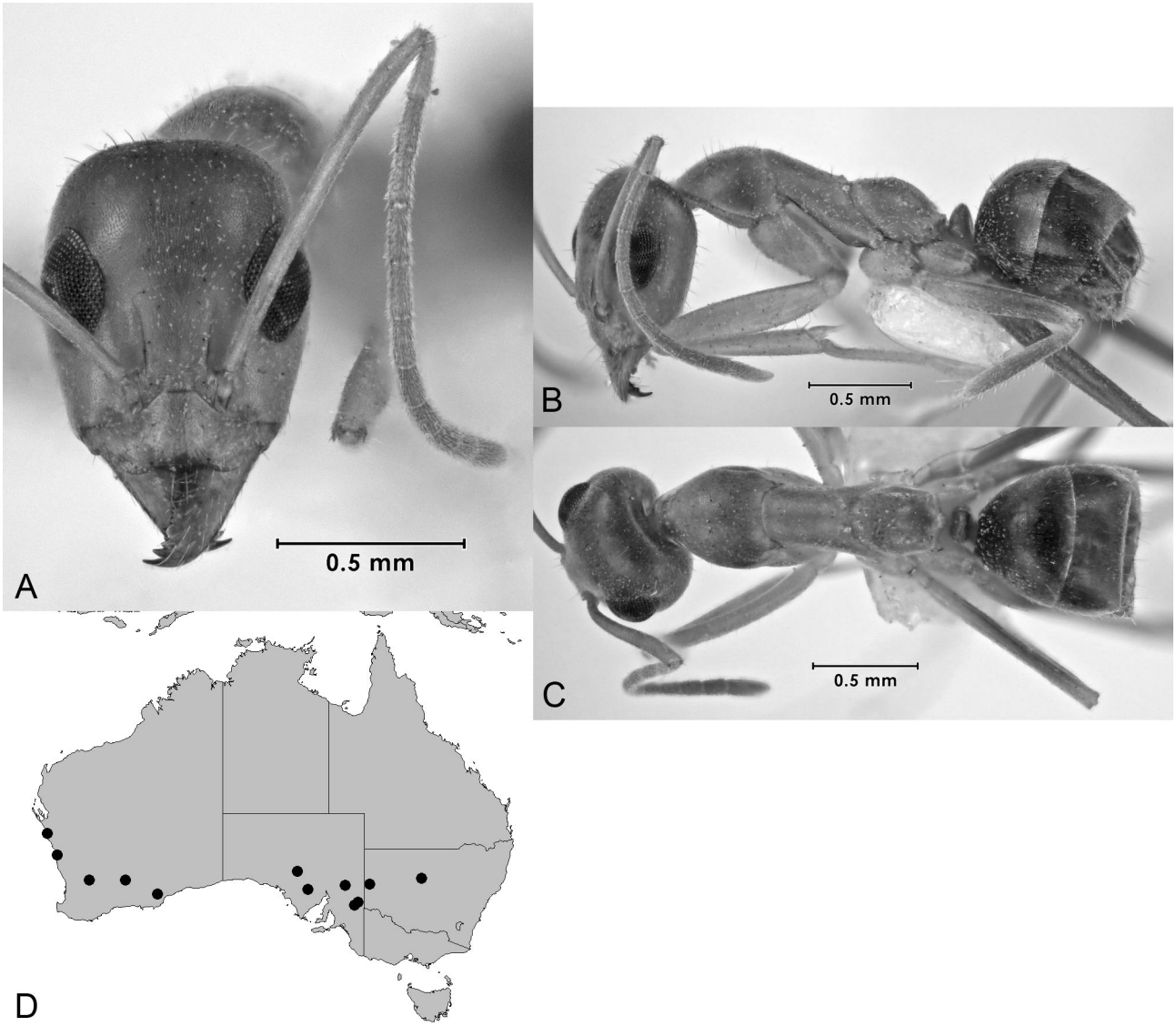


FIGURE 48. *Iridomyrmex macrops* (holotype, Broken Hill, NSW, ANIC32-038004): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Worker Description. ***Head.*** Posterior margin of head weakly convex to planar; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex, or straight or weakly convex; erect genal setae present on sides of head in full-face view. Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye asymmetrical, curvature of inner eye margin more pronounced than its outer margin and anterior sector of eye distinctly broader than its posterior sector. Frontal carinae straight; antennal scape surpassing posterior margin of head by 0.2–0.5 x its length. Erect setae on scape present and abundant, or present and sparse, or absent, except at tip; prominence on anteromedial clypeal margin present as an indistinct swelling or undulation; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae numerous (12 or more), short and bristly. Mesonotum straight. Erect mesonotal setae moderate in number (6–12), short and bristly. Mesothoracic spiracles always inconspicuous; propodeal dorsum smoothly and evenly convex, or straight and short (equal in length to propodeal declivity); placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae numerous (12 or more), short and bristly. ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour yellow, with or without brownish infuscation of the head and a yellowish-brown gaster. Colour of erect setae yellow, same colour as body.

Measurements. *Worker* (n = 5)—CI 78–82; EI 37–46; EL 0.22–0.36; EW 0.15–0.26; HFL 0.94–1.63; HL 0.73–1.00; HW 0.60–0.80; ML 0.99–1.52; MTL 0.66–1.13; PpH 0.11–0.19; PpL 0.39–0.59; SI 124–161; SL 0.74–1.21.

Comments. The large-eyed *I. macrops* resembles a hairy *I. dromus*. Erect setae are present on the hind tibiae, the sides of the head and (in some specimens only) the antennal scape. The ant is much more occasional in its occurrence than *I. dromus*, but is likely to have a similar ecology. One worker from the Holland Track, east of Hyden, Western Australia, was hand collected at night, foraging in heathy sandplain, and specimens taken SSW of Coolgardie, Western Australia, were collected from mallee trunks. Currently, records of this species are restricted to Western Australia and South Australia.

Etymology. Greek: referring to the large eye.

Iridomyrmex mattiroloi Emery

(Fig. 49)

Iridomyrmex mattiroloi Emery, 1898: 236, fig. 8.

Types. Syntype (probably holotype) from Tasmania (MCSN, 1 worker, examined).

Worker Description. ***Head.*** Posterior margin of head strongly concave; erect setae on posterior margin on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae convex; antennal scape barely attaining posterior margin of head, or surpassing it by less than 1 x its diameter. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin present as an indistinct swelling or undulation; mandible regularly triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae moderate in number (6–12), short and bristly. Mesonotum evenly curved. Erect mesonotal setae moderate in number (6–12), short and bristly. Mesothoracic spiracles always inconspicuous; propodeal dorsum smoothly and evenly convex, or straight and short (equal in length to propodeal declivity); placement of propodeal spiracle posteriad and near propodeal declivity; propodeal angle present as a bluntly defined right angle, the dorsal and declivitous propodeal faces never separated by a carina, or weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae numerous (12 or more), short and bristly. ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of

gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour brown to reddish-black, with faint blue iridescence on gaster. Colour of erect setae pale yellowish to whitish.

Measurements. *Worker* (n = 4)—CI 86–89; EI 26–27; EL 0.18–0.20; EW 0.14–0.15; HFL 0.83–0.87; HL 0.80–0.84; HW 0.69–0.75; ML 0.93–1.03; MTL 0.60–0.63; PpH 0.15–0.16; PpL 0.41–0.45; SI 89–96; SL 0.66–0.69.

Comments. This endemic Tasmanian species is very similar to *I. splendens*, but can be distinguished from that species by its much shorter antennal scape and more truncate propodeum. *Iridomyrmex meridianus* is another, similar species that also occurs in Tasmania. However, *I. meridianus* has a glabrous or nearly glabrous mesosoma, whereas *I. mattiroloi* possesses numerous bristly, erect, mesosomal setae. *Iridomyrmex mattiroloi* is known to nest under rocks. Most collections have been made sweeping low vegetation (including *Leptospermum*, *Euchryphia* and *Allocasuarina*) and by pitfall trapping.

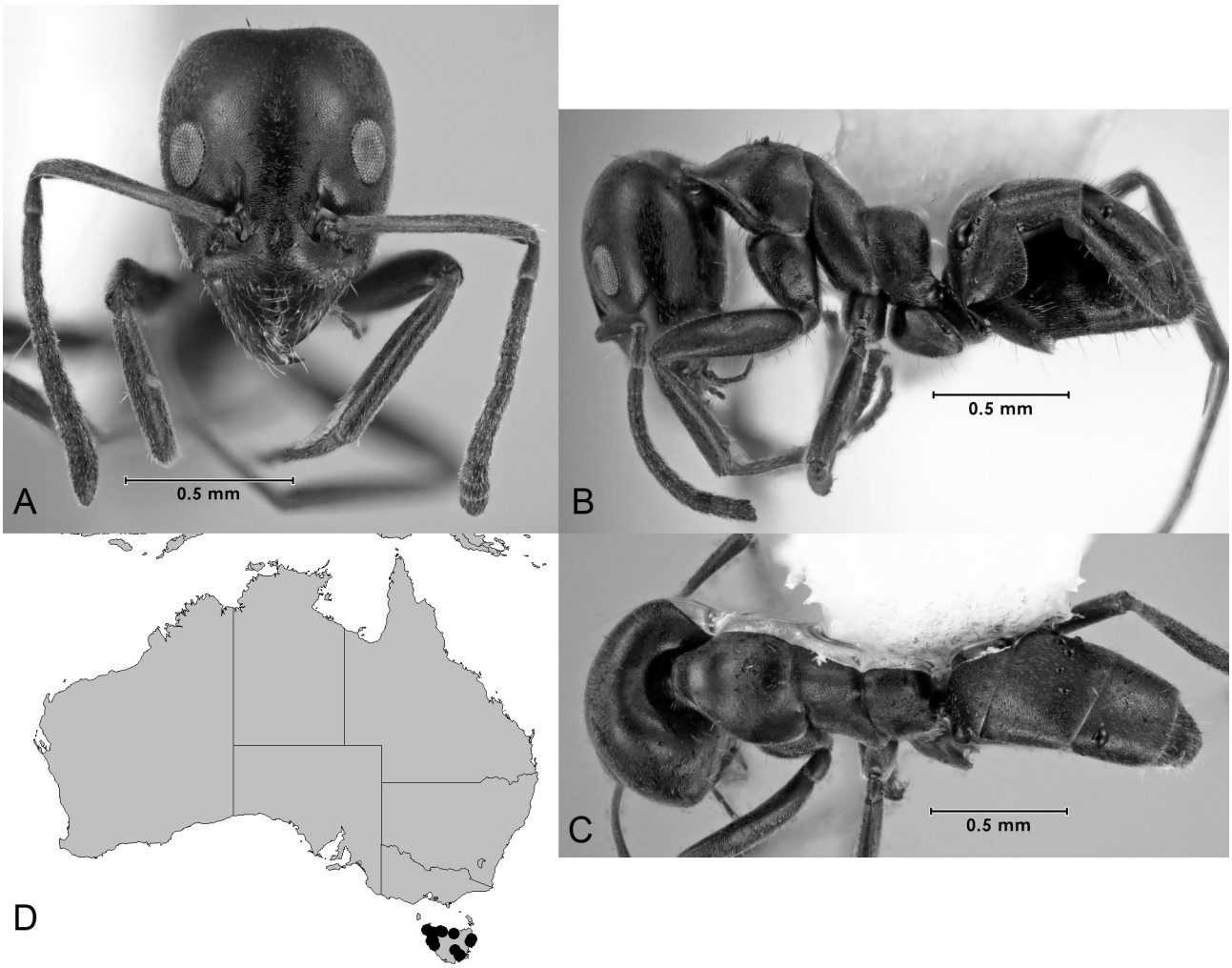


FIGURE 49. *Iridomyrmex mattiroloi* (West Point, Tas., ANIC32-036462): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Iridomyrmex mayri Forel, stat. n.

(Fig. 50)

Iridomyrmex gracilis mayri Forel, 1915: 80.

Types. Syntypes from Blackall Range, Queensland (ANIC, ANIC32-017919, 1 worker, examined); Lamington (as Glen Lamington), Queensland (not located during this study) and Ravenshoe (as Cedar Creek), Queensland (not located during this study).

Worker Description. ***Head.*** Posterior margin of head planar to weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae present on sides of head in full-face view. Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular, or elongate. Frontal carinae convex; antennal scape surpassing posterior margin of head by 0.2–0.5 x its length. Erect setae on scape present and abundant, or present and sparse; prominence on anteromedial clypeal margin projecting as blunt but distinct protuberance; mandible regularly triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae numerous (12 or more), short and bristly. Mesonotum sinuous. Erect mesonotal setae numerous (12 or more), short and bristly. Mesothoracic spiracles always inconspicuous; propodeal dorsum smoothly and evenly convex; placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae numerous (12 or more), short and bristly. ***Petiole.*** Dorsum of node convex; node thick, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest present. Colour uniformly blackish- to reddish-brown, with pale to very pale blue or purple iridescence. Colour of erect setae pale, whitish.

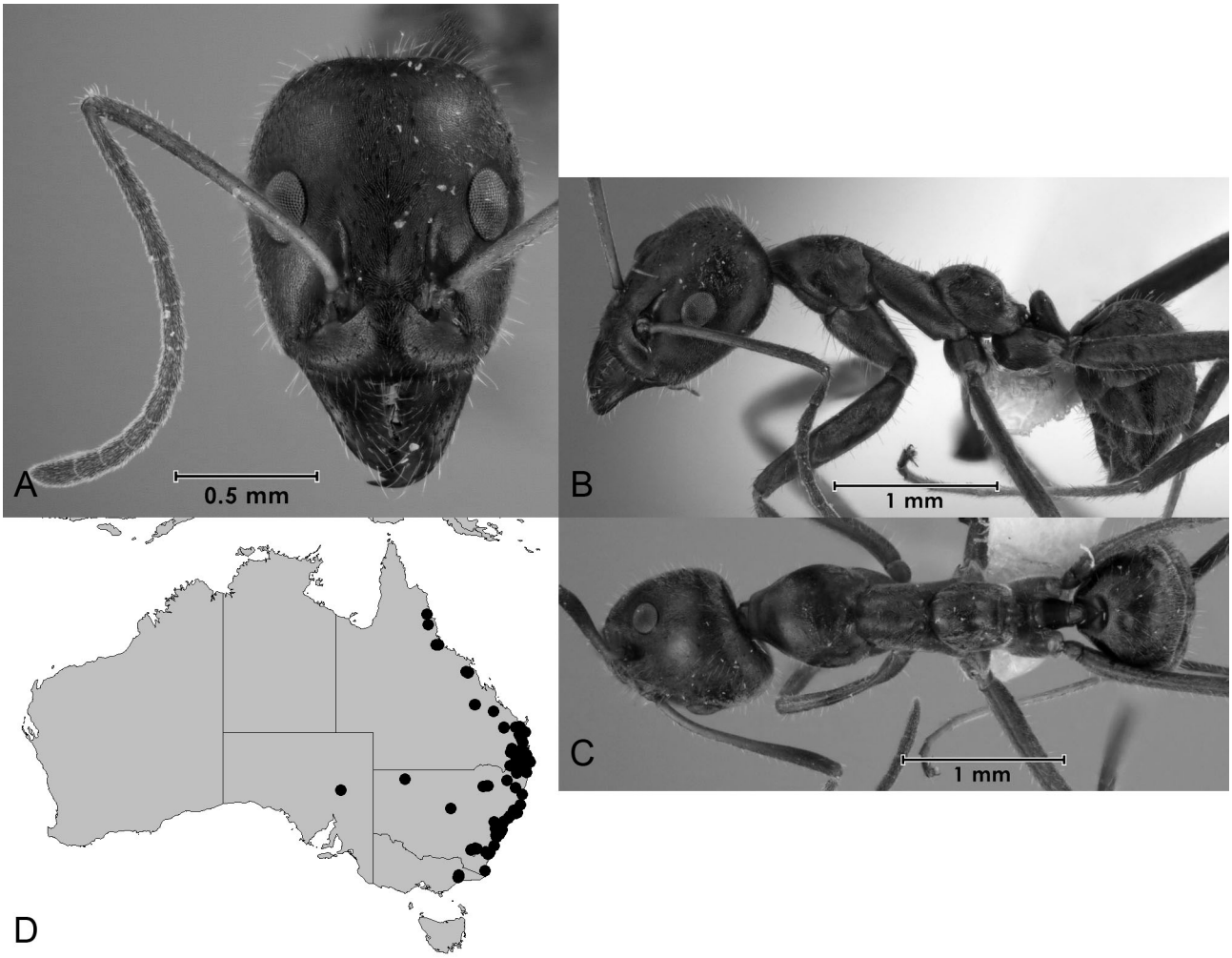


FIGURE 50. *Iridomyrmex mayri* (The Knoll National Park, Qld, ANIC32-041674): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Measurements. *Worker* (n = 6)—CI 86–89; EI 24–27; EL 0.24–0.27; EW 0.18–0.21; HFL 1.50–1.88; HL 1.02–1.24; HW 0.88–1.10; ML 1.41–1.76; MTL 1.08–1.31; PpH 0.19–0.23; PpL 0.54–0.67; SI 117–126; SL 1.11–1.31.

Comments. *Iridomyrmex mayri* is a common, medium-sized *Iridomyrmex* of eastern Australian forests. Like close relatives, this ant has bristly, erect setae on the antennal scape, the mesosoma and the hind tibiae. Large workers could be mistaken for a small meat ant, but lack the strong anteromedial clypeal spur and distinctive mesosomal characters of the meat ants. This species is most easily confused with the closely related *I. obscurior*, from which it can be best distinguished by its longer antennal scape (extending more than one third of its length beyond the posterior margin of the head versus ≤ 0.30 × its length in *I. obscurior*). The range of this species extends from northern Queensland south into southern New South Wales and the ACT. However, the ant appears to be absent from Victoria, and definitely does not occur in Western Australia, the Northern Territory, South Australia and Tasmania. Populations are restricted to areas near the coast, and dry sclerophyll forest appears to be preferred. Label data reveal that *I. mayri* commonly nests under stones but will also use rotting logs as nest sites. Workers have been taken in pitfall traps and not uncommonly by sweeping low vegetation. They will also forage on tree-trunks, and, like many other *Iridomyrmex*, will tend larvae of the lycaenid butterfly *Jalmenus evagoras*.

Iridomyrmex meridianus sp. n.

(Figs 51, 96)

Types. Holotype worker from Porongorup National Park, Western Australia, c. 430 m, 24 October 1969, R. W. Taylor, Marri forest, in soil under log, ANIC Ants Vial 8.5, (ANIC, ANIC32-039679). Paratypes: 13 workers, same data as holotype (ANIC, ANIC32-039679, 5 workers; ANIC, ANIC32-039678, 3 workers; BMNH, ANIC32-039678, 2 workers; MCZC, ANIC32-039679, 3 workers).

Worker Description. ***Head.*** Posterior margin of head planar to weakly concave; erect setae on posterior margin in full-face view, present singly or as a couple of setae on either side of posterior margin of head; sides of head noticeably convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular, or asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae convex; antennal scape surpassing posterior margin of head by 1–2 x its diameter. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin present as an indistinct swelling or undulation; mandible regularly triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae lacking or very minute (one or two tiny setae may be present). Mesonotum evenly curved. Erect mesonotal setae lacking or very minute (one or two tiny setae present). Mesothoracic spiracles always inconspicuous; propodeal dorsum smoothly and evenly convex; placement of propodeal spiracle posteriad and near propodeal declivity, or mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae lacking or very minute (one or two tiny setae present). ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientated anteriad. ***Gaster.*** Non-marginal erect setae of gaster present or absent on first gastral tergite; marginal erect setae of gaster present on first tergite, or absent on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour dark brown to black, with weak yellowish- to bluish-green iridescence on body and legs. Colour of erect setae on head and coxae light yellow-brown.

Measurements. *Worker* (n = 6)—CI 84–89; EI 25–31; EL 0.18–0.21; EW 0.14–0.16; HFL 0.82–1.01; HL 0.79–0.87; HW 0.67–0.76; ML 0.97–1.15; MTL 0.58–0.73; PpH 0.13–0.15; PpL 0.40–0.46; SI 98–115; SL 0.68–0.84.

Comments. *Iridomyrmex meridianus* is a small-medium, dark brown to black *Iridomyrmex* that is currently known from populations in the extreme south-west of Western Australia and also in Tasmania. The worker closely resembles that of *I. splendens* and *I. mattiroloi*, but can be separated from both by the absence or virtual absence of erect setae on the mesosoma and the posterior margin of the head. This species also resembles mesic populations of *I. mjobergi*, but the mandible is dark brown compared with light yellow or orange in *I. mjobergi*. Western Australian material differs slightly from that from Tasmania in that the workers are fractionally larger and darker with a more distinct bluish-green to yellowish-green iridescence. Nests have been found under rocks and logs and in rotting wood. Most collections have been made in heavily forested areas.

Etymology. Latin: ‘south’ or ‘southern’.

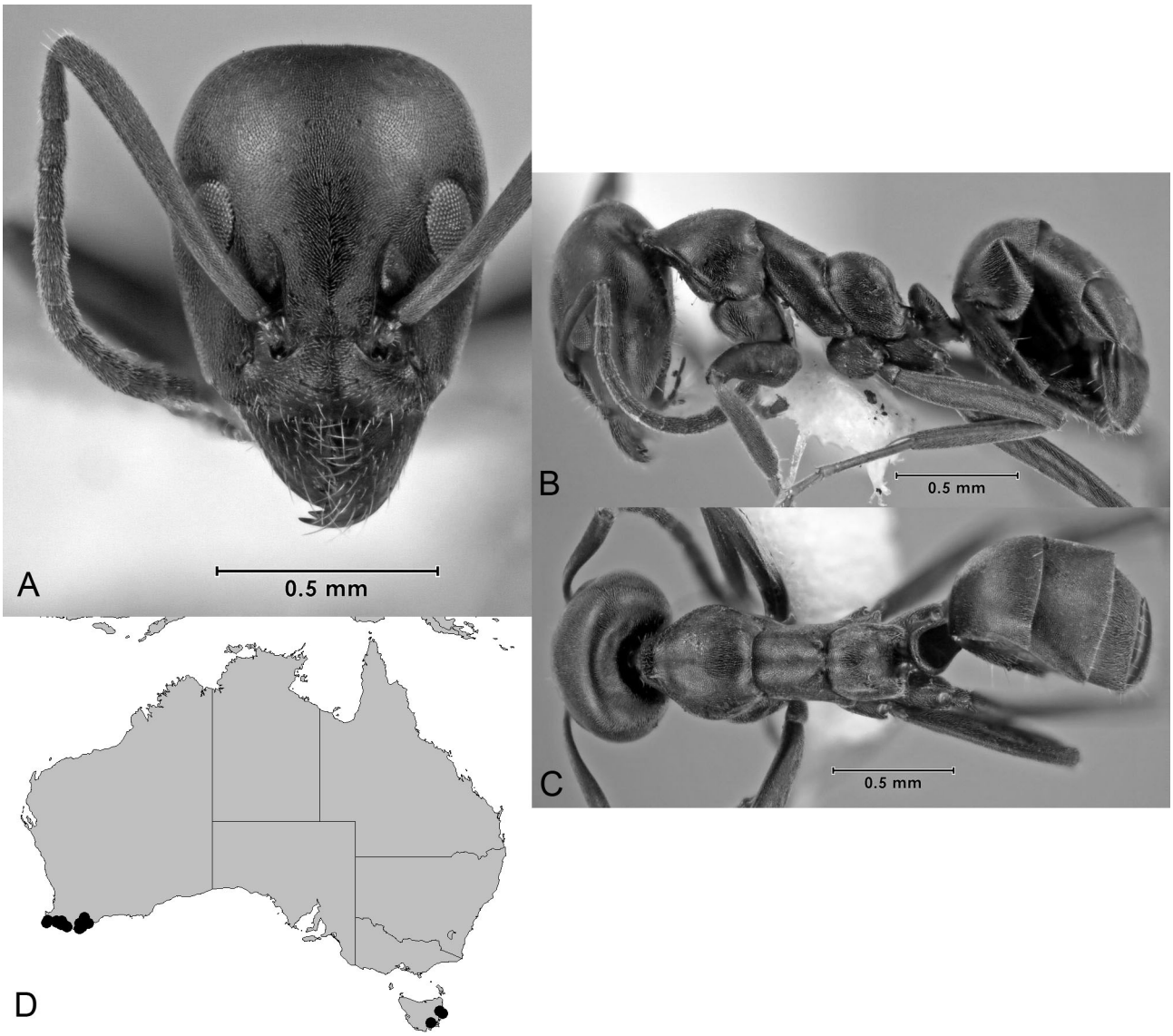


FIGURE 51. *Iridomyrmex meridianus* (paratype, Porongurup, WA, ANIC32-039678): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

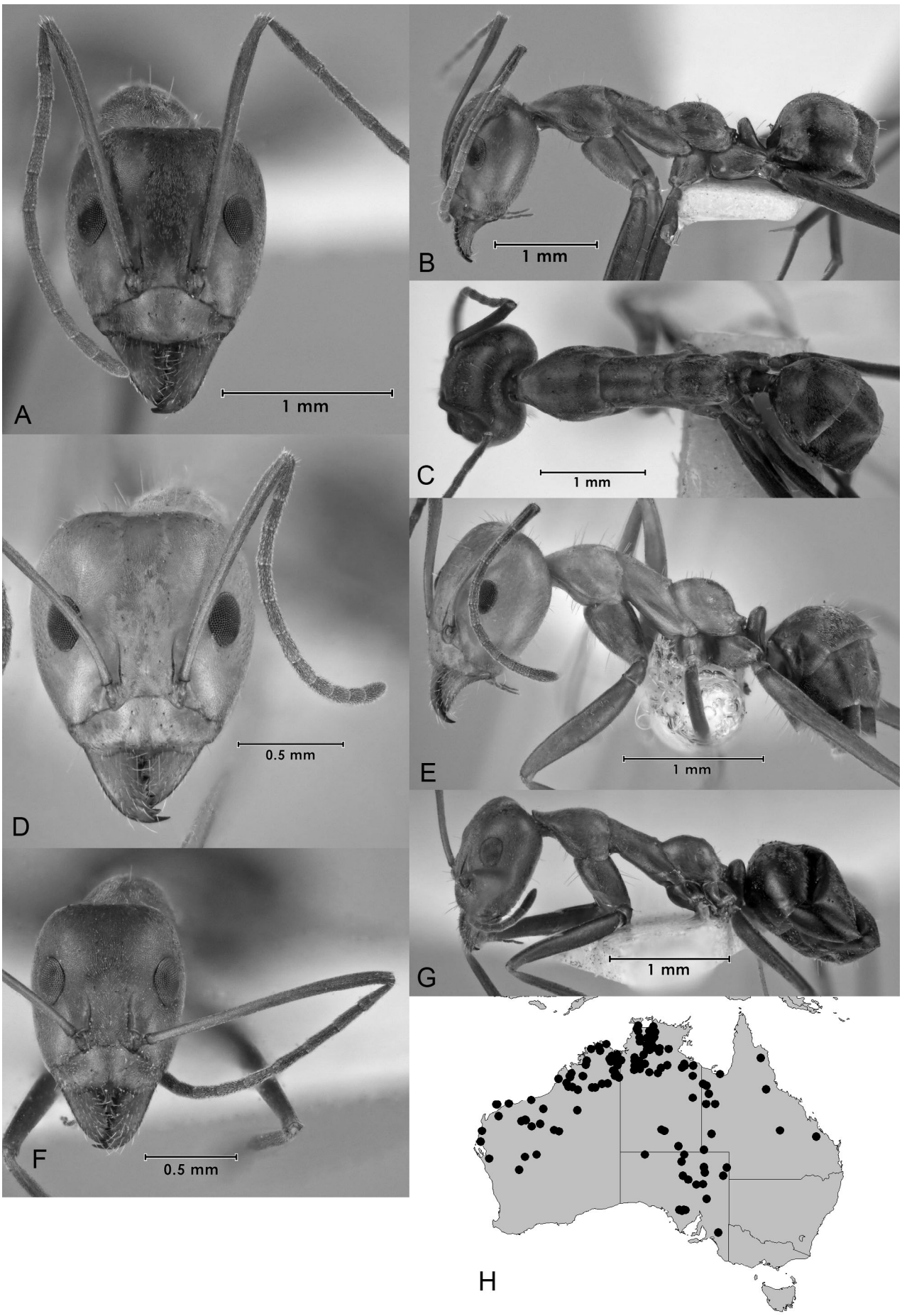
Iridomyrmex minor **Forel, stat. n.**

(Figs 52, 92, 93)

Iridomyrmex gracilis minor Forel, 1915: 80.

Types. Lectotype worker (here designated) from Kimberley District, Western Australia, Mjoberg (MNHG, ANIC32-035263). Paralectotypes from Atherton, Queensland (MHNG, 1 queen); Australia (MHNG, 6 workers); Cape York, Queensland (museum unknown, worker(s)); Cooktown, Queensland (MHNG, 4 workers); Kimberley District, Western Australia (MHNG, 12 workers); Noonkanbah, Western Australia (ANIC, 1 worker; MHNG, 5 workers; NHMB, 1 worker; OXUM, 1 worker; USNM, 1 worker); Port Hedland, Western Australia (museum unknown, worker(s)); Yarrabah, Queensland (MHNG, 3 workers). Additionally, paralectotypes from Perth, Western Australia (ANIC, 2 workers; MHNG, 3 queens) are actually *I. suchieri*.

FIGURE 52. *Iridomyrmex minor*, typical form (Darwin, NT, ANIC32-042346): A. Front of head; B. Side of body; C. Top of body. *Iridomyrmex minor*, pale form (Strzelecki Crossing, SA, ANIC32-032349): D. Front of head; E. Side of body. *Iridomyrmex minor*, narrow headed, glabrous form (Wiluna, WA, ANIC32-039657): F. Front of head; G. Side of body; H. Distribution of material examined.


A
1 mm
B
1 mm
C
1 mm
D
0.5 mm
E
1 mm
F
0.5 mm
G
1 mm
H

Worker Description. ***Head.*** Posterior margin of head planar to weakly concave; erect setae on posterior margin in full-face view set in a row, or present in small aggregations on one or both sides of posterior margin of head, or present singly or as a couple of setae on either side of posterior margin of head; sides of head noticeably convex; erect genal setae present on sides of head in full-face view, or absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set above midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular, or asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae convex; antennal scape surpassing posterior margin of head by at least 0.5 x its length, or surpassing posterior margin of head by 0.2–0.5 x its length. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin projecting as triangular spur, or projecting as blunt but distinct protuberance; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum moderately and evenly curved over its length, or weakly undulant or almost straight. Erect pronotal setae moderate in number (6–12), longest setae elongate, flexuous and/or curved, or sparse (6 or fewer) and bristly. Mesonotum sinuous, or straight. Erect mesonotal setae moderate in number (6–12), short and bristly, or sparse to absent. Mesothoracic spiracles prominent or inconspicuous; propodeal dorsum smoothly and evenly convex, or straight and long (half as long again as length of propodeal declivity); placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae moderate in number (6–12), short and bristly, or sparse to absent. ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical, or thick, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present or absent on first gastral tergite; marginal erect setae of gaster present on first tergite, or absent on first tergite. ***General characters.*** Allometric differences between workers of same nest present. Colour head and body brown to orange, usually variegated, with at least the clypeal region distinctly lighter in colour than the upper vertex in mostly brown specimens, gaster light to dark chocolate brown. Colour of erect setae pale yellow-brown.

Measurements. *Worker* (n = 12)—CI 78–93; EI 23–30; EL 0.21–0.30; EW 0.16–0.23; HFL 1.29–2.08; HL 0.87–1.34; HW 0.74–1.21; ML 1.21–2.03; MTL 0.94–1.65; PpH 0.15–0.24; PpL 0.47–0.74; SI 105–173; SL 0.95–1.61.

Comments. This very variable species is probably the most difficult of all the *Iridomyrmex* species to characterise in terms of its external morphology, and also the most likely to contain cryptic taxa. The ant was originally described as a subspecies of *I. gracilis*. Syntypes of the species were included from a wide range of sites across northern Australia and also Perth. However, the Perth material is actually *I. suchieri*. To secure the identity of this taxon a syntype from the Kimberley District is here selected as the lectotype, the remaining syntypes listed above becoming paralectotypes. The populations in different parts of Australia include strikingly distinctive phenotypes. The population from which the Kimberley type material was taken represents the form most commonly seen in the drier areas of the Torresian zone. This is a broad-headed, large-eyed ant. Seen in full-face view, the appressed genal setae confer a partially silvery appearance to the head capsule. The ant is generally a medium brown, with some vaguely mottled orange-brown sectors on the head and mesosoma in most workers. The antennal scapes are moderately long, exceeding the posterior margin of head by about half their length. Erect setae on the outline of the head capsule are restricted to the posterior margin of head, and there are no erect setae on the hind tibiae. In the wetter northern fringes is a much more gracile morph, with a flattened mesosomal outline, in which the legs and antennal scape are typically noticeably more elongate, and the head is visibly narrower. The antennal scape exceeds the posterior margin of head by more than half its length. The appressed setae on the mesosoma are relatively long and fine, giving the ant a 'furry' appearance. In a few rare instances erect setae extend along the sides of the head and can be found on the hind tibiae. Similarly elongate, but virtually glabrous, is a morph from inland areas of midwest Western Australia. The appressed setae in this form are very short and virtually invisible except in certain lights. In both this and the far northern phenotype the hind tibiae are as long as or even longer than the mesosoma. Workers from coastal Western Australia present yet another distinct phenotype: here the ant also has a rectangular head capsule, along which extend short, erect setae, the hind tibiae are likewise setose, and the antennae are also long. However, the head and mesosoma are a bright brick red. This phenotype and a form intermediate between this and the typical northern phenotype (i.e., reddish but broad-headed and with erect setae confined to the posterior margin of head and absent from the hind tibiae) can be found on Barrow Island. Finally, a distinct form occurs in inland South Australia. Workers of this phenotype have orange heads and bodies with contrasting brown antennal

scapes, legs and gaster. The antennal scape is quite short, extending by only about quarter of its length beyond the head capsule. Erect setae on the posterior margin of head do not extend to the sides of the head.

Despite these distinctive morphs, there are very many intermediate forms, making a hypothesis that this is a single innately morphologically highly variable species the hypothesis of choice for the present time. There are no molecular data as yet, and this would be highly desirable, in the light of the huge variation seen for *I. minor.* As it is constituted here, this taxon can be separated from the similar *I. anceps* by its longer pronotal setae, and (in the glabrous form) its non-uniform colouration. *Iridomyrmex minor* is primarily a northern and central Australian species: in Western Australia the most southerly populations have been found near Billabong Roadhouse in the Shark Bay region, and in South Australia populations can be found as far south as the Gawler Ranges. The ant is also common in the Northern Territory and Queensland, but so far has not been collected in New South Wales, and is unlikely to occur in Victoria or Tasmania. This species occurs in a variety of habitats, although sandy areas may be preferred, judging from collections. At least one nest has been found under bark, but soil is a more usual nest substrate. Along with *I. anceps* and several meat ants, *I. minor* is included among the *Iridomyrmex* species most likely to be encountered by the general public in northern parts of Australia.

Iridomyrmex mirabilis sp. n.

(Fig. 53)

Types. Holotype worker from Eneabba-Leeman Rd, 29°52.26'S 115°05.45E, Western Australia, April 2004, R. Dunn, pitfall trap,1.5m shrubland, white sand on limestone (ANIC, ANIC32-053428). Paratypes: 2 workers, same data as holotype (ANIC); 1 worker from 23km E by N Dongara, 29°12S 115°10E, Western Australia, 30 September 1981, I. D. Naumann and J. C. Cardale, ex alcohol (ANIC, ANIC32-039597); 2 workers from Albany, Western Australia, October 1929, T. Greaves (MCZC, ANIC32-037250).

Worker Description. ***Head.*** Posterior margin of head weakly convex; erect setae on posterior margin in full-face view, present singly or as a couple of setae on either side of posterior margin of head; sides of head noticeably convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular, or asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae concave; antennal scape barely attaining posterior margin of head, or surpassing it by less than 1 x its diameter. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin always completely absent; mandible triangular with distinct angle between masticatory and basal margins; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum weakly undulant or almost straight. Erect pronotal setae sparse (6 or fewer) and bristly. Mesonotum evenly curved. Erect mesonotal setae lacking or very minute (one or two tiny setae present). Mesothoracic spiracles always inconspicuous; propodeal dorsum straight and short (equal in length to propodeal declivity); placement of propodeal spiracle posteriad and near confluence of propodeal dorsum and propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae sparse to absent. ***Petiole.*** Dorsum of node planar; node reduced to anterior lip only, the rest incorporated in the petiole. ***Gaster.*** Non-marginal erect setae of gaster absent on first gastral tergite; marginal erect setae of gaster present on first tergite, or absent on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour dark brown to black, with bluish iridescence on foreparts, purple iridescence on gaster. Colour of erect setae pale whitish-yellow.

Measurements. *Worker* (n = 5)—CI 89–91; EI 27–29; EL 0.18–0.19; EW 0.14–0.15; HFL 0.71–0.75; HL 0.69–0.74; HW 0.63–0.66; ML 0.83–0.90; MTL 0.54–0.56; PpH 0.08–0.11; PpL 0.35–0.39; SI 85–88; SL 0.53–0.58.

Comments. The small *I. mirabilis* is probably the most extraordinary *Iridomyrmex* of all, and cannot be mistaken for any other ant. This species has many apomorphies. The small size, short, strongly concave frontal carinae and its general morphology place it firmly in the *I. calvus* complex, but the propodeal spiracle on the uniquely flattened propodeum is within the propodeal angle (the propodeum is somewhat reminiscent of the genus *Turneria*, although lacking the propodeal tubercles of the latter). The broadly concave anterior clypeal margin lacks any sort of medial protuberance, even a vestigial one, the gaster is dorsoventrally compressed, but most peculiar of all is the

petiolar node, which is reduced to a vertical carina. This species is confined to south-western and southern Western Australia, and is rarely encountered. Recent specimens have been collected at Eneabba and Bandalup Hill near Ravensthorpe (JDMC). Older material (ANIC) was taken at Albany, while specimens held at the California Academy of Sciences in the USA were collected very many years ago at Darlington, on the outskirts of Perth. Ecological data are largely lacking, but the Eneabba specimens were taken by pitfall trap in shrubland over white quartz sand, while the Bandalup Hill workers were collected while foraging on *Kunzia similis* growing on gravel/laterite caprock.

Etymology. Latin: 'wonderful', with reference to the unique features of this species.

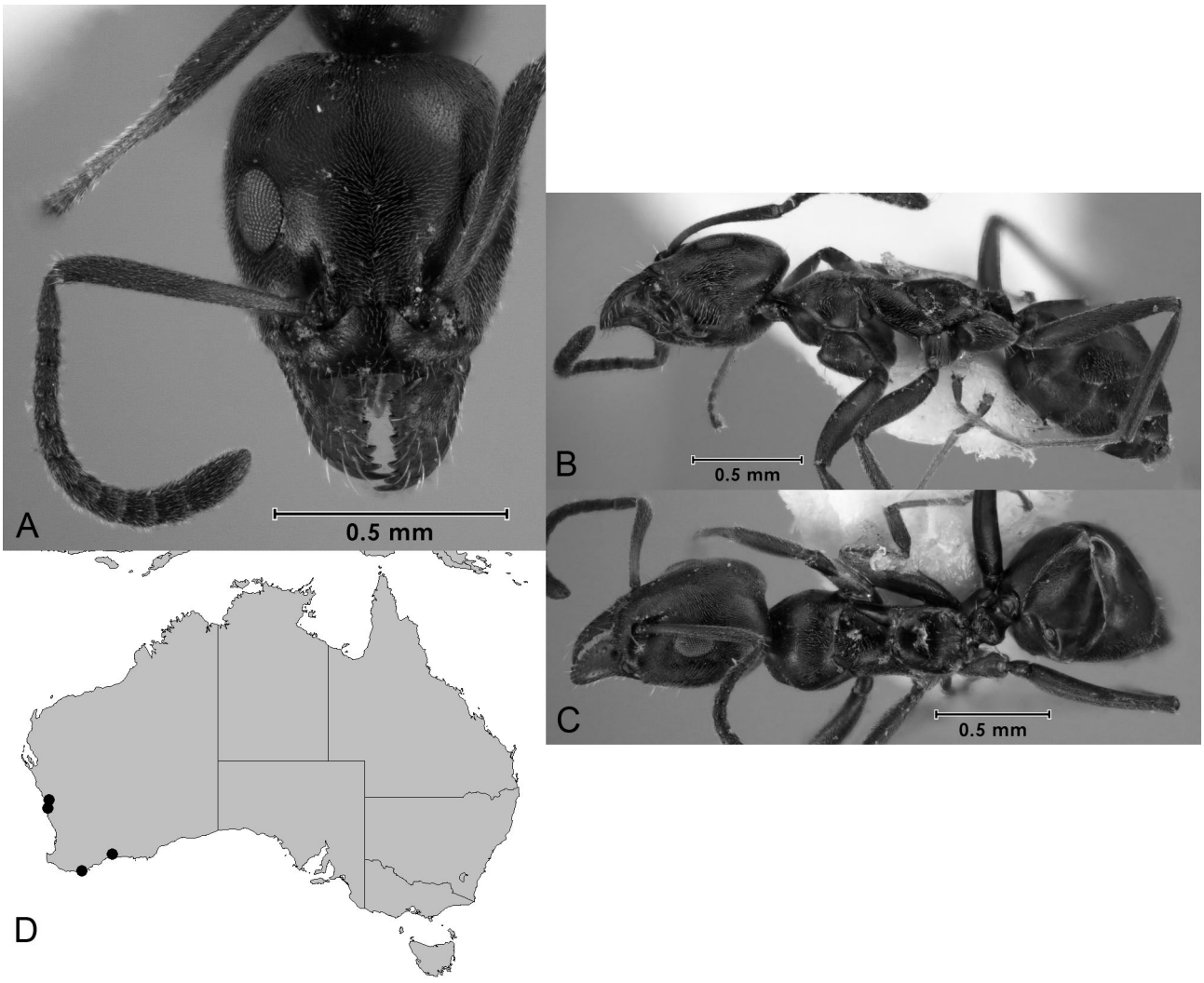


FIGURE 53. *Iridomyrmex mirabilis* (holotype, Eneabba-Leeman Road, WA, JDM32-000260): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Iridomyrmex mjobergi Forel

(Figs 54, 95, 96)

Iridomyrmex mjobergi Forel, 1915: 77.

Types. Lectotype worker (here designated) from the Kimberley district, Western Australia, Mjöberg (MHNG). Paralectotypes, same data as lectotype (MHNG, 6 workers, 2 workers examined; NHMB, 1 worker), and from Ravenshoe (as Cedar Creek) and Malanda, Queensland (not located during this study). Note: The type material from the Kimberley district contains a mix of both *I. mjobergi* and *I. difficilis* specimens. With the lectotype designated here the name of this taxon is secured and the holotype selected for *I. difficilis* provides a name of that taxon.

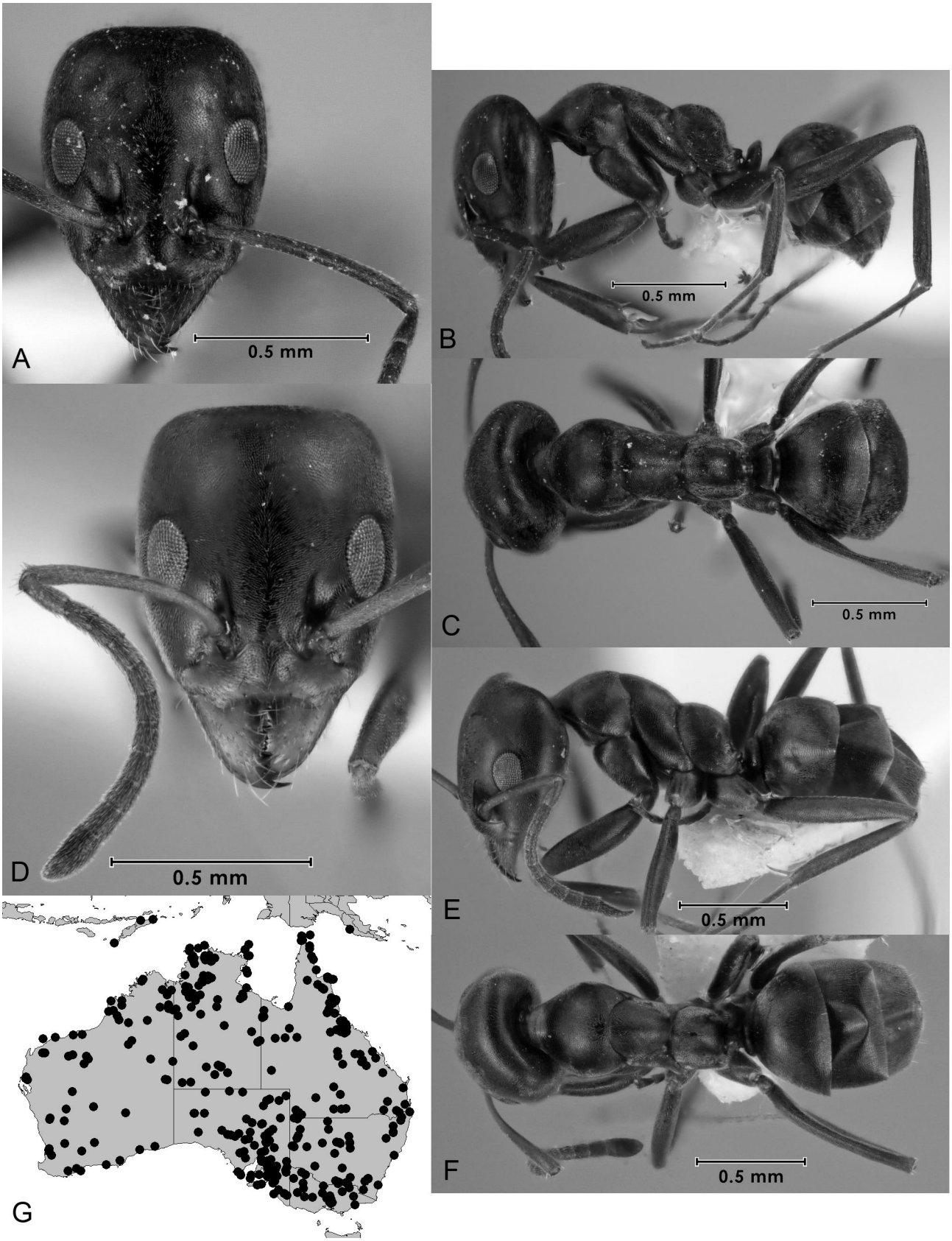


FIGURE 54. *Iridomyrmex mjobergi*, southern form (Upper Sturt, SA, ANIC32-047202): A. Front of head; B. Side of body; C. Top of body. *Iridomyrmex mjobergi*, northern form (CSIRO TERC, Darwin, NT, ANIC32-047314): D. Front of head; E. Side of body; F. Top of body; G. Distribution of material examined.

Worker Description. ***Head.*** Posterior margin of head planar to weakly concave; erect setae on posterior margin in full-face view, present in small aggregations on one or both sides of posterior margin of head, or in full-face view, present singly or as a couple of setae on either side of posterior margin of head, or absent; sides of head noticeably convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae convex; antennal scape surpassing posterior margin of head by 1–2 x its diameter. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin projecting as triangular spur; mandible regularly triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae sparse to absent. Mesonotum straight, or evenly curved. Erect mesonotal setae sparse (6 or fewer) and bristly. Mesothoracic spiracles always inconspicuous; propodeal dorsum protuberant, or smoothly and evenly convex, or straight and short (equal in length to propodeal declivity), or tapered posteriad; placement of propodeal spiracle posteriad and near propodeal declivity; propodeal angle present as a bluntly defined right angle, the dorsal and declivitous propodeal faces never separated by a carina, or weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae lacking or very minute (one or two tiny setae present). ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present or absent on first gastral tergite; marginal erect setae of gaster present on first tergite, or absent on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour generally medium to dark brown, but rarely may have orange mesosoma with darker head and gaster. Colour of erect setae pale yellow.

Measurements. *Worker* (n = 11)—CI 82–88; EI 27–30; EL 0.16–0.24; EW 0.12–0.19; HFL 0.66–1.18; HL 0.63–0.98; HW 0.56–0.85; ML 0.69–1.22; MTL 0.47–0.80; PpH 0.09–0.17; PpL 0.31–0.52; SI 92–108; SL 0.51–0.90.

Comments. *Iridomyrmex mjobergi*, along with *I. dromus* and *I. minor* (discussed above), is included in the three most taxonomically troublesome *Iridomyrmex* taxa. What makes *I. mjobergi* particularly difficult is its bland and uninformative appearance, which can easily lead to it being confused with over half-a-dozen other *Iridomyrmex* species. Typically, *I. mjobergi* is a small-medium to small, coppery, brown ant, although the rare nest (South Australia) contains orange-and-brown workers. Workers from mesic areas of the south-west and south-east of the continent are on average larger and hairier than their conspecifics in drier or more northerly areas. In the Northern Territory and northern parts of Western Australia, South Australia and Queensland, populations of very small, truncate workers occur, in which the propodeum becomes progressively more narrowly rectangular in appearance across geographic distance. These are connected with the larger morphs by a continuum of forms, in which variation has to be examined across a large geographic scale to be properly understood. Conspicuous iridescence is mostly absent, but uniform yellowish-green reflections can be seen in some populations near the southern coast of Western Australia. As understood here, this species always lacks a well-defined line or aggregation of small, erect setae on the posterior margin of the head when seen in full-face view (although there may be up to a half dozen randomly distributed setae in ants from Kangaroo Island and adjacent parts of the South Australian mainland), thus enabling it to be separated from *I. splendens*, and its yellow to pale orange mandibles also enable relatively glabrous forms to be distinguished from the rarer and localised *I. meridianus* (dark mandibles). In difficult cases, the size of the eye in individuals *of the same size* (overall, EL 0.13–0.24 in *I. mjobergi*, compared with 0.16–0.19 in *I. splendens*) is often helpful in pulling apart workers of *I. splendens* and *I. mjobergi*. There is also a phenotype that is structurally indistinguishable from *I. suchieri*. However, that ant has a glabrous mesosoma, and the posterior margin of the head is also usually lacking in erect setae (a solitary tiny seta may be present), thus enabling it to be distinguished from *I. suchieri.* The planar appearance of the posterior margin of the head in full-face view also distinguishes hairier, eastern populations of this ant from *I. victorianus* that have a concave posterior margin of the head. Finally, its longer antennal scape separates northern populations of *I. mjobergi* from other small *Iridomyrmex* found in the more tropical areas (most notably, *I. difficilis* and *I. hertogi*). Typically, *I. mjobergi* workers have a pair of well-separated, tiny, erect setae on the posterior margin of the head. Rarely, the eye may be moderately asymmetrical, leading to comparison with some other forms with asymmetrical eyes, such as *I. dromus* and *I. cupreus*, but *I. dromus* has a hairier mesosomal dorsum and almost always a longer antennal scape, while *I. cupreus* has hairy tibiae (always glabrous in *I. mjobergi*).

Away from settled areas, *I. mjobergi* probably shares with *I. suchieri* and *I. chasei* the title of most populous *Iridomyrmex* species. This taxon can be found in all Australian states, and even extends into New Guinea. Colonies sampled by the first author have been found nesting in the soil or under stones. At Mt. Tomah (New South Wales) a nest was found by the second author in an aluminium beer can! This species climbs trees in search of nectar, and, presumably, honeydew, and has been taken from *Banksia* flowers. Workers are not aggressive, and will actively conceal themselves in litter when efforts are made to collect them. This behaviour in the field separates them from more aggressive species like *I. chasei*, which attempt to attack the forceps or other collecting implements.

***Iridomyrmex neocaledonica* sp. n.**
(Figs 55, 96)

Types. Holotype worker from Mt Mou summit, New Caledonia, 22°04'S 166°21'E, 1200 m, 24 May 1984, G. Monteith & D. Cook, rainforest, moss on trees and rocks (ANIC, ANIC32-041436). Paratypes: 6 workers from Montagne des Sources, New Caledonia, 22°08'S 166°36'E, 27 February 1977, P. Ward, ANIC Ants Vial 64.17 (ANIC, MCZC, 3 each, ANIC32-040305).

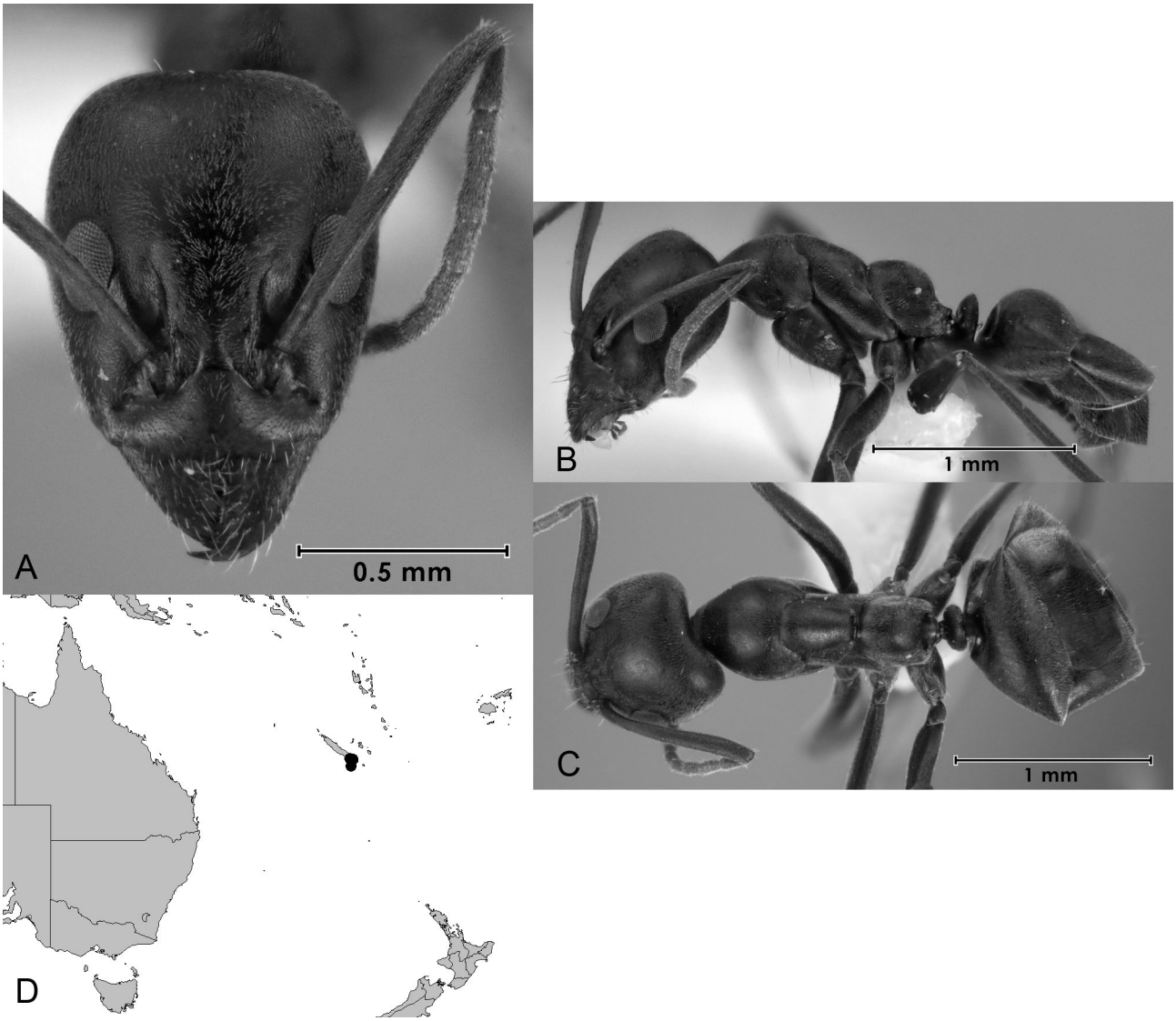


FIGURE 55. *Iridomyrmex neocaledonica* (paratype, Montagne des Sources, New Caledonia, ANIC32-040305): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Worker Description. ***Head.*** Posterior margin of head planar to weakly concave; erect setae on posterior margin in full-face view, present singly or as a couple of setae on either side of posterior margin of head; sides of head noticeably convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae convex; antennal scape surpassing posterior margin of head by approximately 3 x its diameter. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin present as an indistinct swelling or undulation; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae sparse (6 or fewer) and bristly. Mesonotum sinuous, or evenly curved. Erect mesonotal setae sparse (6 or fewer) and bristly. Mesothoracic spiracles always inconspicuous; propodeal dorsum smoothly and evenly convex; placement of propodeal spiracle posteriad and near propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae lacking or very minute (one or two tiny setae present). ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present or absent on first gastral tergite; marginal erect setae of gaster absent on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour uniformly pale to dark brown. Colour of erect setae depigmented, pale.

Measurements. *Worker* (n = 3)—CI 85–86; EI 26–27; EL 0.21–0.22; EW 0.16–0.17; HFL 1.16–1.25; HL 0.95–0.98; HW 0.82–0.84; ML 1.23–1.27; MTL 0.82–0.86; PpH 0.16–0.17; PpL 0.51–0.52; SI 115–116; SL 0.94–0.96.

Comments. Apart from its biogeography, this handsome medium-sized, brown *Iridomyrmex* is distinguished from very similar species like *I. splendens*, *I. meridianus* and *I. mjobergi* (southern, mesic populations) by a combination of its longer antennal scape (extending beyond the posterior margin of the head by 3 × its greatest width) and lack of a row of setae on the posterior margin of the head. The handful of specimens available has been collected at a considerable elevation on the island (to 1200 m).

Etymology. Latin: with reference to the distribution of the species (New Caledonia).

Iridomyrmex niger sp. n.

(Figs 56, 94)

Types. Holotype worker from 2km S Ravine des Casoars, Kangaroo Island, South Australia, 11 January 1973, P. J. M. Greenslade (ANIC, ANIC32-037336). Paratypes: 1 worker from N of Breakneck River, South Australia, January, 1973, P. J. M. Greenslade (ANIC, ANIC32-037335); 1 worker from Victor Harbor, South Australia, 10-11 November 1973, P. J. M. Greenslade (ANIC, ANIC32-037223); 1 worker from 15km ENE Cranbrook, Tasmania, 41°57'S 148°14'E, 28 January 1983, I. D. Naumann & J. C. Cardale, ex ethanol (MCZC, ANIC32-042211); 1 worker from Kabarli E (Cooloola), Queensland, 22 April 1976, P. J. M. Greenslade (BMNH, ANIC32-037262).

Worker Description. ***Head.*** Posterior margin of head planar to weakly concave; erect setae on posterior margin absent; sides of head noticeably convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular, or asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae straight; antennal scape barely attaining posterior margin of head, or surpassing it by less than 1 x its diameter. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin always completely absent; mandible regularly triangular with oblique basal margin; long, curved setae on venter of head capsule present. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae lacking or very minute (one or two tiny setae may be present) or present as short bristles. Mesonotum evenly curved. Erect mesonotal setae lacking or very minute (one or two tiny setae present) or present as short bristles. Mesothoracic spiracles always inconspicuous; propodeal dorsum protuberant; placement of propodeal spiracle posteriad and near propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae lacking or very minute (one or two tiny setae present) or present as short bristles. ***Petiole.*** Dorsum

of node planar; node thick, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present or absent on first gastral tergite; marginal erect setae of gaster may be absent from first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour dark brown to black, sometimes with bluish iridescence. Colour of erect setae on coxae, clypeus yellowish-brown.

Measurements. *Worker* (n = 5)—CI 84–86; EI 31–33; EL 0.17–0.21; EW 0.13–0.16; HFL 0.64–0.73; HL 0.62–0.76; HW 0.53–0.65; ML 0.78–0.99; MTL 0.48–0.55; PpH 0.10–0.14; PpL 0.31–0.40; SI 90–96; SL 0.51–0.60.

Comments. This minute, grey-black to bluish *Iridomyrmex* (HW ≈ 0.5mm) is most reminiscent of *I. coeruleus*, but the anterior clypeal margin lacks a distinct prominence or spur. Workers are minute and among the smallest *Iridomyrmex*, only the morphologically identical *I. hertogi* (Northern Territory) being consistently smaller (see discussion under that species). The ant is found from south-east South Australia to southern Queensland, but relatively few specimens are known. A worker from Wyperfeld NP was collected in a malaise trap in mallee with a *Leptospermum* understory, suggesting that the species will forage on low vegetation.

Etymology. Latin: 'black'.

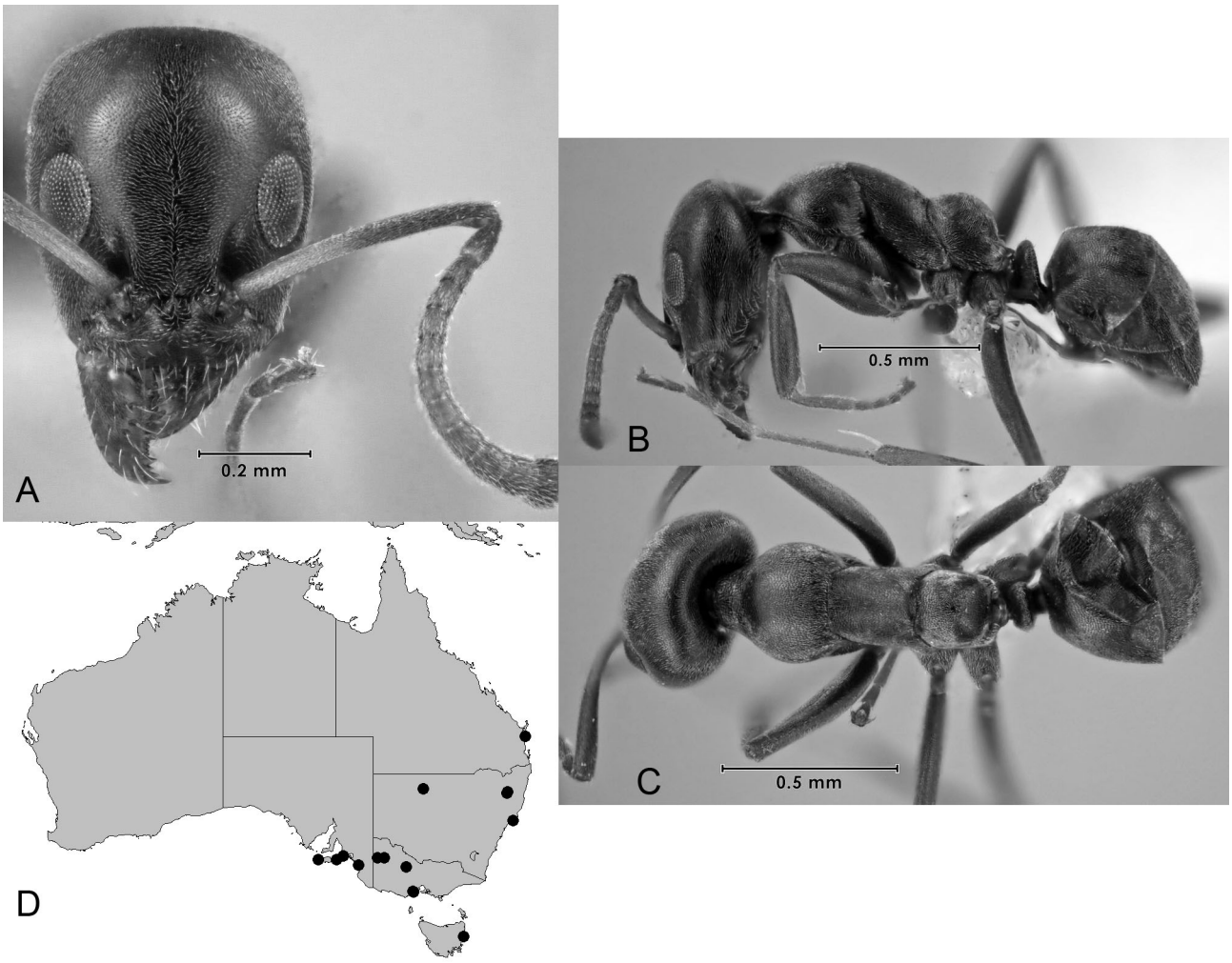


FIGURE 56. *Iridomyrmex niger* (Coorong-Keith, Bunbury, SA, ANIC32-037334): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Iridomyrmex nudipes sp. n.

(Fig. 57)

Types. Holotype worker from Lake Wyangan bank, Griffith, New South Wales, 17 July 1979, B. B. Lowery, 10am foragers on mallee stem (ANIC, ANIC32-040009). Paratypes: 6 workers, same data as holotype (ANIC, 2 workers;

BMNH, 2 workers; MCZC, 2 workers); 1 worker from Moonarie, 10km S of Homestead, Gawler Ranges, South Australia, October 1972, P. J. M. Greenslade (ANIC, ANIC32-042660).

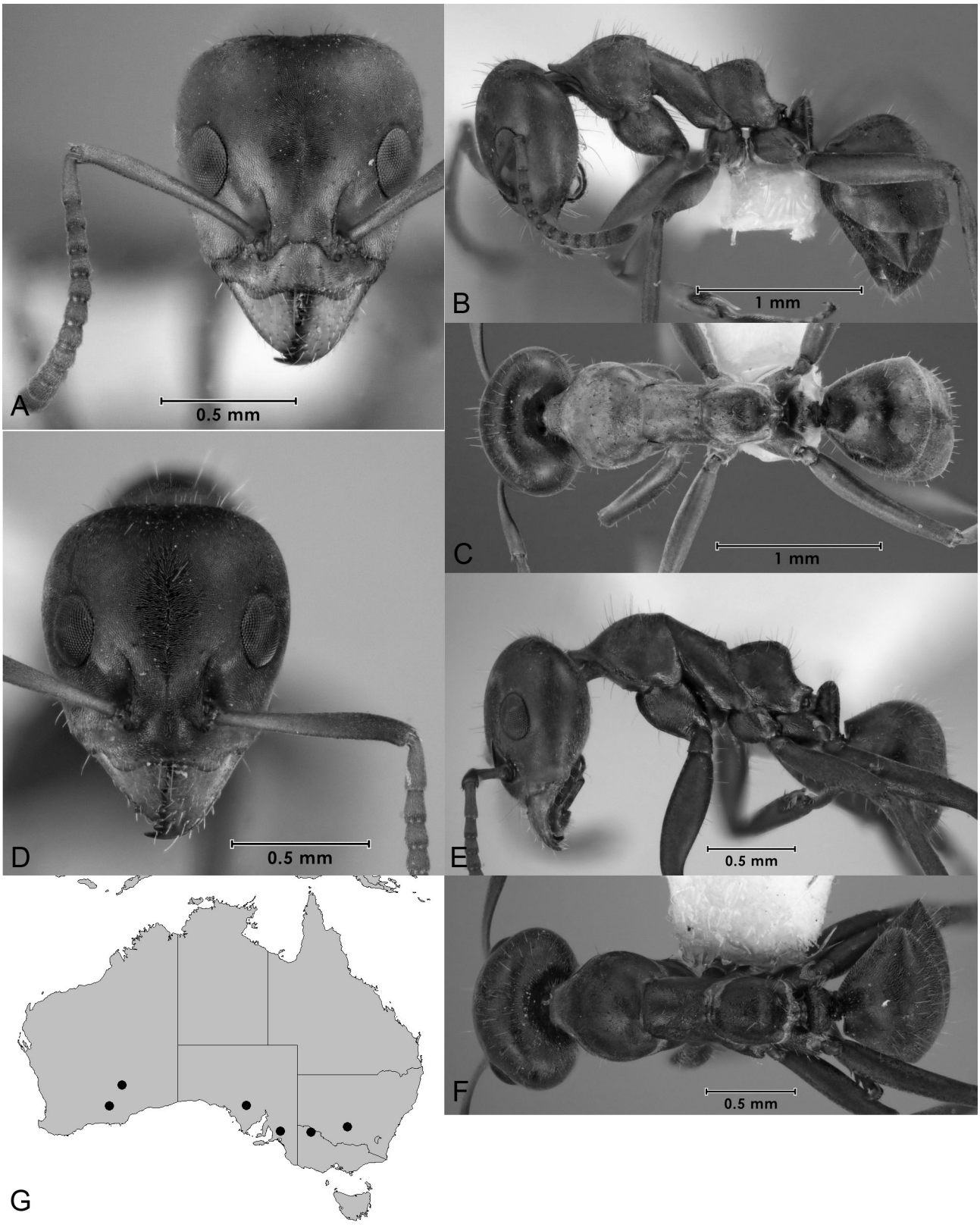


FIGURE 57. *Iridomyrmex nudipes*, pale form (holotype, Griffith, NSW, ANIC32-040009): A. Front of head; B. Side of body; C. Top of body. *Iridomyrmex nudipes*, dark form (46km E Norseman, WA, ANIC32- 32-031872): D. Front of head; E. Side of body; F. Top of body; G. Distribution of material examined.

Worker Description. ***Head.*** Posterior margin of head weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular. Frontal carinae concave; antennal scape barely attaining posterior margin of head, or surpassing it by less than 1 x its diameter. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin present as an indistinct swelling or undulation; mandible regularly triangular with oblique basal margin; long, curved setae on venter of head capsule present. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae moderate in number to numerous (6 or more) and longest setae elongate, flexuous and/or curved. Mesonotum straight. Erect mesonotal setae numerous (12 or more), short and bristly. Mesothoracic spiracles always inconspicuous; propodeal dorsum protuberant; placement of propodeal spiracle posteriad and near propodeal declivity, or mesad, more than its diameter away from propodeal declivity; propodeal angle present as a bluntly defined right angle, the dorsal and declivitous propodeal faces never separated by a carina. Erect propodeal setae numerous (12 or more) and elongate, flexuous and/or curved, or numerous (12 or more), short and bristly. ***Petiole.*** Dorsum of node convex; node thick, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour frons and legs tawny orange to brown, mesosoma orange to brick-red, gaster brown. Colour of erect setae yellow.

Measurements. *Worker* (n = 4)—CI 95–97; EI 26–28; EL 0.26–0.27; EW 0.20–0.22; HFL 1.04–1.13; HL 0.99–1.06; HW 0.95–1.02; ML 1.37–1.47; MTL 0.80–0.86; PpH 0.24–0.27; PpL 0.52–0.59; SI 82–83; SL 0.79–0.84.

Comments. *Iridomyrmex nudipes* is a fairly nondescript member of the *viridigaster* complex that can be identified by its lack of erect setae on the hind tibiae and its thickish node. The known distribution of the species includes New South Wales and South Australia. This ant is a diurnal forager: workers near Griffith, New South Wales, were collected from mallee stems during mid-morning (10 am).

Etymology. Latin: '*nudus*' 'naked' plus '*pes*' 'foot'.

Iridomyrmex obscurior Forel

(Figs 58, 90)

Iridomyrmex discors obscurior Forel, 1902: 465 (raised to species by Shattuck, 1996: 42).

Types. Syntypes from Ballarat, Victoria (ANIC, ANIC32-009841, 1 worker, examined; MHNG, 4 workers).

Worker Description. ***Head.*** Posterior margin of head weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae present on sides of head in full-face view. Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular. Frontal carinae convex; antennal scape surpassing posterior margin of head by approximately 3 x its diameter, or surpassing posterior margin of head by approximately 2 x its diameter. Erect setae on scape present and abundant, or present and sparse; prominence on anteromedial clypeal margin projecting as blunt but distinct protuberance; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae numerous (12 or more), short and bristly. Mesonotum straight. Erect mesonotal setae numerous (12 or more), short and bristly. Mesothoracic spiracles always inconspicuous; propodeal dorsum smoothly and evenly convex; placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae numerous (12 or more), short and bristly. ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour medium to dark reddish-brown, gaster may be darker than foreparts, iridescence (weak greenish or bluish) confined to gaster. Colour of erect setae white or whitish. In some Victorian specimens mesosoma distinctly lighter than head, while it is only slightly lighter in other Victorian specimens as well as more northern populations.

Measurements. *Worker* (n = 11)—CI 91–93; EI 22–23; EL 0.25–0.27; EW 0.15–0.16; HL 1.19–1.29; HW 1.10–1.19; ML 0.52–0.57; PpH 0.16–0.18; PpL 0.64–0.68; SI 100–105; SL 1.14–1.19.

Comments. *Iridomyrmex obscurior* is most similar to *I. mayri,* but has a shorter antenna. In the field, most workers also lack the pale blue or purple iridescence usually seen in *I. mayri*. Preserved worker material can also be confused with large workers of *I. omalonotus*, but there is little if any biogeographical overlap between the two species, and body size together with the structure of the propodeum are determinative. Specimens of *I. suchieri* ('*Iridomyrmex obscurus*') are also similar, but this is a much smaller ant (HW ≤ 0.95mm) with an antennal scape that does not extend much beyond the head capsule. The range of *I. obscurior* is approximately the same as that of *I. mayri*, except that the ant does not occur much north of Brisbane, and the original type material was collected at Ballarat, Victoria. Label data reveals similar habitat preferences to *I. mayri,* and, like that ant, *I. obscurior* will also attend caterpillars of *Jalmenus evagoras*. This species was discussed by Shattuck (1996), in his revision of the *I. discors* species-group, but *I. obscurior* is actually not closely related to *I. discors*.

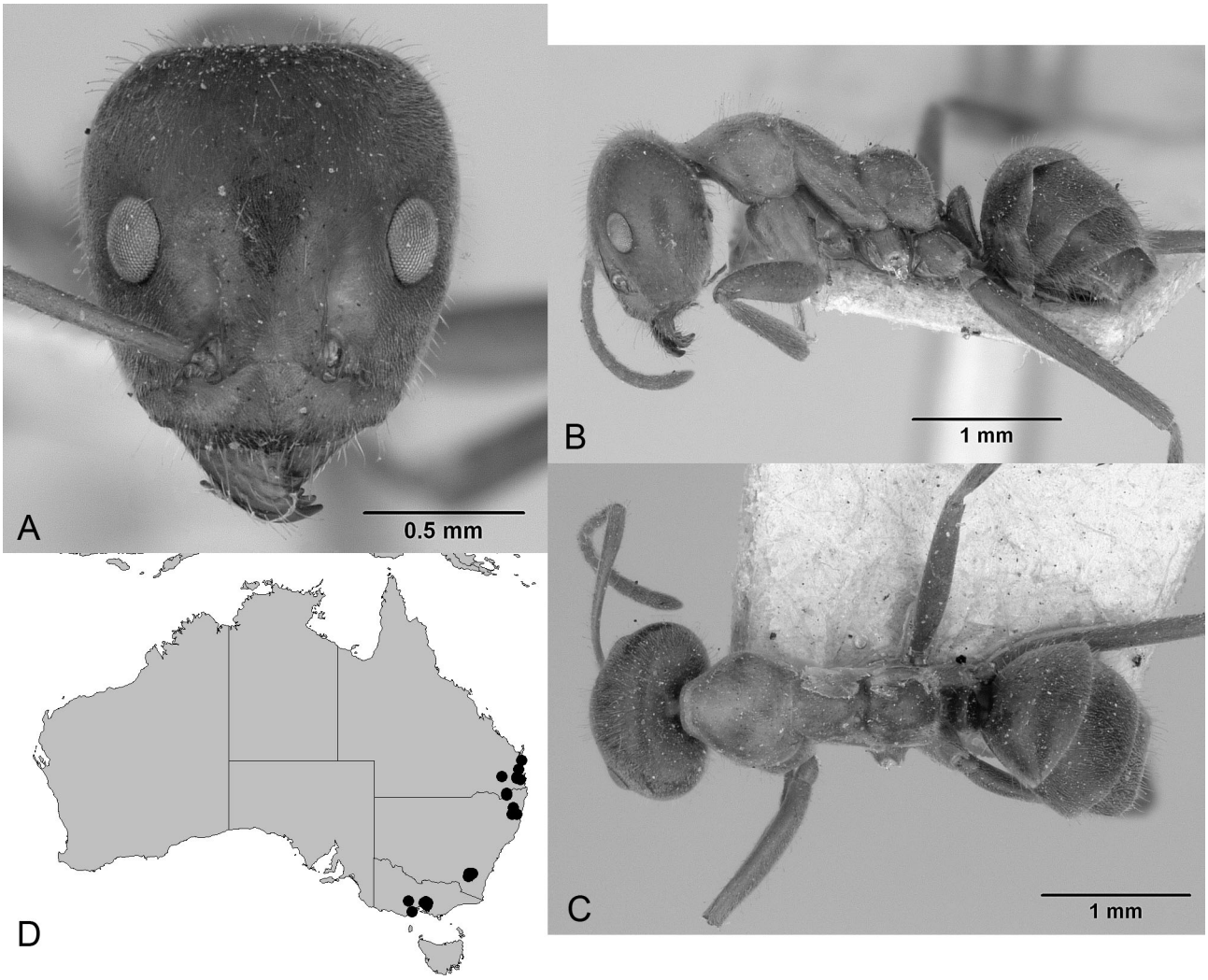


FIGURE 58. *Iridomyrmex obscurior* (syntype, Ballarat, Vic., ANIC32-009841): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined (A. Noble, www.antweb.org).

Iridomyrmex obsidianus **Emery**

(Figs 59, 87, 88)

Iridomyrmex obsidianus Emery, 1914: 419, pl. 13, fig. 13.

Types. Syntypes from Mt. Humboldt, 1600 m, New Caledonia (MCSN, 1 worker, examined; NHMB, 1 worker, Baroni Urbani, 1977).

Worker Description. ***Head.*** Posterior margin of head planar to weakly concave; erect setae on posterior margin absent; sides of head noticeably convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae concave; antennal scape surpassing posterior margin of head by approximately 3 x its diameter. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin always completely absent; mandible triangular with distinct angle between masticatory and basal margins; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae lacking or very minute (one or two tiny setae may be present). Mesonotum straight. Erect mesonotal setae lacking or very minute (one or two tiny setae present). Mesothoracic spiracles always prominent as small, vertical protuberances; propodeal dorsum protuberant; placement of propodeal spiracle posteriad and near propodeal declivity; propodeal angle present as a bluntly defined right angle, the dorsal and declivitous propodeal faces never separated by a carina. Erect propodeal setae lacking or very minute (one or two tiny setae present). ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour shining dark chocolate. Colour of erect setae pale yellow.

Measurements. *Worker* (n = 3)—CI 86–93; EI 25–25; EL 0.18–0.21; EW 0.12–0.13; HL 0.85–0.90; HW 0.73–0.84; ML 0.39–0.42; PpH 0.13–0.13; PpL 0.42–0.51; SI 107–119; SL 0.87–0.90.

Comments. The extremely shiny cuticle and rather long antennal scape (surpassing the posterior margin of the head by approximately 3 x its diameter) enable this ant to be distinguished readily from *I. calvus*, which is also found on New Caledonia. For other details see Shattuck (1993b).

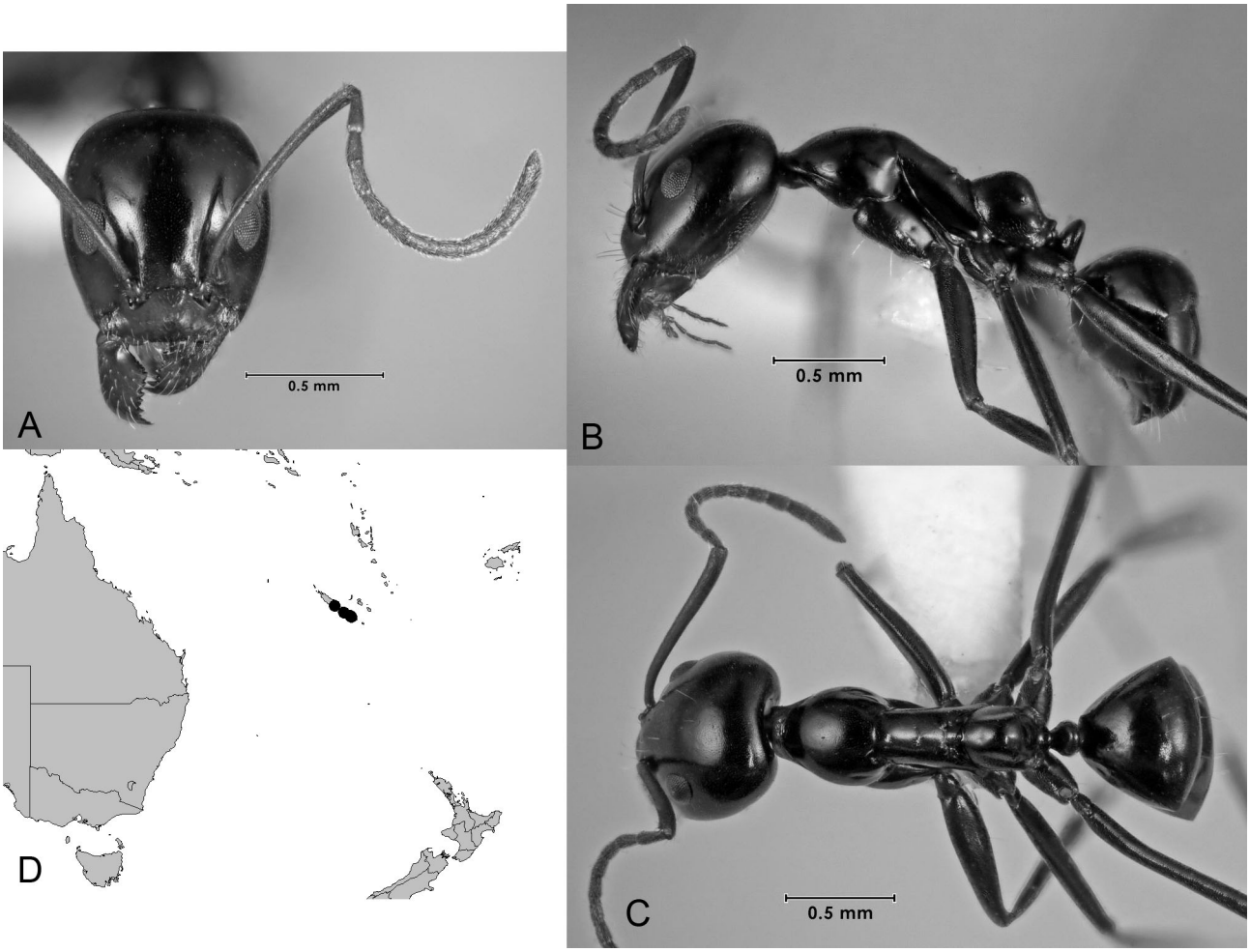


FIGURE 59. *Iridomyrmex obsidianus* (Mount Dzumac, New Caledonia, ANIC32-007293): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

***Iridomyrmex omalonotus* sp. n.**
(Figs 60, 90)

Types. Holotype worker from 5km S Borden, 34°05'S 118°15'E, Western Australia, 239m, 9 April 1992, S. Shattuck (ANIC, ANIC32-038854). Paratypes: 5 workers, same data as holotype (ANIC); 5 workers from Cliff Head, 29°31'33"S 114°59'44"E, Western Australia, 12 m, 20 September–9 November 2003, C. Lambkin, N. Starwick & J. Recsei, low closed mallee, malaise (ANIC, 3 workers, MCZC, 2 workers, ANIC32-030807); 3 workers from 46mi. SSW Coolgardie 31°33'S 120°48'E, Western Australia, 6 November 1969, R. W. Taylor, trunk strays mallee (BMNH, ANIC32-032124).

Worker Description. ***Head.*** Posterior margin of head weakly convex to planar, or planar to weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae present on sides of head in full-face view. Ocelli absent; in full-face view, eyes set above midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular, or asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae convex; antennal scape surpassing posterior margin of head by 0.2-0.5 x its length. Erect setae on scape present and sparse; prominence on anteromedial clypeal margin projecting as blunt but distinct protuberance; mandible regularly triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum moderately and evenly curved over its length, or weakly undulant or almost straight. Erect pronotal setae numerous (12 or more) and longest setae elongate, flexuous and/or curved, or numerous (12 or more), short and bristly. Mesonotum sinuous. Erect mesonotal setae moderate in number to numerous (6 or more), short and bristly. Mesothoracic spiracles always inconspicuous; propodeal dorsum straight and short (equal in length to propodeal declivity), or straight and long (half as long again as length of propodeal declivity); placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae sparse (6 or fewer) to numerous (12 or more), short and bristly. ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour shades of brown, gaster may be darker than foreparts. Colour of erect setae white, depigmented.

Measurements. *Worker* (n = 6)—CI 76–89; EI 25–28; EL 0.18–0.22; EW 0.13–0.18; HFL 1.08–1.37; HL 0.82–0.96; HW 0.63–0.86; ML 1.03–1.34; MTL 0.81–0.97; PpH 0.12–0.17; PpL 0.41–0.52; SI 116–141; SL 0.88–1.04.

Comments. *Iridomyrmex omalonotus* is a very common species that has a preference for drier habitats. The appearance of many workers is that of their eastern cousins, namely *I. mayri* and *I. obscurior*, but in a number of populations the propodeum is peculiarly flattened. However, the propodeum is variable in appearance, and efforts to find discrete characters to differentiate the most distinctive workers representing the two morphs have been unsuccessful. The view taken here is that variable propodeal shape is part of normal intraspecific variation in *I. omalonotus*. This ant can be distinguished from most others by its long, hairy antennal scapes, erect setae on the hind tibiae and sides of the head, and its relatively small size. Of the few species with which *I. omalonotus* can be confused, *I. spurcus* is found in the same habitat, but this species may be recognised by the unusually long setae on its legs and mesosoma (short and bristly in *I. omalonotus*—see species key). Morphological similarities between *I. omalonotus* and *I. obscurior* are also discussed under 'Comments' for the latter. *Iridomyrmex omalonotus* has been collected in Western Australia, Victoria, New South Wales and also South Australia, where this species makes terrestrial nests, denoted by a small mound (Renmark, South Australia: S. O. Shattuck, label data). Sandplain heathland, *Triodia*-covered sand dunes and mallee scrubland are typical habitats. The ant frequently ascends trees to forage, and unsurprisingly, label data indicates that a number of specimens have been collected using such methods as malaise traps and honey baits on tree-trunks. Interestingly, foragers have been collected at night (Cocklebiddy, Western Australia), although this ant is also diurnally active. On the basis of its known relationships and attraction to honey, this species is also likely to attend lycaenid caterpillars and honeydew-producing Hemiptera, although label data are lacking for this detail.

Etymology. Greek: *omalus*—'flat' plus Latin: *notus*—'back', referring to the appearance of the worker propodeum seen in profile.

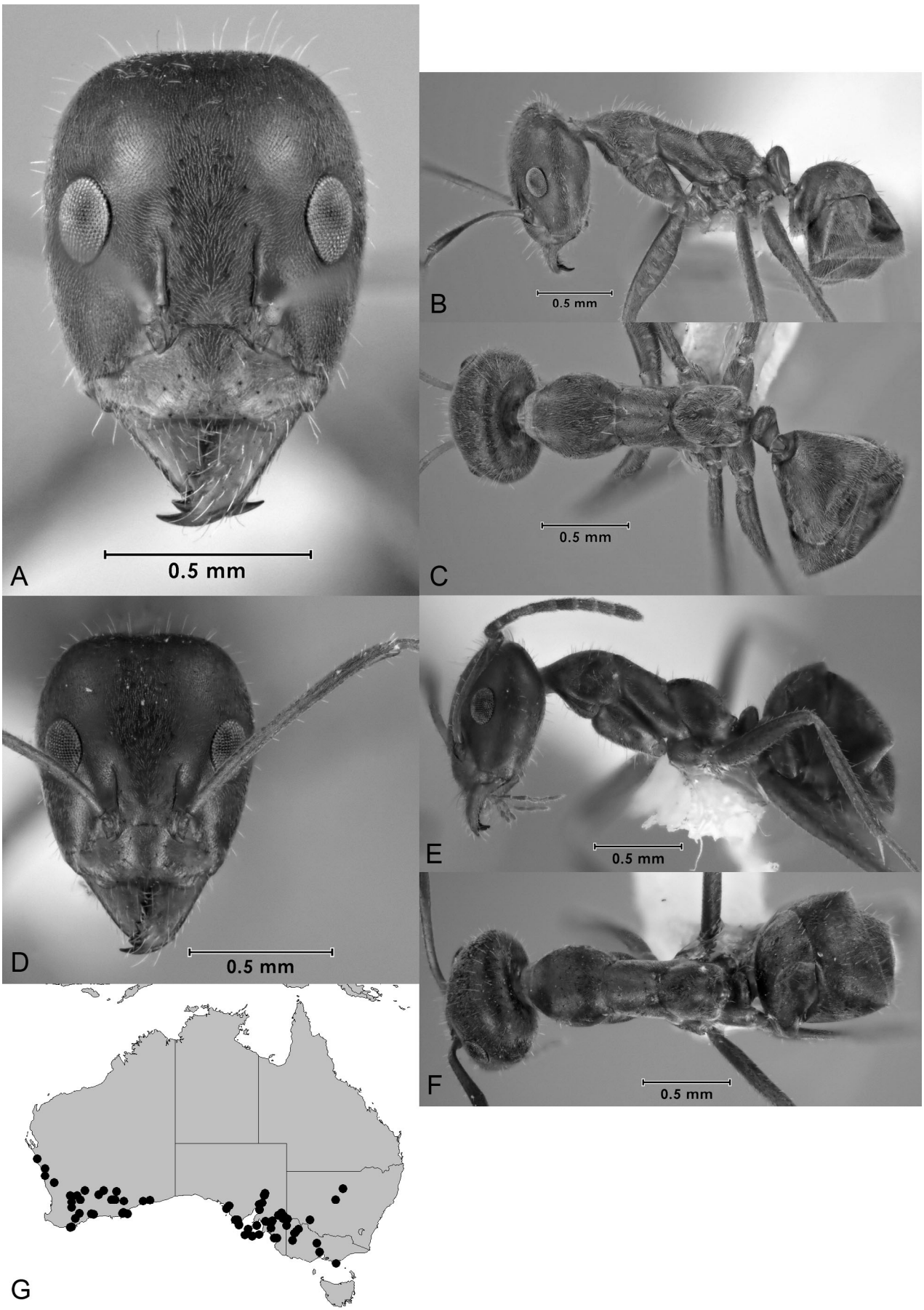


FIGURE 60. *Iridomyrmex omalonotus*, low propodeum form (Little Desert National Park, Vic., ANIC32-030796): A. Front of head; B. Side of body; C. Top of body. *Iridomyrmex omalonotus*, high propodeum form (45km N Balranald, NSW, ANIC 32-039412): D. Front of head; E. Side of body; F. Top of body; G. Distribution of material examined.

***Iridomyrmex pallidus* Forel, stat. n.**
(Fig. 61)

Iridomyrmex rufoniger pallidus Forel, 1901: 22 (footnote).
Iridomyrmex rufoniger pallidus pallidior Forel, 1915: 78 (footnote) (unavailable infrasubspecific name, see Taylor, 1986: 34).
Iridomyrmex rufoniger incertus Forel, 1902: 466 (first available use of *Iridomyrmex rufoniger pallidus incertus* Forel, 1901: 22, an unavailable infrasubspecific name). **New synonym.**
Iridomyrmex wingi Donisthorpe, 1949: 754. **New synonym.**

Types. *Iridomyrmex rufoniger pallidus* Forel: Lectotype worker (here designated) from Mackay, Queensland (MHNG, ANIC32-037651). Paralectotypes from Mackay, Queensland (MHNG, 18 workers, examined) and Cape York, Queensland (MCZC, 3 workers, examined). *Iridomyrmex rufoniger incertus* Forel: Syntype workers from Rabaul (as Ralum), East New Britain, Papua New Guinea (not located during this study). *Iridomyrmex wingi* Donisthorpe: Syntypes from Maffin-baai (as Maffin Bay), Irian Jaya, Indonesia (CASC, BMNH, 6 workers, examined).

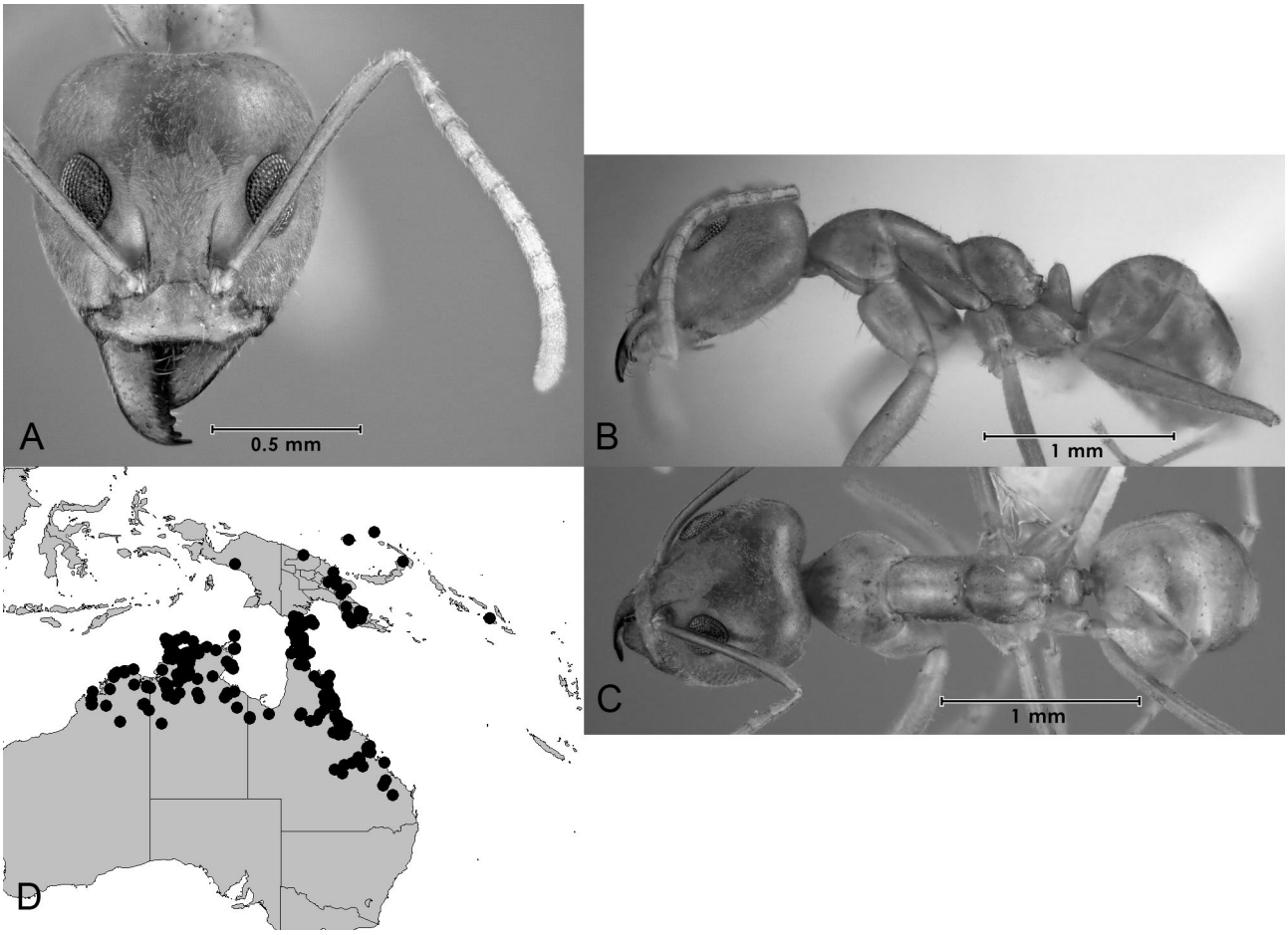


FIGURE 61. *Iridomyrmex pallidus* (Heathlands, Qld, ANIC32-043563): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Worker Description. ***Head.*** Posterior margin of head planar to weakly concave, or weakly concave, or strongly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae present on sides of head in full-face view, or absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set at about mid-point of head capsule; in profile, eye set anteriad of head capsule; eye asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin, or asymmetrical, curvature of inner eye margin more pronounced than its outer margin and anterior sector of eye distinctly broader than its posterior sector. Frontal carinae straight,

or convex; antennal scape surpassing posterior margin of head by 1–2 x its diameter. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin projecting as blunt but distinct protuberance, or present as an indistinct swelling or undulation; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae numerous (12 or more), short and bristly. Mesonotum straight. Erect mesonotal setae moderate in number (6–12), short and bristly, or sparse (6 or fewer) and bristly. Mesothoracic spiracles always inconspicuous; propodeal dorsum smoothly and evenly convex; placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae moderate in number (6–12), short and bristly. ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest present. Colour Tawny yellow-orange. Colour of erect setae yellow.

Measurements. *Worker* (n = 9)—CI 90–104; EI 24–30; EL 0.23–0.29; EW 0.18–0.22; HFL 1.18–1.42; HL 0.88–1.14; HW 0.80–1.16; ML 1.17–1.49; MTL 0.80–0.97; PpH 0.16–0.22; PpL 0.46–0.61; SI 88–109; SL 0.87–1.04.

Comments. *Iridomyrmex pallidus* is a distinctive pale yellow to brownish-yellow ant that is largely confined to the Torresian biogeographic zone. Two forms have been described (one with an invalid quadrinomial). Type material of the first, *I. rufoniger pallidus*, lacks genuine erect setae on the hind tibiae (although the occasional subdecumbent seta may be artificially bent in a vertical plane), whereas type material of the second, *I. rufoniger pallidus* '*pallidior'*, possesses genuine erect setae on the hind tibiae. The phenotypes meld together in a definite clinal pattern throughout the range of the genotype, with the hairiest workers being found in Papua New Guinea, and the most glabrous in the more southerly parts of the range on the Australian mainland. Intermediate forms (with a few erect setae on the hind tibiae) occur around the centre of the species' range, mainly on islands just off the Australian mainland, although populations also occur on the very far north of the Australian mainland. The species itself can be separated from other pale, large-eyed taxa by virtue of the position of the asymmetrical eyes and the abundant, small, subdecumbent and suberect setae that give most workers a shaggy appearance. This species is most closely related to *I. hartmeyer*i (whose workers are entirely or almost entirely glabrous), and recent molecular data has also linked it, more surprisingly, with the stick-nest ants (*I. conifer* and relatives) from the south-western part of the Australian continent, and with *I. alpinus* from the cool montane regions of New South Wales, Victoria and Tasmania (unpubl. data). The ant is found in northern Western Australia and Queensland and also occurs abundantly in the Northern Territory. Within its range, consisting mainly of tropical rainforest and tropical eucalypt forest, *I. pallidus* probably fills a similar niche to that filled by *I. hartmeyeri* in more xeric regions. This ant nests in soil and is mainly nocturnal. However, it may forage diurnally in suitable conditions: the Rev. Bede Lowery collected workers from tree-trunks at 3 pm in the afternoon, 160 km SW of Mackay. Furthermore, other ants collected by Rev. Lowery next to a PNG hotel were active on a garden tree at 9 am in the morning. Soil nests uncovered by the two authors of this paper near CSIRO Tropical Ecosystems Research Centre, Darwin, were identifiable by small mounds of topsoil on the ground surface.

While type material of *I. rufoniger incertus* Forel could not be located during this study, it seems highly likely that this taxon is synonymous with *I. pallidus*. Forel's (1901) description matches *I. pallidus*, he compared *incertus* with *pallidus* at several points in the description, and he established this name as a variety of *pallidus*. *Iridomyrmex pallidus* is distinct from the other known Papuan species of the genus (*I. anceps*, *I. coeruleus*, *I. mjobergi* and *I. angusticeps*) and it is unlikely that Forel would have confused this taxon with any of these species. The possibility exists that this name represents a taxon not seen during this study. However, in the unlikely event that this proves to be the case then this name can be resurrected and used for this additional species.

Donisthorpe's *I. wingi* matches the concept of *I. pallidus* developed here, and there is nothing to suggest that it represents a separate species. Donisthorpe (1949) provides no indication of how his species might differ from any other species in the genus as no other species are mentioned. Based on the material examined this synonymy is straightforward.

***Iridomyrmex phillipensis* sp. n.**
(Fig. 62)

Types. Holotype worker from Upper Long Valley, 29°07'S 167°57'E, Phillip Island (near Norfolk Island), 20–24 November 1984, I. D. Naumann & T. A. Weir, ANIC Ants Vial 39.166 (ANIC, ANIC32-038497). Paratypes: 2 workers, same data as holotype (ANIC); 3 workers from Red Road Valley, 29°07'S 167°57'E, Phillip Island (near Norfolk Island), 26 March–2 April 1984, J. E. Feehan (ANIC, ANIC32-038494); 3 workers from Upper Long Valley, 29°07'S 167°57'E, Phillip Island (near Norfolk Island), 26 March–2 April 1984, J. E. Feehan, ANIC Ants Vial 35.211 (MCZC, ANIC32-038494); 3 workers from between Red Road & Whitewood Valleys, 29°07'S 167°57'E, Phillip Island (near Norfolk Island), 20-24 November 1984, I. D. Naumann & T. A. Weir, ANIC Ants Vial 39.164 (BMNH, ANIC32-038496).

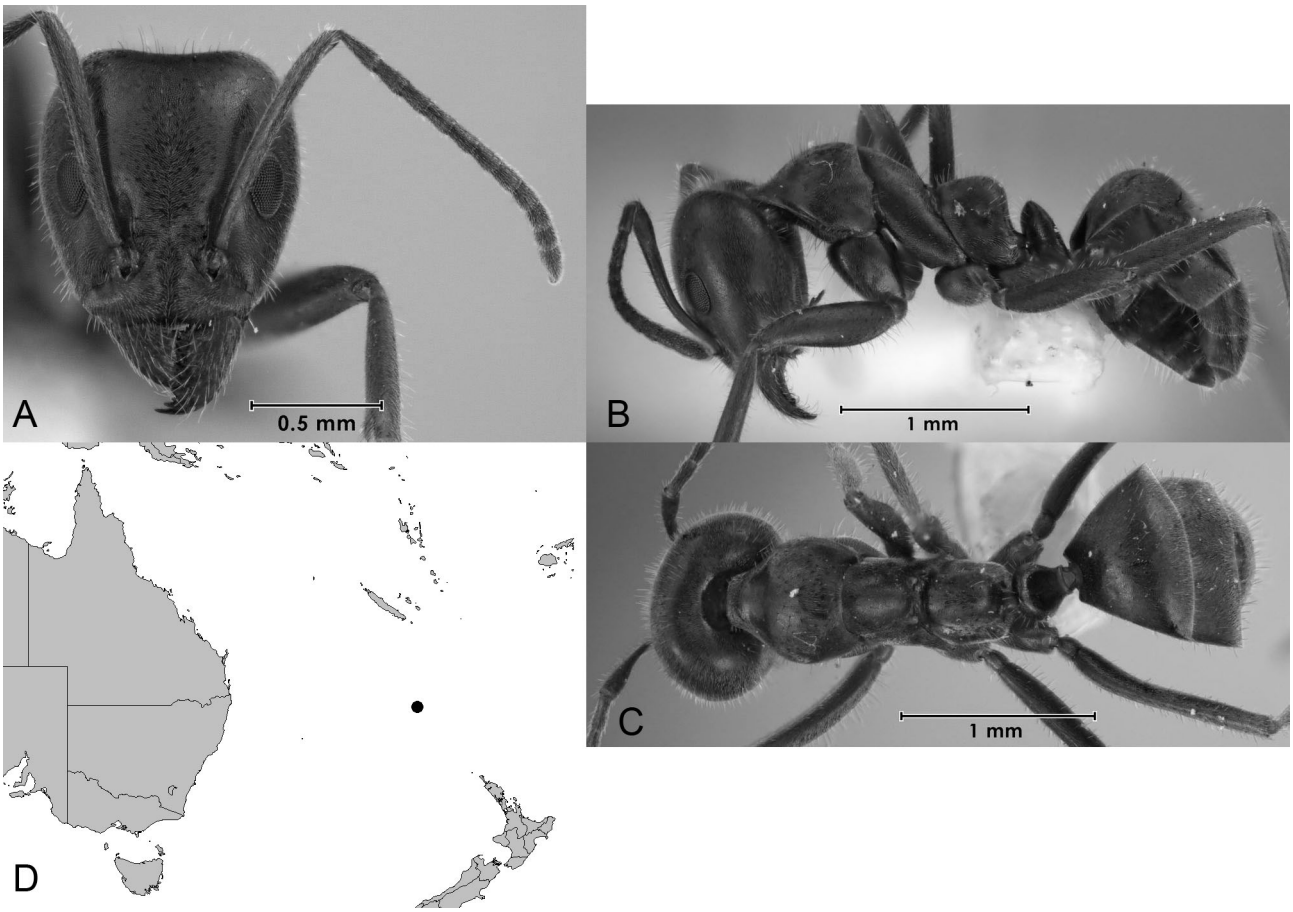


FIGURE 62. *Iridomyrmex phillipensis* (Upper Long Valley, Phillip Island (near Norfolk Island), ANIC32-038491): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Worker Description. ***Head.*** Posterior margin of head strongly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae present on sides of head in full-face view. Number of ocelli one (a minute ocellus), position of obsolete ocelli indicated by small pits only or pits lacking, or ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular. Frontal carinae convex; antennal scape surpassing posterior margin of head by 1-2 x its diameter. Erect setae on scape present and abundant; prominence on anteromedial clypeal margin present as an indistinct swelling or undulation; mandible regular triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae numerous (12 or more) and longest setae elongate, flexuous and/or curved. Mesonotum evenly curved. Erect mesonotal setae numerous (12 or more) and elongate, flexuous and/or curved. Mesothoracic spiracles always prominent as small, vertical protuberances; propodeal dorsum straight and short (equal in length to propodeal

declivity); placement of propodeal spiracle posteriad and near propodeal declivity, or mesad, more than its diameter away from propodeal declivity; propodeal angle present as a bluntly defined right angle, the dorsal and declivitous propodeal faces never separated by a carina. Erect propodeal setae numerous (12 or more), short and bristly. ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour coppery brown to blackish-brown, with yellowish-green to faintly bluish iridescence on gaster. Colour of erect setae light brownish-yellow.

Measurements. *Worker* (n = 6)—CI 87–94; EI 23–26; EL 0.21–0.23; EW 0.16–0.18; HFL 1.07–1.26; HL 0.92–1.08; HW 0.82–1.00; ML 1.17–1.43; MTL 0.76–0.90; PpH 0.22–0.25; PpL 0.50–0.60; SI 94–100; SL 0.82–0.95.

Comments. *Iridomyrmex phillipensis* is reminiscent of an extremely hirsute *I. suchieri*, but the iridescent gaster and the nature of the protuberant propodeum suggest that its true affinities are more likely to lie with *I. rufoniger* and relatives. This is the only *Iridomyrmex* confined to territory outside of the Australian mainland, apart from the three species found on New Caledonia. The nature of the propodeum separates this species from *I. suchieri*, the species with which it is most likely to be confused (some very hairy populations of *I.* '*obscurus*'), and also *I. rufoniger.* The species is endemic to Phillip Island, situated about 10 km south of Norfolk Island, where all known specimens were collected by J. Feehan in March/April 1984, and I. Naumann & T. Weir in Nov. 1984. The dates suggest the ants were collected in pitfall traps, but further information is lacking.

Etymology. The species is named after the island on which it was collected.

Iridomyrmex prismatis Shattuck

(Fig. 63)

Iridomyrmex prismatis Shattuck, 1993b: 1321, figs 20, 21, 36.

Types. Holotype worker from c. 15km WNW of Yaapeet, Wyperfield National Park, Victoria (ANIC, examined). Paratypes: same data as holotype (ANIC, 3 workers, examined).

Worker Description. ***Head.*** Posterior margin of head weakly convex to planar; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae present on sides of head in full-face view. Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin always completely absent; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule present. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae numerous (12 or more) and longest setae elongate, flexuous and/or curved. Mesonotum sinuous, or straight. Erect mesonotal setae numerous (12 or more), short and bristly. Mesothoracic spiracles prominent or inconspicuous; propodeal dorsum smoothly and evenly convex, or straight and short (equal in length to propodeal declivity); placement of propodeal spiracle posteriad and near propodeal declivity, or mesad, more than its diameter away from propodeal declivity; propodeal angle present as a bluntly defined right angle, the dorsal and declivitous propodeal faces never separated by a carina, or weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae numerous (12 or more), short and bristly. ***Petiole.*** Dorsum of node planar; node thick, orientated anteriad. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour brown to black, genae around mandibles and antennal flagellum orange in eastern states populations, pale bluish iridescence present on head and body. Colour of erect setae white.

Measurements. *Worker* (n = 6)—CI 90–94; EI 28–31; EL 0.25–0.29; EW 0.14–0.18; HL 0.90–1.09; HW 0.82–1.00; ML 0.35–0.46; PpH 0.13–0.18; PpL 0.51–0.62; SI 87–94; SL 0.75–0.89.

Comments. *Iridomyrmex prismatis* is a well-defined species that has recently been recorded from Western Australia (Esperance). Elsewhere in Australia this species has been collected in South Australia, Victoria and New South Wales. For other details of distribution and the ecology of the ant see Shattuck (1993b).

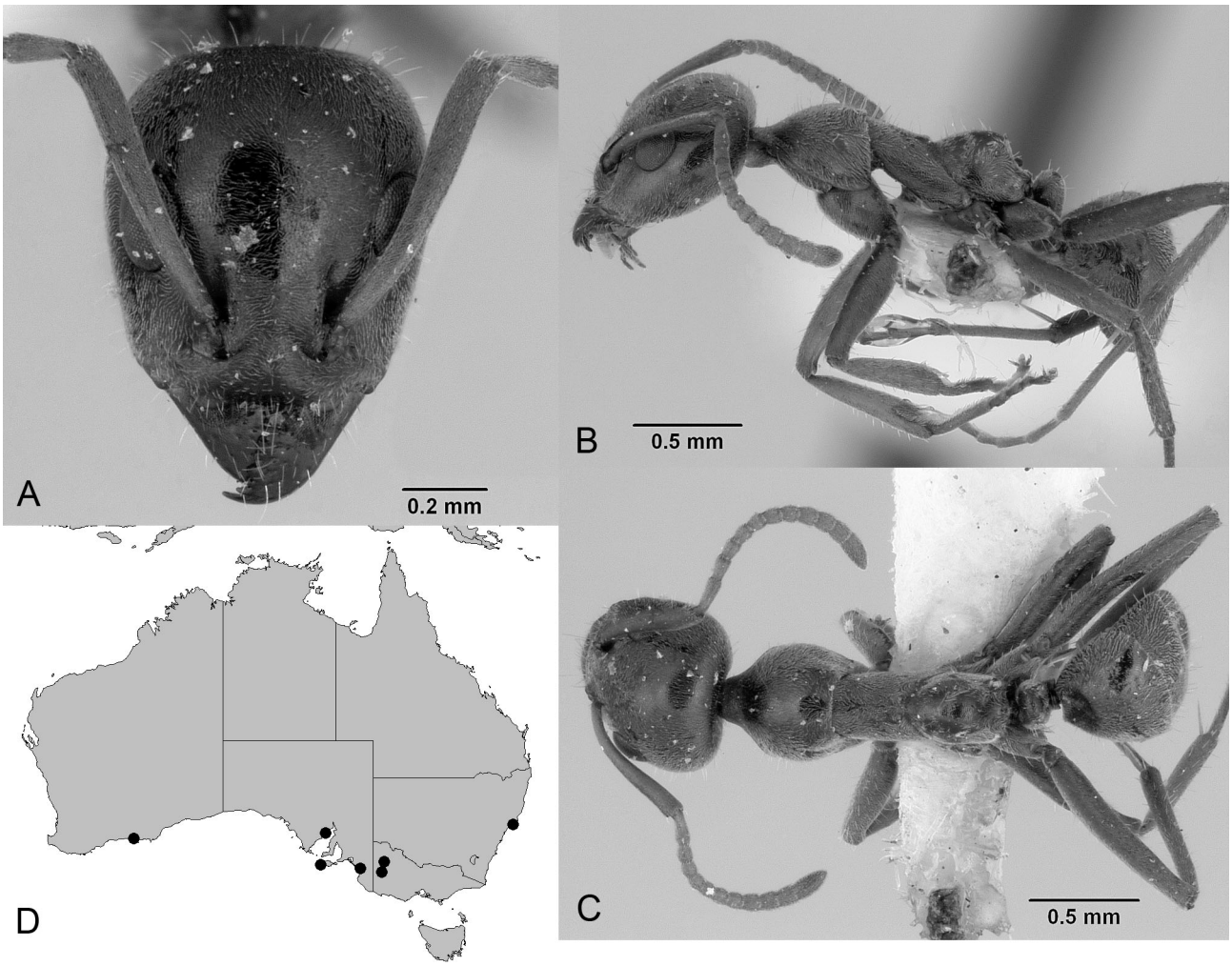


FIGURE 63. *Iridomyrmex prismatis* (holotype, Wyperfeld National Park, Vic., ANIC32-000018): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined (A. Noble, www.antweb.org).

Iridomyrmex purpureus (F. Smith)

(Fig. 64)

Iridomyrmex purpureus F. Smith, 1858: 40.

Formica detecta Smith, F. 1858b: 36 (combination in *Iridomyrmex* by Dalla Torre, 1893: 168; junior synonym of *purpureus* by Lowne, 1865a: 275; Mayr, 1876: 81; Taylor & Brown, D.R., 1985: 102).

Liometopum aeneum Mayr, 1862: 704 (junior synonym of *purpureus* by Mayr, 1876: 81).

Formica smithii Lowne, 1865a: 276 (junior synonym of *purpureus* by Mayr, 1870: 955; Taylor & Brown, D.R., 1985: 102).

Camponotus horni Kirby, W.F. 1896: 205 (junior synonym of *purpureus* by Clark, 1930c: 20; lectotype designated by Shattuck, 1993a: 132).

Iridomyrmex detectus castrae Viehmeyer, 1925a: 31 (subspecies of *purpureus* by Taylor & Brown, D.R., 1985: 102; junior synonym of *purpureus* by Shattuck, 1993a: 128).

Iridomyrmex greensladei Shattuck, 1993a: 122, fig. 11. **New synonym.**

Types. *Iridomyrmex purpureus* F. Smith: Holotype worker from Melbourne, Victoria (BMNH). *Formica detecta* Smith: Syntype(s) from Hunter River, New South Wales (BMNH, queen(s)). *Liometopum aeneum* Mayr: Holotype queen from Australia (as New Holland) (NMW). *Formica smithii* Lowne: Syntype(s) from Sydney, New South Wales (BMNH, material uncertain). *Camponotus horni* Kirby: Lectotype (designated by Shattuck, 1993a: 132) from Palm Creek, Northern Territory (MVMA, worker). Paralectotypes, same data as lectotype (BMNH, 2 workers; MCZC, 2 workers; MVMA, 2 workers). *Iridomyrmex detectus castrae* Viehmeyer: Syntype from Liverpool, New South Wales (MHNG, 1 worker). *Iridomyrmex greensladei* Shattuck: Holotype worker from 15km WSW of

Israelite Bay, 33°41'16"S 123°43'03"E, Western Australia (ANIC, ANIC32-014957, examined). Paratypes: same data as holotype (ANIC, 13 workers, 5 queens, 39 males (ANIC32-015000), examined; BMNH, 4 workers, 1 male; MCZC, 4 workers, 1 male).

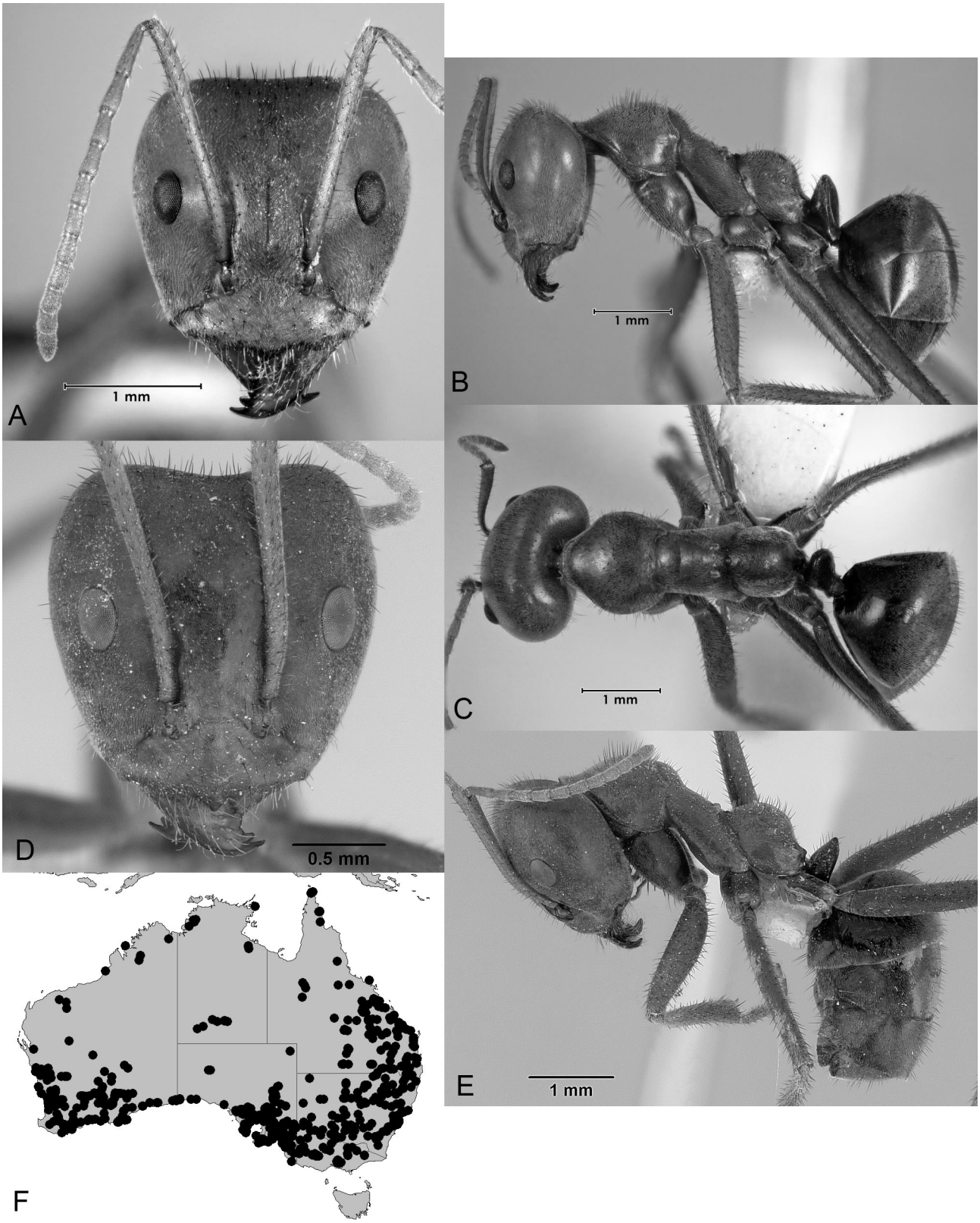


FIGURE 64. *Iridomyrmex purpureus*, eastern form (Belair, SA, ANIC32-008690): A. Front of head; B. Side of body; C. Top of body. *Iridomyrmex purpureus*, western form (*greensladei* holotype, Israelite Bay, WA, ANIC32-014957, images by A. Noble, www.antweb.org): D. Front of head; E. Side of body; F. Distribution of material examined.

Worker Description. ***Head.*** Posterior margin of head weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae present on sides of head in full-face view, or absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set above midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular. Frontal carinae convex; antennal scape surpassing posterior margin of head by approximately 3 x its diameter, or surpassing posterior margin of head by approximately 2 x its diameter. Erect setae on scape present and abundant; prominence on anteromedial clypeal margin projecting as triangular spur; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule present. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae numerous (12 or more), short and bristly. Mesonotum sinuous. Erect mesonotal setae numerous (12 or more), short and bristly. Mesothoracic spiracles always prominent as small, vertical protuberances; propodeal dorsum protuberant, or smoothly and evenly convex; placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae numerous (12 or more), short and bristly. ***Petiole.*** Dorsum of node acuminate; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour of head and often pronotum orange to brick-red, mesonotum and propodeum lighter than, concolorous with or darker than the head, gaster brown to black, legs orange to brown, foreparts with bluish, pink, pale greenish-yellow or purple iridescence, gaster with greenish, bluish or purple iridescence. Colour of erect setae brown.

Measurements. *Worker* (n = 84)—CI 89–103; EI 17–22; EL 0.33–0.42; EW 0.18–0.26; HL 1.69–2.31; HW 1.51–2.29; ML 0.76–1.26; PpH 0.21–0.44; PpL 0.83–1.28; SI 86–104; SL 1.57–2.05.

Comments. Physically, *I. purpureus* workers are difficult to distinguish from *I. lividus*, and these two species form a complex, along with the much more localised *I. spadius*, that can be distinguished from other meat ant complexes by the shape of the pronotum when seen in profile. *Iridomyrmex greensladei* (Shattuck, 1993a) is supposedly separated from *I. purpureus* by the hue of its head and pronotum, which are concolorous with the rest of the mesosoma (lighter than the rest of the mesosoma in *I. purpureus*). The two nominal species were regarded as non-sympatric by Shattuck (his figures 11 and 13 form a nice symmetry). Additional evidence adducing that *I. greensladei* and *I. purpureus* were separate came from Halliday (1979 and 1981) who examined the enzymes esterase and amylase within the *I. purpureus* species-group. That researcher found differing amylase allele frequencies that suggested that *I. purpureus* and *I. greensladei* clustered into two separate groups (along with other meat ant forms). However, research during the present study has failed to recover a clear distinction in colour between a number of eastern and western populations of meat ants formerly categorised as '*greensladei*' and '*purpureus*', namely, some Western Australian populations have a head that is paler than the mesosoma, and vice-versa for some eastern states populations. Moreover, much worker material is indeterminate as to colour. Unpublished mitochondrial DNA (using the CO1 gene) has also failed to authoritatively distinguish western and eastern populations of '*greensladei*' and '*purpureus*'; indeed, the distance between the terminals falls well within what is normally regarded as acceptable for populations of the same species (<< 0.1 substitutions/site). The two nominal species also strongly overlap in regards to a number of morphometric measurements.

The work of Halliday notwithstanding, the evidence thus suggests that the common reddish meat ants of eastern and western Australia are conspecific. However, there is a caveat: the form found in the Yorke Peninsula in South Australia, and identified by Greenslade (1987) as 'small purple' or SP, was intended to be the same as *I. greensladei*. Although these ants are morphologically indistinguishable from some Western Australian *I. greensladei* and many *I. purpureus* (both of which have multiple entrance mound nests), they supposedly have a single nest entrance (Greenslade, 1987). However, Shattuck chose workers from Israelite Bay, Western Australia, 1000 km west of the Yorke Peninsula, for his *I. greensladei* holotype and paratypes, respectively. This means that the form SP found in the Yorke Peninsula (which has not thus far been subject to CO1 analysis) may yet prove to be genetically distinct, albeit morphologically cryptic. The decision made here is to treat the currently existing taxa represented by the eastern *I. purpureus* and the Western Australian '*I. greensladei*' as conspecific, with the latter name falling into synonymy: potentially, a new name could be erected if future research revealed the Yorke Peninsula ants were indeed a separate species.

Apart from the variation in colour used to separate *I. purpureus* and its junior synonym, *I. purpureus* populations exhibit an unsettling polymorphism in other respects, some in the extreme south-west of Western Australia referable to *I. greensladei* having erect setae on the genae while those outside that region have glabrous genae. Shattuck (1993a) found this pattern to be likely clinal. The colour of the erect setae found on all parts of the body, and to some degree the iridescence, can also vary: *I. purpureus* with pale setae are confined to the extreme south coast of Western Australia, compared with a much broader distribution for those populations possessing the normal, blackish setae. Again, Shattuck (1993a) could not separate the pale setae form from remaining populations of *I.* '*greensladei*' when other characters were considered. A tendency to pale greenish-blue to yellowish-green iridescence is also found in specimens from the Western Australian wheatbelt and goldfields, particularly on the humeri and the frons, but this is a more subtle character than the other two mentioned, and there is no hard-and-fast distinction between these and other members of the taxon. The difference in colour is much less marked, for example, than colour differences between *I. viridiaeneus* (also found in drier parts of the south-west) and all samples of *I. purpureus* seen. Other variants mentioned by Shattuck (1993a) include workers with reduced appressed pubescence on the first gastral tergite (found in South Australia and the Northern Territory).

In regard to their habits, Western Australian populations of what is regarded here as *I. purpureus* are in conformity with typical behaviour seen in *I. purpureus* in Eastern Australia. As mentioned above, both ants, for example, form large pebble mounds with multiple nest holes. Wherever it occurs, *I. purpureus* is extremely pugnacious, and workers will pour out of entrance holes to attack any person or other creature that disturbs their nest. Workers forage on the ground and will also ascend trees in search of nectar and honeydew.

Iridomyrmex reburrus Shattuck

(Fig. 65)

Iridomyrmex reburrus Shattuck, 1993a: 132, figs 8, 14.

Types. Holotype worker from Kapalga, Kakadu National Park, 12°33'S 132°19'E, Northern Territory (ANIC, ANIC32-008780, examined). Paratypes: same data as holotype (ANIC, ANIC32-008781, 28 workers, examined; BMNH, 2 workers; MCZC, 2 workers).

Worker Description. ***Head.*** Posterior margin of head planar to weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae present on sides of head in full-face view. Ocelli absent; in full-face view, eyes set above midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular. Frontal carinae convex; antennal scape surpassing posterior margin of head by 1–2 x its diameter. Erect setae on scape present and abundant; prominence on anteromedial clypeal margin projecting as triangular spur; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae numerous (12 or more), short and bristly. Mesonotum sinuous. Erect mesonotal setae numerous (12 or more), short and bristly. Mesothoracic spiracles always prominent as small, vertical protuberances; propodeal dorsum protuberant, or smoothly and evenly convex; placement of propodeal spiracle posteriad and near propodeal declivity, or mesad, more than its diameter away from propodeal declivity; propodeal angle present as a bluntly defined right angle, the dorsal and declivitous propodeal faces never separated by a carina, or weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae numerous (12 or more), short and bristly. ***Petiole.*** Dorsum of node acuminate, or convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour foreparts orange to reddish, gaster dark brown to black, legs brown, iridescence on body and legs (where present) pinkish, iridescence on gaster yellow-green to bluish. Colour of erect setae brown to dark brown.

Measurements. *Worker* (n = 31)—CI 86–95; EI 17–21; EL 0.26–0.36; EW 0.16–0.23; HL 1.46–2.09; HW 1.26–1.99; ML 0.64–1.06; PpH 0.19–0.32; PpL 0.69–1.06; SI 89–108; SL 1.36–1.82.

Comments. In contrast with *I. purpureus* and its relatives, *I. reburrus* belongs to a largely northern meat ant complex in which the posterior pronotum rises rather abruptly towards its junction with the mesonotum (the posterior pronotum has a much more gradual slope in the *I. purpureus* complex). While *I. reburrus* workers can generally be distinguished by the erect setae on the sides of the head, this condition can also occur in the closely related

I. sanguineus, so it is desirable, if possible, to examine a series of ants (in the case of *I. sanguineus*, individuals without erect setae on the sides of the head are much more frequent than those possessing them, whereas all *I. reburrus* workers possess at least 2–4 erect setae and commonly 15–40 such setae: see Shattuck (1993a) for a fuller discussion of this feature). Living or freshly collected workers of *I. reburrus* also tend to be somewhat darker than *I. sanguineus* workers (Shattuck, 1993a).

Iridomyrmex reburrus shows a preference for riparian habitats (Andersen, 2000), and was recently found by the two authors of this paper to be particularly common near the Darwin (Northern Territory) International Airport, along the banks of Rapid Creek. Interestingly, isolated collections of *I. reburrus* have also been made in remote mallee country in south-eastern Western Australia (Emu Rock and Gora Hill), these colonies being well separated from other known populations (see Heterick, 2009).

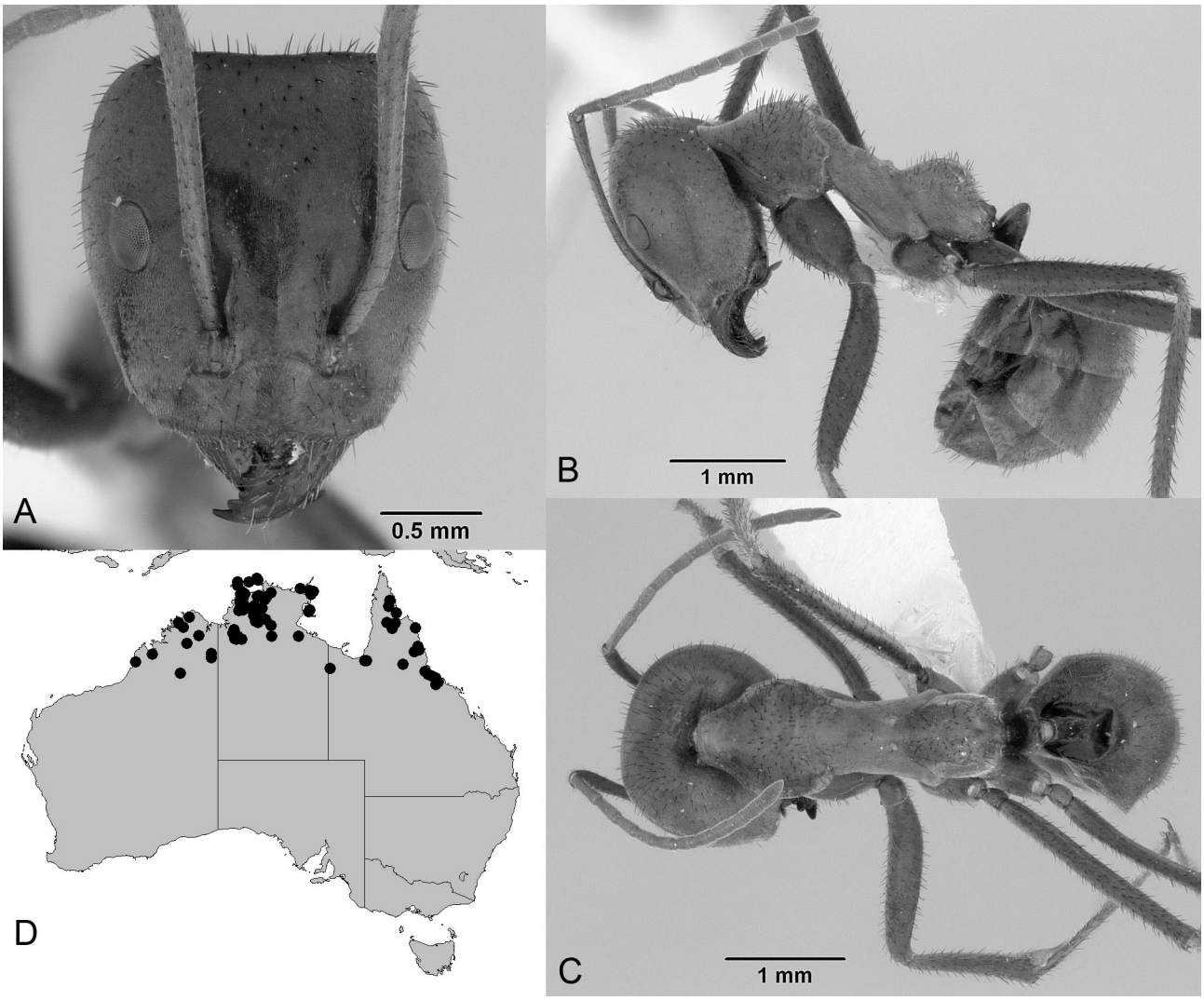


FIGURE 65. *Iridomyrmex reburrus* (holotype, Kakadu National Park, NT, ANIC32-008781): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined (A. Noble, www.antweb.org).

***Iridomyrmex roseatus* sp. n.**
(Figs 66, 89)

Iridomyrmex gracilis mayri eteocles Forel, 1915: 80 (unavailable infrasubspecific name, see Taylor, 1986: 34).

Types. Holotype worker from 13km ENE of Millstream, Western Australia, October, 1970, J. Feehan, ANIC Ants Vial 9.126 (ANIC, ANIC32-031951). Paratypes: 8 workers, same data as holotype (ANIC); 6 workers from Dovers

Hills, Western Australia, 23°08’S 128°40’E, 27 July 1967, K. T. Richards, ANIC Ants Vial 122.111 (MCZC, ANIC32-032003, 3 workers; BMNH, ANIC32-042402, 3 workers).

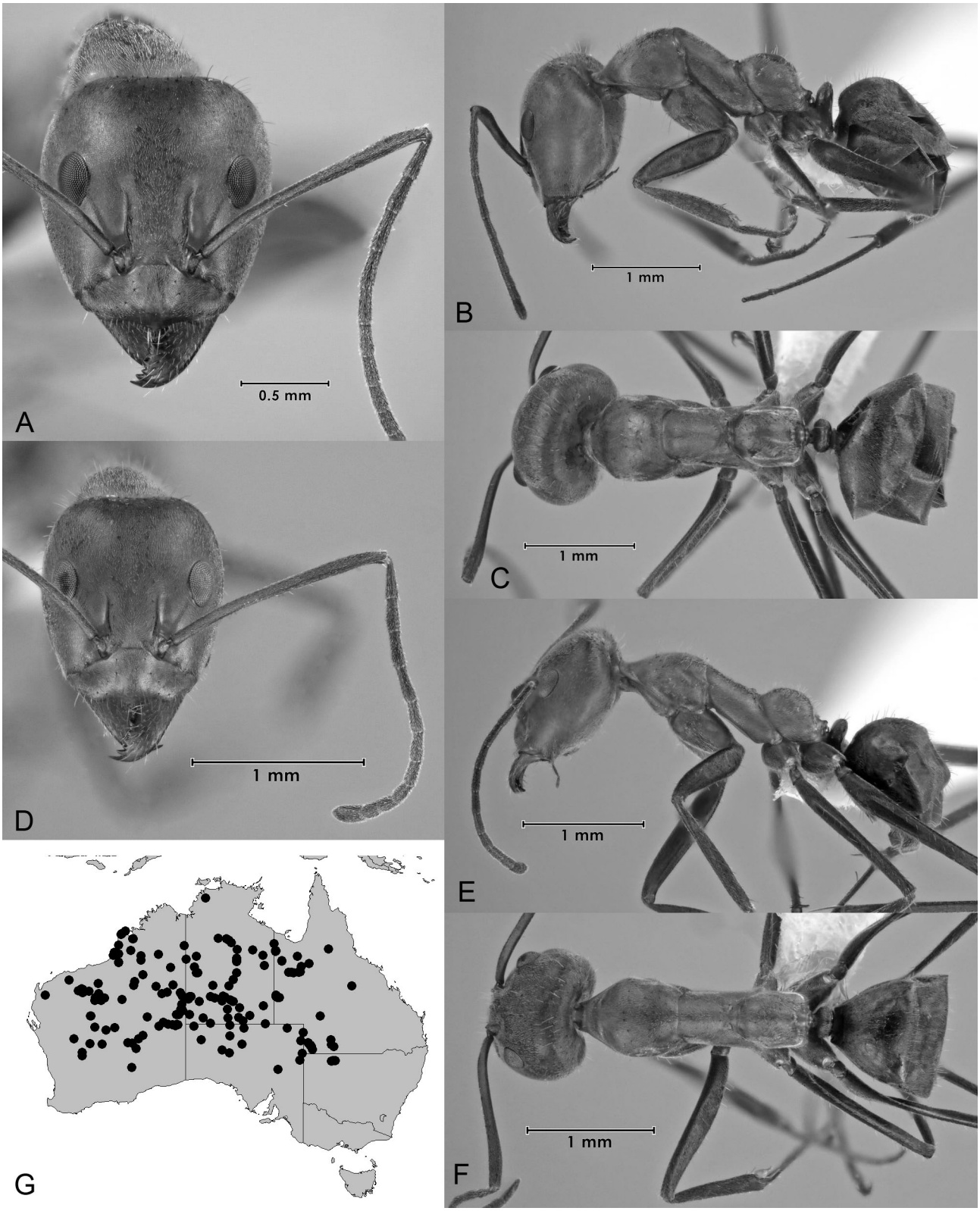


FIGURE 66. *Iridomyrmex roseatus*, robust form (Cravens Peak Station, Qld, ANIC32-035444): A. Front of head; B. Side of body; C. Top of body. *Iridomyrmex roseatus*, slender form (Cravens Peak Station, Qld, ANIC32-036830): D. Front of head; E. Side of body; F. Top of body; G. Distribution of material examined.

Worker Description. ***Head.*** Posterior margin of head weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae present on sides of head in full-face view. Ocelli absent; in full-face view, eyes set above midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular, or asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae convex; antennal scape surpassing posterior margin of head by 0.2–0.5 x its length. Erect setae on scape present and sparse; prominence on anteromedial clypeal margin projecting as triangular spur; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum moderately and evenly curved over its length, or weakly undulant or almost straight. Erect pronotal setae numerous (12 or more) and longest setae elongate, flexuous and/or curved. Mesonotum straight. Erect mesonotal setae numerous (12 or more), short and bristly. Mesothoracic spiracles always prominent as small, vertical protuberances; propodeal dorsum straight and long (half as long again as length of propodeal declivity); placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae numerous (12 or more), short and bristly. ***Petiole.*** Dorsum of node acuminate, or convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour foreparts orange or reddish, gaster and legs brown to black, iridescence on foreparts usually pink, iridescence on gaster bluish to greenish-yellow. Colour of erect setae pale yellow to whitish.

Measurements. *Worker* (n = 6)—CI 86–91; EI 22–24; EL 0.26–0.32; EW 0.20–0.25; HFL 1.94–2.23; HL 1.26–1.56; HW 1.09–1.37; ML 1.74–2.10; MTL 1.45–1.66; PpH 0.23–0.30; PpL 0.63–0.81; SI 110–127; SL 1.38–1.56.

Comments. The phylogenetic position of *I. roseatus* is uncertain, based purely on morphology. The strong anteromedial clypeal spur is identical with that seen in the *I. purpureus* species-group, but the long antennal scape with its paucity of erect setae and its mesosomal features suggest that it may belong elsewhere. Species related to *I. mayri* all lack a prominent anteromedial clypeal spur, and only *I. spurcus* is found in the more northerly regions of Australia. Possibly, *I. roseatus* is close to *I. anceps* and relatives, somewhere near *I. minor.* The features mentioned here ensure that this ant cannot be confused with any other. *Iridomyrmex azureus* comes very close, but its hind tibiae are glabrous, whereas hairy versions of *I. minor* itself lack iridescence (always present in *I. roseatus*). *Iridomyrmex roseatus* has a generally northern temperate and tropical distribution in Australia, and is recorded from all states except Victoria and Tasmania. From the experience of the authors of this paper, this species is common in drier areas. Workers have been collected in a variety of arid and semi-arid localities, often in mallee or mulga woodlands. Several series have been captured in malaise traps, and the species has been taken at *Hakea* blossoms. The habits of this medium-large ant are likely to be similar to those of meat ants, but details of behaviour and nest structure are lacking. Note that this species was recognised by Forel, who coupled it with *I. mayri*, but his name is unavailable (quadrinomial), and the association with *I. mayri* and relatives is tenuous for the reasons outlined above.

Etymology. Latin: ‘dressed in pink’.

Iridomyrmex rubriceps Forel, stat. n.

(Fig. 67)

Iridomyrmex gracilis rubriceps Forel, 1902: 468.

Types. Syntypes from Mackay, Queensland (ANIC, 2 workers, examined; BMNH, 5 workers, examined; MCZC, 2 workers, examined; MHNG, 8 workers, examined; NHMB, 1 worker).

Worker Description. ***Head.*** Posterior margin of head weakly convex to planar; erect setae on posterior margin in full-face view set in a row; sides of head convergent anteriad; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular. Frontal carinae convex; antennal scape surpassing posterior margin of head by approximately 3 x its diameter. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin projecting as triangular spur; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum

weakly undulant or almost straight. Erect pronotal setae numerous (12 or more), short and bristly. Mesonotum straight. Erect mesonotal setae moderate in number (6–12), short and bristly. Mesothoracic spiracles always prominent as small, vertical protuberances; propodeal dorsum smoothly and evenly convex; placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae moderate in number (6–12), short and bristly. ***Petiole.*** Dorsum of node convex, or planar; node thick, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour head orange, pronotum brownish-orange, rest of body brown. Colour of erect setae pale, depigmented yellow.

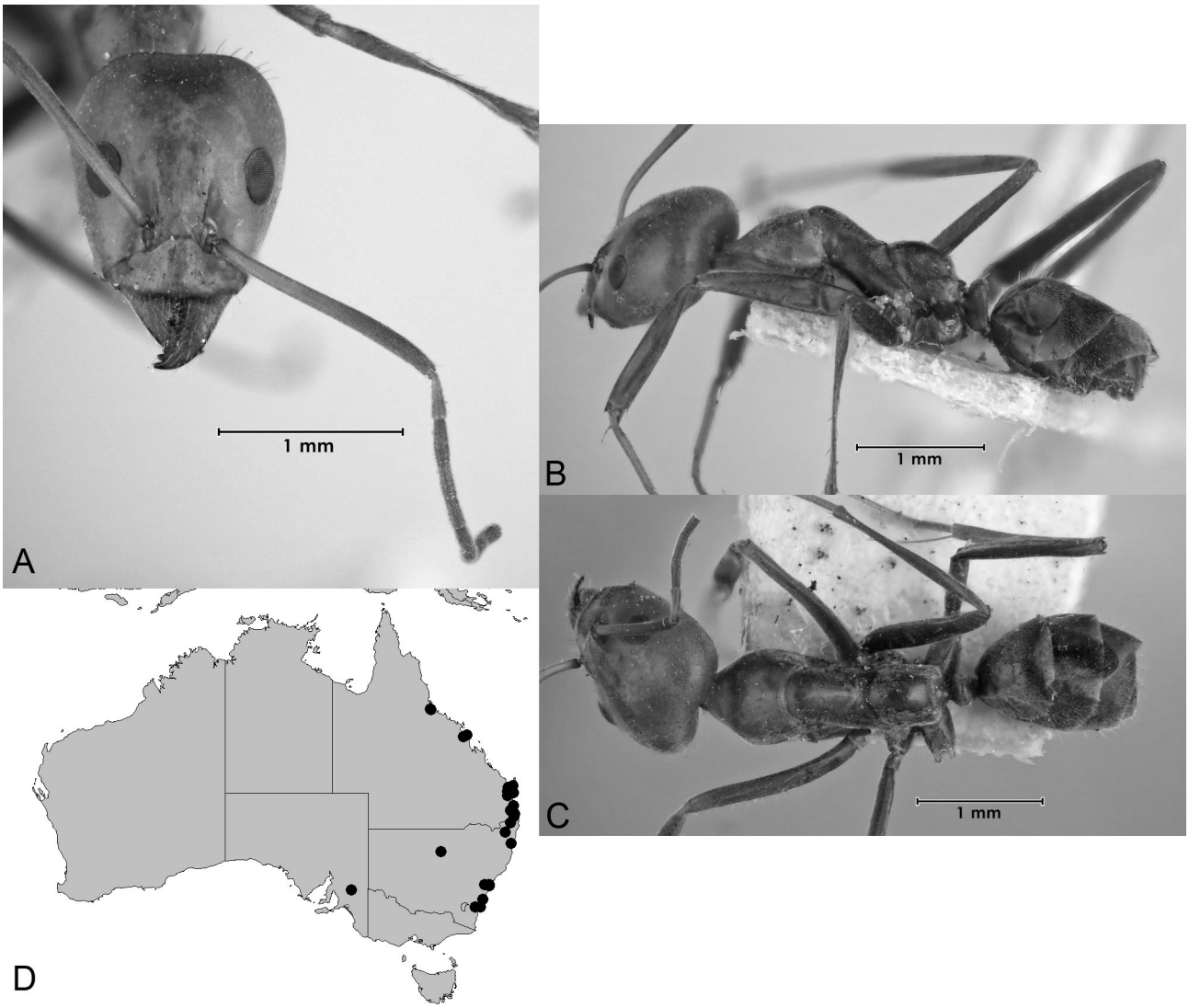


FIGURE 67. *Iridomyrmex rubriceps* (syntype, Port of Mackay, Qld, ANIC32-038937): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Measurements. *Worker* (n = 3)—CI 81–82; EI 24–24; EL 0.29–0.29; EW 0.22–0.23; HFL 2.26–2.28; HL 1.47–1.51; HW 1.20–1.23; ML 2.00–2.06; MTL 1.58–1.63; PpH 0.23–0.24; PpL 0.72–0.74; SI 123–124; SL 1.49–1.52.

Comments. *Iridomyrmex rubriceps* is the sister species to *I. agilis*, and can be distinguished from it as described in 'Comments' under the former species. *Iridomyrmex rubriceps* also differs in its habitat preferences, being an ant of the rainforest and wet sclerophyll forests of the Australian east coast. The taxon has been recorded

from Queensland and New South Wales (including one record from the Bogan River in central New South Wales). There is also one South Australia record that requires verification. This species appears to have different requirements to its sister species, various label data indicating that colonies have been located under rocks or stones rather than in the open ground preferred by *I. agilis*. Workers have also been taken from termite nests around logs in Castlereagh SF (New South Wales), and have been found foraging on low vegetation (Tamborine, Queensland) and tending lycaenid larvae (*Jalmenus evagoras*) (Maryborough, Queensland).

Iridomyrmex rufoinclinus Shattuck
(Fig. 68)

Iridomyrmex rufoinclinus Shattuck, 1993b: 1322, figs 34, 35, 37.

Types. Holotype worker from Edith Falls, Katherine Gorge National Park, 14°10'57"S 132°11'13"E, Northern Territory (ANIC, ANIC32-000062, examined). Paratypes: same data as holotype (ANIC, ANIC32-000061, 28 workers, examined; BMNH, 1 worker; MCZC, 1 worker).

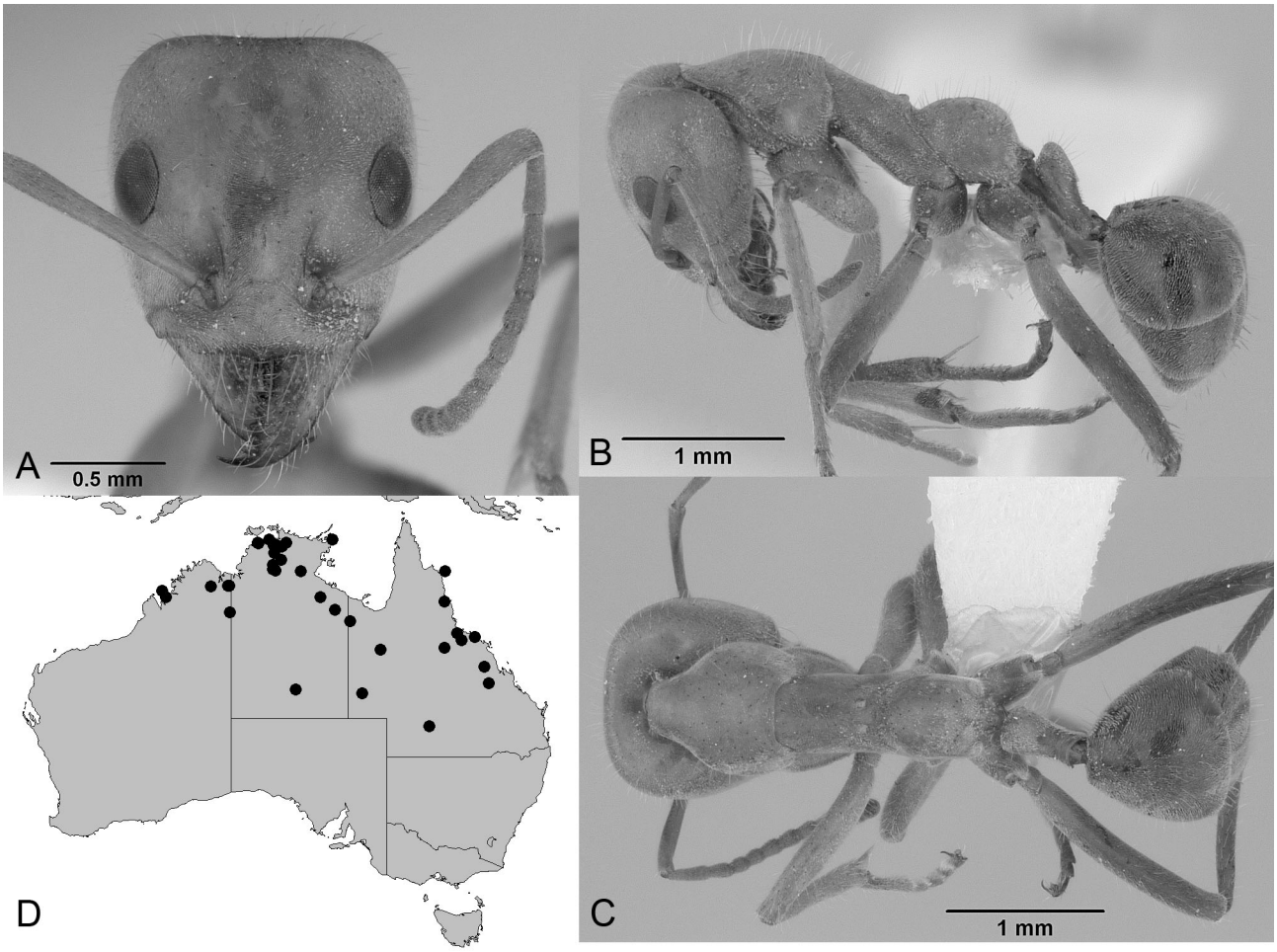


FIGURE 68. *Iridomyrmex rufoinclinus* (holotype, Katherine Gorge National Park, NT, ANIC32-000062): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined (A. Noble, www.antweb.org).

Worker Description. ***Head.*** Posterior margin of head weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae present on sides of head in full-face view. Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye more-or-less circular. Frontal carinae concave; antennal scape barely attaining posterior margin of head,

or surpassing it by less than 1 x its diameter. Erect setae on scape present and abundant, or present and sparse, or absent, except at tip; prominence on anteromedial clypeal margin present as an indistinct swelling or undulation; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule present. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae numerous (12 or more) and longest setae elongate, flexuous and/or curved. Mesonotum sinuous, or straight. Erect mesonotal setae numerous (12 or more) and elongate, flexuous and/or curved. Mesothoracic spiracles prominent or inconspicuous; propodeal dorsum smoothly and evenly convex; placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae numerous (12 or more) and elongate, flexuous and/or curved. ***Petiole.*** Dorsum of node convex; node reduced to anterior lip only, the rest incorporated in the petiole. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour foreparts and legs orange to brick red, gaster dark chocolate with blue iridescence. Colour of erect setae depigmented pale yellow.

Measurements. *Worker* (n = 15)—CI 91–98; EI 25–28; EL 0.31–0.37; EW 0.18–0.22; HL 1.20–1.44; HW 1.10–1.38; ML 0.55–0.70; PpH 0.16–0.22; PpL 0.69–0.82; SI 81–95; SL 0.96–1.18.

Comments. This species is distinctive in its colouration, being the only member of the *I. rufoinclinus* species-complex with a uniformly red or yellowish-red head and mesosoma and blue iridescence on the gaster. *Iridomyrmex rufoinclinus* occurs across the entire top end of Australia, from the Kimberley region to south central Queensland, and Shattuck (1993b) states that this species appears to favour woodland. Shattuck (1993b) also reports that workers from the colony from which the type series was taken were foraging throughout the day in a loosely formed column. Observations of other colonies revealed workers would move on to low vegetation. The nest housing ants belonging to the type series was a low, asymmetrical disc of loose soil, and had a single entrance hole.

Iridomyrmex rufoniger (Lowne)

(Figs 69, 92)

Formica rufonigra Lowne 1865a: 279.

Iridomyrmex rufoniger septentrionalis Forel, 1902: 465 (first available use of *Iridomyrmex rufoniger* r. *pallidus* var. *septentrionalis* Forel, 1901: 23, an unavailable infrasubspecific name). **New synonym.**

Acantholepis mamillatus Lowne, 1865b: 333 (combination in *Hypoclinea* by Mayr, 1870: 995; junior synonym of *I. rufoniger* (Lowne) by Mayr, 1876: 82).

Iridomyrmex rufoniger domestica Forel, 1907a: 291. **New synonym.**

Types. *Formica rufonigra* Lowne: Neotype worker (here designated) from Camden Haven, New South Wales, 18 November 1985, D.S. Horning, Jr., sweeping ocean beach vegetation (ANIC, ANIC32-038679; 13 additional workers from same series: ANIC, 8 workers; BMNH, 2 workers; MCZC, 3 workers). *Iridomyrmex rufoniger septentrionalis* Forel: Syntypes from Mackay, Queensland (ANIC, 2 workers, examined; MCZC, 2 workers, examined; MHNG, 12 workers, 3 queens, 14 males; NHMB, 1 worker). *Acantholepis mamillatus* Lowne: Syntypes from Sydney, New South Wales (BMNH, 1 worker, examined). *Iridomyrmex rufoniger domestica* Forel: Syntypes from Howlong, New South Wales (ANIC, 4 workers, examined); Richmond, New South Wales (ANIC, 3 workers, examined; MHNG, 14 workers, 5 queens, 19 males; NHMB, 1 worker, 1 male (missing gaster); OXUM, 2 workers, 1 male) and Sydney, New South Wales (MCZC, 3 workers, examined).

Worker Description. ***Head.*** Posterior margin of head weakly concave, or strongly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae present on sides of head in full-face view, or absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular. Frontal carinae convex; antennal scape surpassing posterior margin of head by 1–2 x its diameter. Erect setae on scape present and abundant, or present and sparse, or absent, except at tip; prominence on anteromedial clypeal margin projecting as blunt but distinct protuberance; mandible regular triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** pro-

notum strongly inclined anteriorly. Erect pronotal setae numerous (12 or more) and longest setae elongate, flexuous and/or curved. Mesonotum straight. Erect mesonotal setae moderate in number (6–12), short and bristly. Mesothoracic spiracles always inconspicuous; propodeal dorsum smoothly and evenly convex; placement of propodeal spiracle posteriad and near propodeal declivity, or mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae numerous (12 or more), short and bristly. ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour orange to dark brown, head and gaster usually darker than mesosoma, gaster with bluish, bluish-purple or yellowish-green iridescence. Colour of erect setae depigmented yellow.

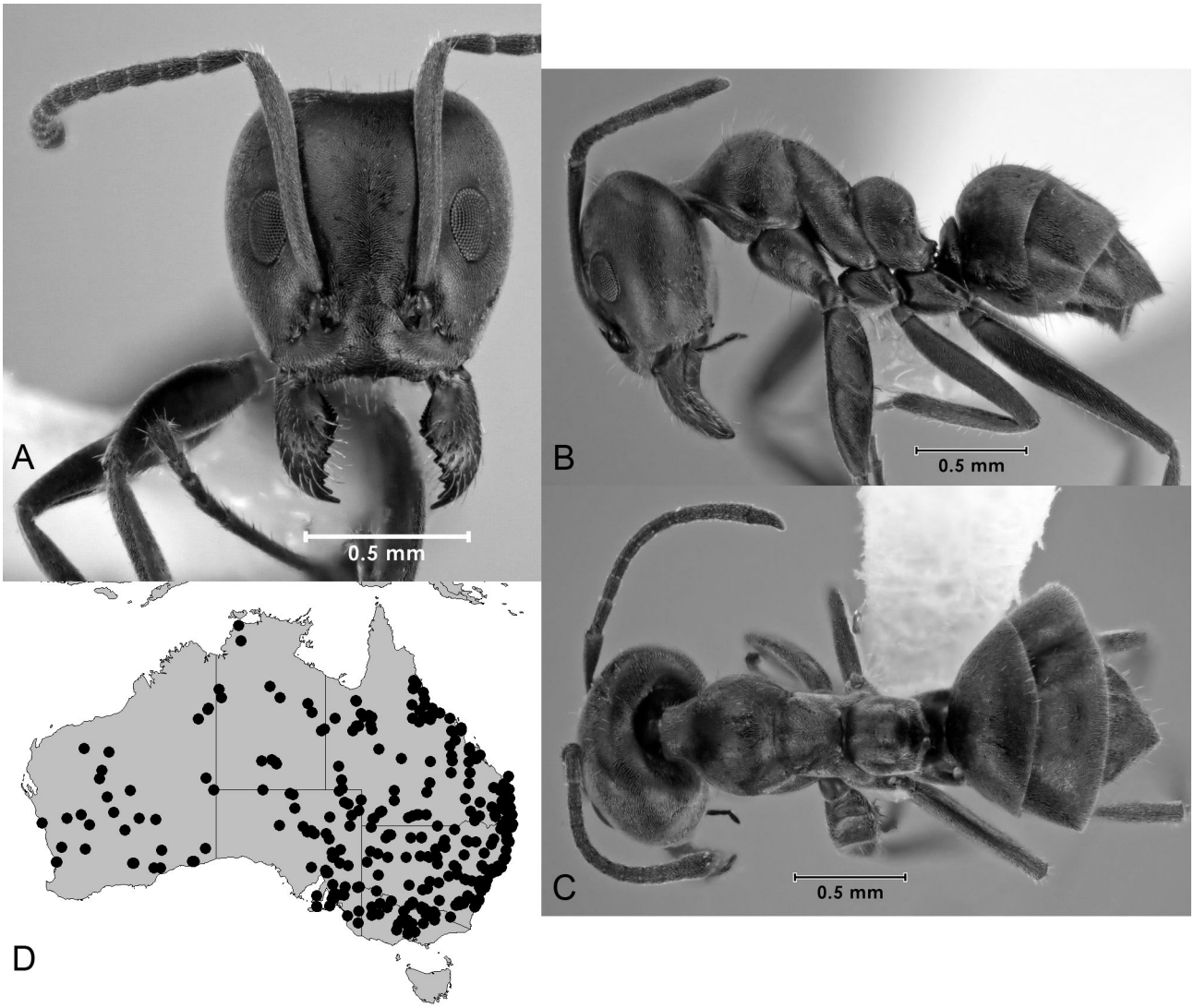


FIGURE 69. *Iridomyrmex rufoniger* (Canberra, ACT, ANIC32-023677): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined (excluding the introduced New Zealand population).

Measurements. *Worker* (n = 10)—CI 91–98; EI 22–25; EL 0.19–0.25; EW 0.15–0.20; HFL 0.93–1.24; HL 0.84–1.11; HW 0.79–1.08; ML 1.03–1.47; MTL 0.70–0.90; PpH 0.16–0.21; PpL 0.45–0.60; SI 84–96; SL 0.74–0.92.

Comments. *Iridomyrmex rufoniger*, along with the meat ants (*I. purpureus* group), *I. chasei* and *I. suchieri*, is the *Iridomyrmex* with which the Australian public is most familiar. At least on the eastern seaboard, this species is

at much at home on urban paths and verges and in backyards as it is in dry sclerophyll woodland, thick forest or heathland. Throughout its wide range *I. rufoniger* is morphologically variable, but not excessively so, with the result that identification is less problematic than in more morphologically polymorphic species such as *I. dromus* and *I. minor*. Typically, this species is a squat, broad-headed, short-scaped (SI 84-96), medium-sized *Iridomyrmex* with bluish- or yellowish-green iridescence on the gaster. Erect setae are always present on the hind tibiae but, except for a few isolated populations, are absent from the antennal scapes and the sides of the head. The pronotum is often noticeably humped, as with *chasei*, *gibbus* and *difficilis* (many workers), but the combination of erect hind tibial setae, size (*gibbus* and *difficilis* are much smaller with glabrous hind tibial setae) and lack of generalised iridescence on the gaster (*I. chasei*) will separate out workers of these species from workers of *I. rufoniger*. The most troublesome variation is seen in ants from the coastal regions of New South Wales, especially around Sydney. Here, there are populations consisting of small, dark workers with relatively narrow heads. The setae on the hind tibiae are small, inconspicuous and few in number, often just one or two near the base of the tibiae. In such cases, both hind tibiae should be checked and, if available, several workers should be examined, to ensure they can be separated from *I. victorianus*, which has glabrous tibiae. However, the more compact mesosoma, raised promesonotum and shorter antennal scapes of *I. rufoniger* (surpassing the posterior margin of the head by $1 \leq \times$ their greatest diameter, versus surpassing the posterior margin of the head by $1.5 \geq \times$ their greatest diameter in *I. victorianus*) can be used as definitive characters if the specimen is abraded. Narrow-headed workers can also be seen in some Queensland populations, but these are relatively hairy and pose no particular issues as far as recognition is concerned. Some hairy eastern populations of *I. suchieri* (*I.* '*obscurus*') may also resemble *I. rufoniger* workers, but the pronotum in the former species is more undulant than humped, and the propodeal dorsum is relatively straight and rounds over into the propodeal declivity through a distinct angle.

This ant is found in a variety of habitats in all mainland Australian states, although it appears to be rare in the Northern Territory and absent from the wet south-west corner of Western Australia for reasons that are unclear (one very old series from 'Perth, WA' is questionably from that locality). Specimens of the relatively glabrous coastal New South Wales phenotype have been intercepted in NZ at the ports of Auckland and Freyberg, but the species has not yet become established in NZ. Additionally, there is a single, very old series from a farm in New Caledonia, where the ant has almost certainly been introduced. Behaviourally, this species is typical of the smaller *Iridomyrmex*. Nests, which may be numerous within a given area, are made into soil, and the ants are dominant where they occur. Around the Western Australian goldfields town of Westonia this species is the most conspicuous ant in mine dumps, but is much less common in surrounding rehabilitated bushland. As with the morphologically similar and closely related *I. chasei*, *I. rufoniger* nests have a crater of loose dirt at the entrance, and workers may forage nocturnally as well as diurnally. Some nests are also made under stones. Workers will ascend eucalypts in search of nectar and honeydew, and label data also records scavenging of dead insects. There is, in fact, a considerable amount of label data on the dietary preferences of this species: the ants are known to tend the scale *Saisettia oleae* and the aphid *Aphis hederae*, as well as tend larvae of at least four lycaenid butterflies, namely, *Jalmenus daemeli*, *J. evagoras*, *J. icilius* and *Ogyrus zosine*. Foraging on the flowers of *Leptospermum* is also noted on several labels. This species has been known to enter Canberra houses, but accompanying label data note it is not a serious urban pest.

The original type material for *I. rufoniger* has not been located in any of the museums accessed during this study, and is believed lost. A neotype has been chosen to represent this taxon, which is commonly referred to in the myrmecological literature, and has been given species-group name status by generations of researchers. This neotype combines features that are consistent with the description of the original specimen (a description that is admittedly scant by modern criteria, but includes references to colour and antennal scape length), and was collected from coastal New South Wales, 380 km N of Sydney. (Note: The original specimen was collected 'in the vicinity of Sydney'). Since the taxon has attracted several species-level and subspecies-level names, the erection of a neotype is designed to give stability to this name. The neotype worker also conforms in its appearance to the description of the subspecies *I. rufoniger domestica* (here a junior synonym) in which the author Forel provides further diagnostic information regarding the nominal species *rufoniger*.

***Iridomyrmex sanguineus* Forel**
(Fig. 70)

Iridomyrmex detectus sanguinea Forel, 1910: 53 (subspecies of *sanguineus* by Greenslade, 1974: 247; raised to species by Shattuck, 1993a: 134).

Types. Syntypes from Mackay, Queensland (ANIC, ANIC32-008877, 3 workers, examined; MHNG, 6 workers).

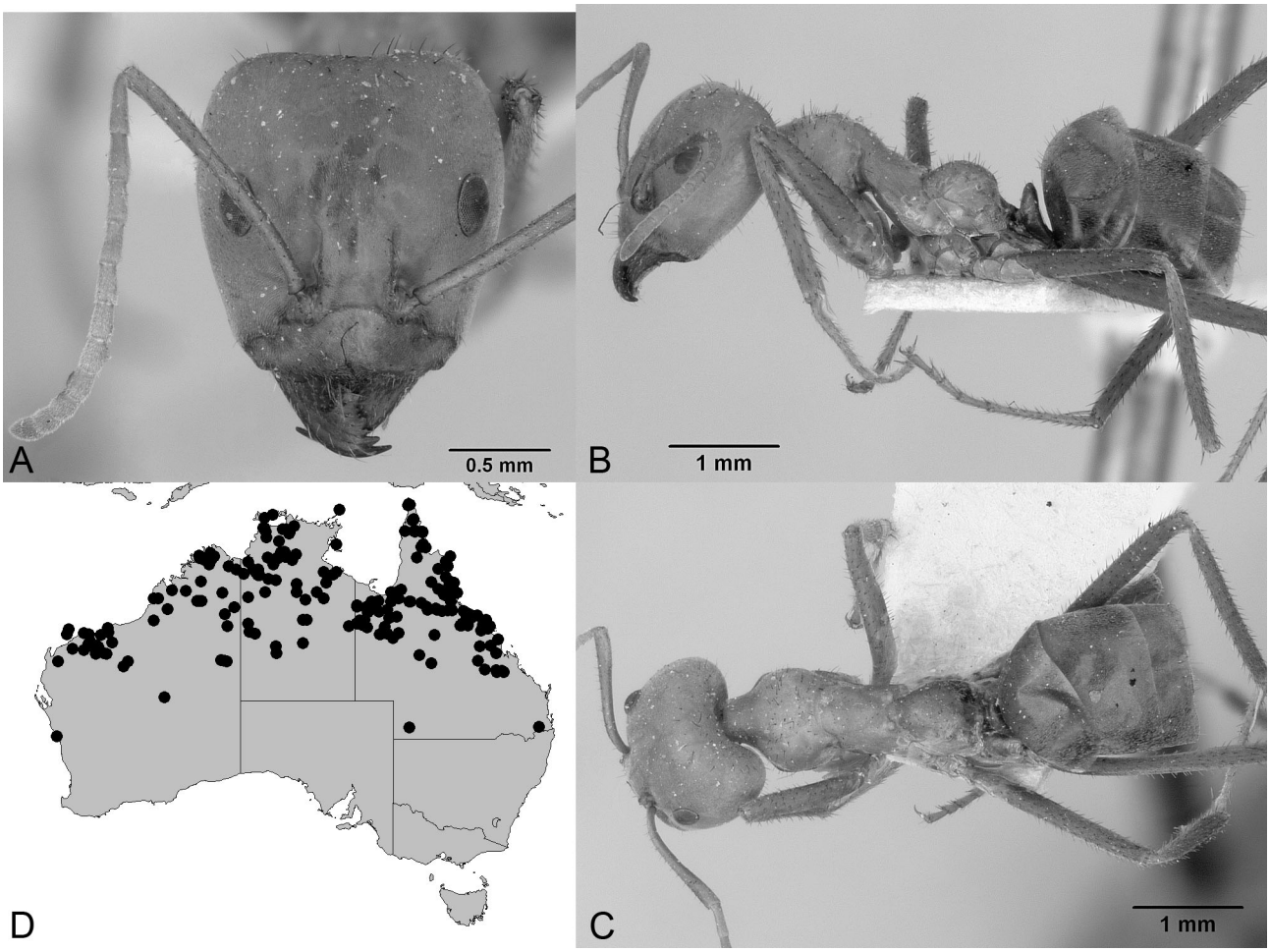


FIGURE 70. *Iridomyrmex sanguineus* (syntype, Mackay, Qld, ANIC32-008877): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined (A. Noble, www.antweb.org).

Worker Description. ***Head.*** Posterior margin of head planar to weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular. Frontal carinae convex; antennal scape surpassing posterior margin of head by 1-2 x its diameter. Erect setae on scape present and abundant; prominence on anteromedial clypeal margin projecting as triangular spur; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae numerous (12 or more), short and bristly. Mesonotum sinuous. Erect mesonotal setae moderate in number to numerous (6 or more), short and bristly. Mesothoracic spiracles always prominent as small, vertical protuberances; propodeal dorsum smoothly and evenly convex; placement of propodeal spiracle posteriad and near propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae numerous (12 or more), short and bristly. ***Petiole.*** Dorsum of node acuminate, or convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between

workers of same nest absent. Colour brick red, gaster dark brown, legs dull brown, bluish green iridescence on gaster, purplish iridescence on legs, very weak pinkish iridescence on head and mesosoma. Colour of erect setae black.

Measurements. *Worker* (n = 55)—CI 88–100; EI 17–21; EL 0.30–0.40; EW 0.17–0.24; HL 1.66–2.32; HW 1.49–2.23; ML 0.71–1.13; PpH 0.19–0.33; PpL 0.75–1.19; SI 85–106; SL 1.45–1.92.

Comments. *Iridomyrmex sanguineus* occurs in the same climatic zone as *I. reburrus* and is the most common northern meat ant (Andersen, 2000). The morphological differences between this species and *I. reburrus* are slight, and are discussed above (see also Shattuck, 1993a).

Iridomyrmex setoconus Shattuck & McMillan

(Fig. 71)

Iridomyrmex setoconus Shattuck & McMillan, 1998: 307, figs 9–11.

Types. Holotype worker from Yokinup Bay, Cape Arid Natl Pk [c. 33°52'S, 123°02'E], Western Australia (ANIC, ANIC32-023696, examined). Paratypes: same data as holotype (ANIC, ANIC32-000238, 45 workers, examined; BMNH, 3 workers; MCZC, 3 workers; WAMP, 3 workers).

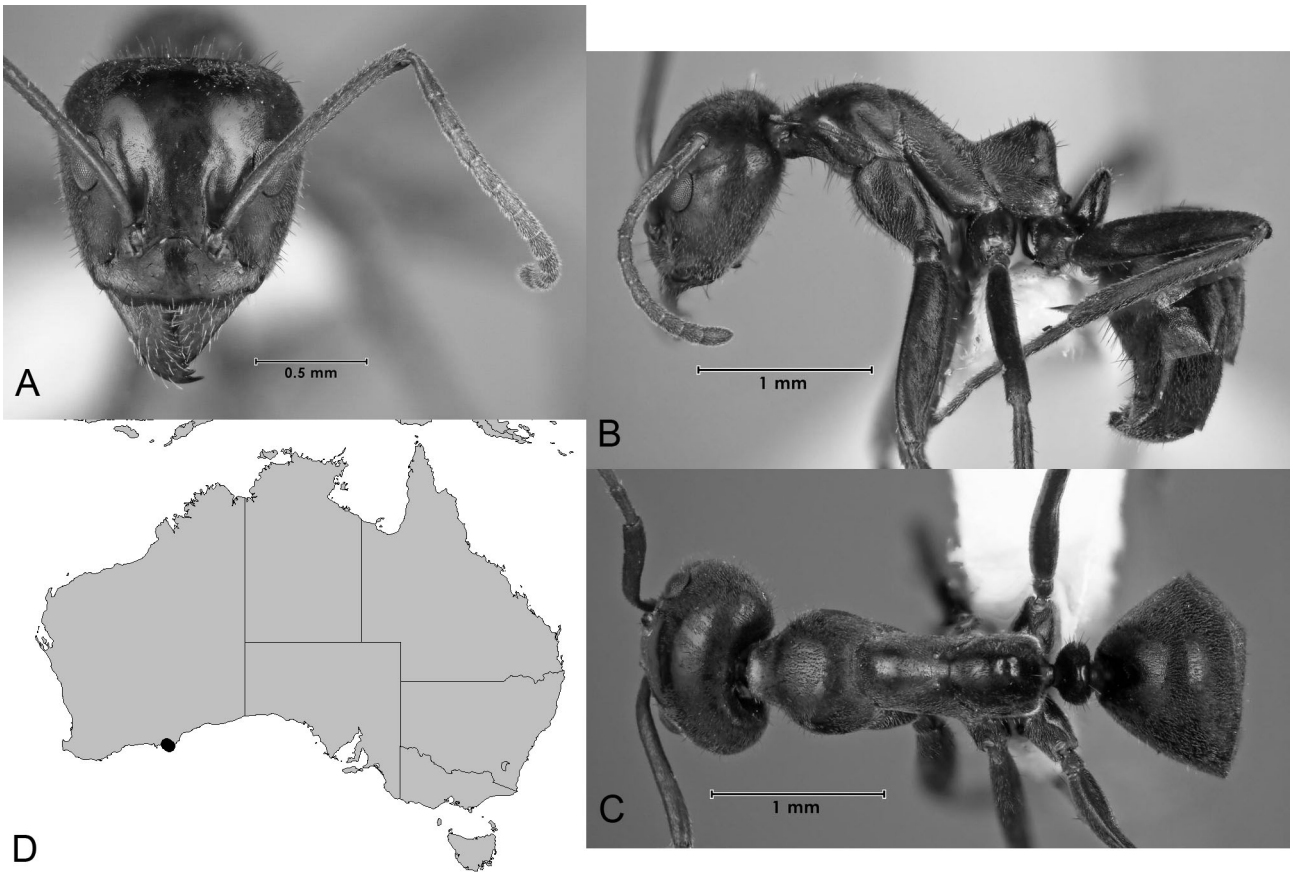


FIGURE 71. *Iridomyrmex setoconus* (holotype, Cape Arid National Park, WA, ANIC32-023696): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Worker Description. ***Head.*** Posterior margin of head planar to weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae present on sides of head in full-face view. Ocelli absent; in full-face view, eyes set above midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular. Frontal carinae convex; antennal scape surpassing posterior margin of head by 0.2-0.5 x its length. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin present as an

indistinct swelling or undulation; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule present. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae numerous (12 or more), short and bristly. Mesonotum sinuous. Erect mesonotal setae numerous (12 or more), short and bristly. Mesothoracic spiracles always inconspicuous; propodeal dorsum protuberant; placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle present as a bluntly defined acute angle, the propodeal dorsum conical in shape. Erect propodeal setae numerous (12 or more), short and bristly. ***Petiole.*** Dorsum of node convex; node thick, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour reddish-brown, legs and gaster dark brown. Colour of erect setae medium brown.

Measurements. *Worker* (n = 5)—CI 94–100; EI 22–23; EL 0.24–0.27; EW 0.15–0.17; HL 1.10–1.17; HW 1.04–1.17; ML 0.52–0.61; PpH 0.27–0.32; PpL 0.60–0.70; SI 99–108; SL 1.12–1.16.

Comments. *Iridomyrmex setoconus* is restricted to two small populations at Yokinup Bay and Thomas River, respectively. Both localities are east of Esperance. This species is easily recognised by virtue of the short, straight or only weakly curved erect setae on the sides of the head capsule (longer and strongly curved in those workers of *I. turbineus* that possess such pilosity). *Iridomyrmex setoconus* has only been collected on calcareous or otherwise sandy soils, and may require such a substrate for its nests. Nothing more is known of its ecology (see Shattuck & McMillan, 1998).

Iridomyrmex spadius Shattuck

(Fig. 72)

Iridomyrmex spadius Shattuck, 1993a: 138, figs 7, 17.

Types. Holotype worker from Millstream National Park, near Ravenshoe, Queensland (ANIC, ANIC32-017915, examined). Paratypes: same data as holotype (ANIC, ANIC32-009157, 6 workers, examined; ANIC, ANIC32-009156, 2 workers, examined; ANIC, ANIC32-009158, 2 workers, examined; BMNH, 3 workers; MCZC, 3 workers).

Worker Description. ***Head.*** Posterior margin of head weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular. Frontal carinae convex; antennal scape surpassing posterior margin of head by approximately 3 x its diameter. Erect setae on scape present and abundant; prominence on anteromedial clypeal margin projecting as triangular spur; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae numerous (12 or more), short and bristly. Mesonotum sinuous. Erect mesonotal setae numerous (12 or more), short and bristly. Mesothoracic spiracles always prominent as small, vertical protuberances; propodeal dorsum protuberant; placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae numerous (12 or more), short and bristly. ***Petiole.*** Dorsum of node acuminate; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour head orange with weak green iridescence, mesosoma and legs brown (mesosoma with pink iridescence), gaster chocolate with bluish iridescence. Colour of erect setae brown.

Measurements. *Worker* (n = 13)—CI 89–95; EI 18–21; EL 0.34–0.38; EW 0.20–0.23; HL 1.83–2.11; HW 1.66–1.99; ML 0.89–1.07; PpH 0.25–0.33; PpL 0.95–1.10; SI 91–105; SL 1.64–1.81.

Comments. *Iridomyrmex spadius* belongs to the *I. purpureus* complex, but can be distinguished from other members of the complex by its light yellow-red head, contrasting with the darker mesosoma. This is a localised species, known only from two disjunct populations in north-eastern and eastern Queensland, respectively. Ecological information is lacking. Shattuck (1993a) found that the male genitalia for this taxon were distinctive within the *I. purpureus* species-group.

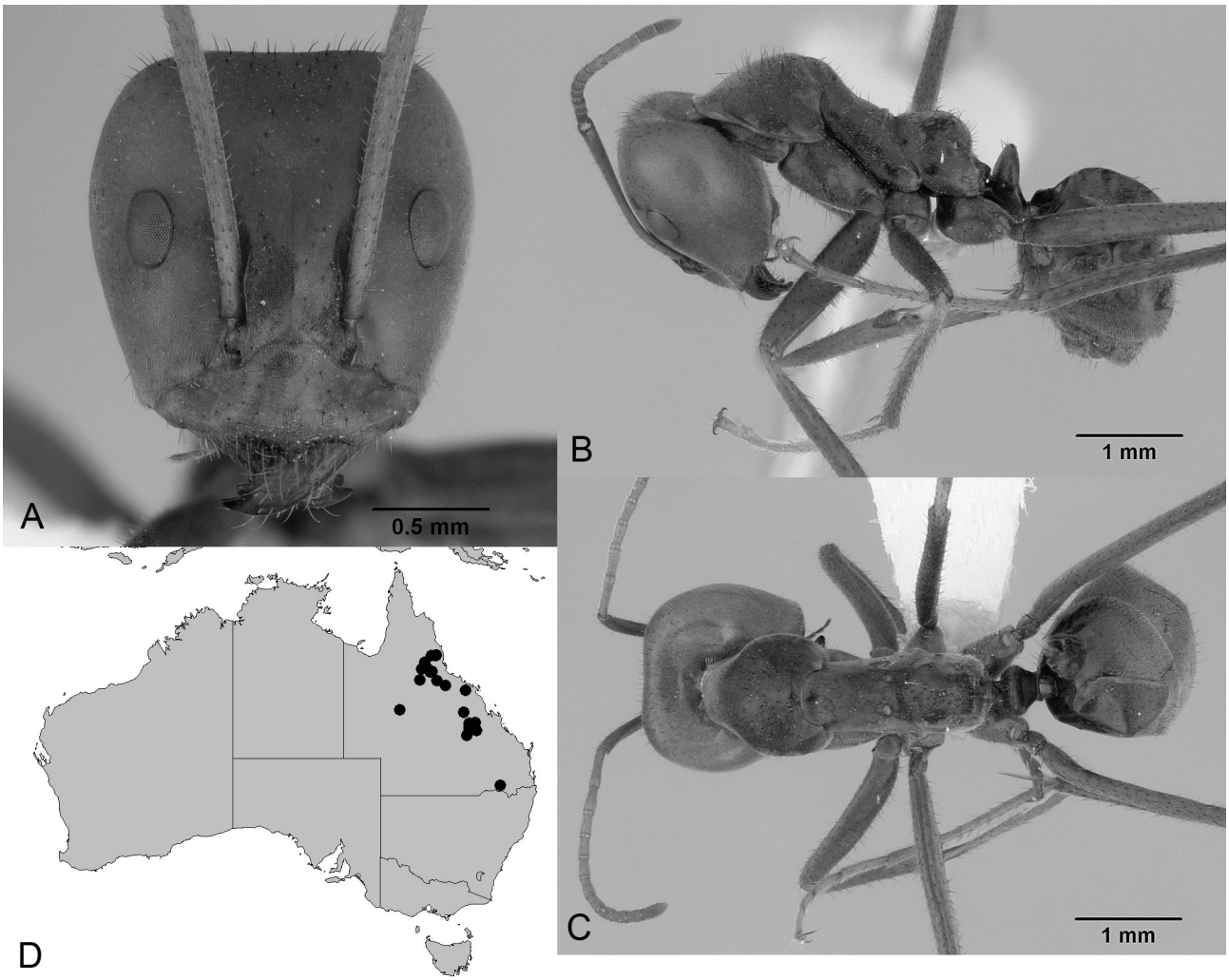


FIGURE 72. *Iridomyrmex spadius* (holotype, Millstream National Park, Qld, ANIC32-017915): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined (A. Noble, www.antweb.org).

Iridomyrmex splendens Forel, stat. n.

(Figs 73, 96)

Iridomyrmex mattiroloi splendens Forel, 1907a: 290.
Iridomyrmex vicina Clark, 1934b: 62, pl. 4, fig. 22. **New synonym.**

Types. *Iridomyrmex mattiroloi splendens* Forel: Syntypes from Donnybrook and Albany, Western Australia (MHNG, 1 worker, examined; WAMP, 1 worker, examined) (MCZC holds 1 worker from Mundaring Weir, Western Australia labelled as a type, but this is not true type material). *Iridomyrmex vicina* Clark: Holotype worker from Beech Forest, Victoria (MVMA, examined). Paratypes: same data as holotype (ANIC, ANIC32-017918, 4 workers, examined; MVMA, 10 workers, 2 queens).

Worker Description. ***Head.*** Posterior margin of head planar to weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular, or asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae straight; antennal scape surpassing posterior margin of head by approximately 2 x its diameter. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin present as an indistinct swelling or undulation; mandible triangular with distinct angle between masticatory and basal margins; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae moderate in num-

ber (6–12), short and bristly. Mesonotum sinuous, or straight, or evenly curved. Erect mesonotal setae moderate in number (6–12), short and bristly, or sparse (6 or fewer) and bristly. Mesothoracic spiracles always inconspicuous; propodeal dorsum smoothly and evenly convex; placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae numerous (12 or more), short and bristly. ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour shining medium brown to dark blackish-brown, weak yellowish to bluish iridescence on head and body. Colour of erect setae pale yellow to whitish.

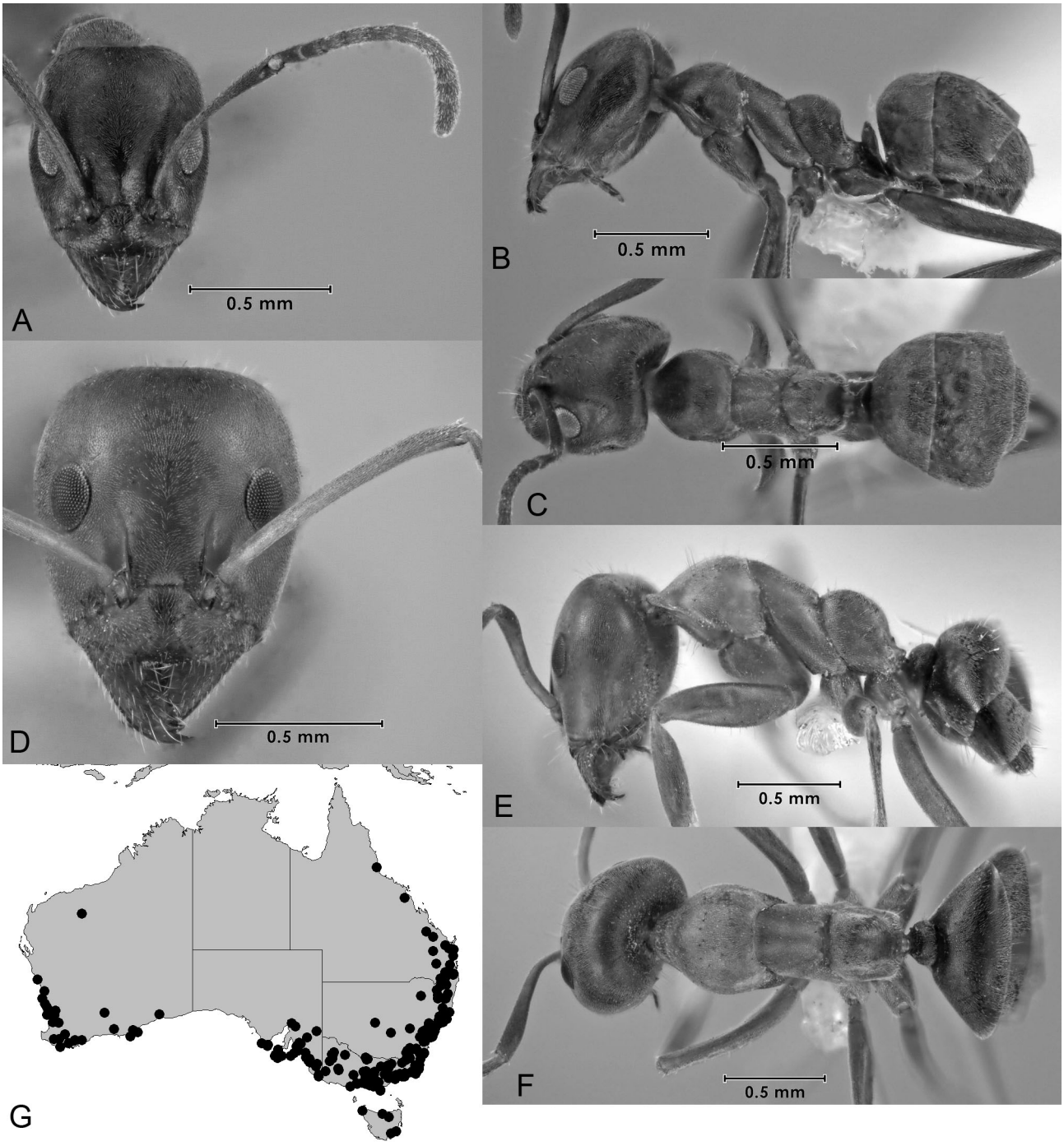


FIGURE 73. *Iridomyrmex splendens*, smaller, dark form (Wrattonbully, SA, ANIC32-023684): A. Front of head; B. Side of body; C. Top of body. *Iridomyrmex splendens*, larger, pale form (Mount Remarkable, SA, ANIC32-038285): D. Front of head; E. Side of body; F. Top of body; G. Distribution of material examined.

Measurements. *Worker* (n = 5)—CI 84–90; EI 23–29; EL 0.18–0.19; EW 0.14–0.15; HFL 0.80–1.05; HL 0.77–0.92; HW 0.65–0.82; ML 0.91–1.24; MTL 0.62–0.76; PpH 0.13–0.17; PpL 0.40–0.51; SI 105–108; SL 0.68–0.86.

Comments. *Iridomyrmex splendens* is one of about a dozen small-medium variegated brown to black *Iridomyrmex* that are superficially very similar and, in some cases, sympatric. This species can generally be recognised by the mesosomal vestiture of short, pale, bristly setae and row of short, erect setae on the posterior margin of the head (one or a few randomly distributed setae are present in the very similar *I. mjobergi* and *I. meridianus*). In difficult cases, the eye size is often decisive (see 'Comments' under *I. mjobergi*). Workers usually possess a greenish-yellow or bluish iridescence over the entire body (present only on the gaster in *I. victorianus*, which also has a concave posterior margin of the head, whereas this margin is planar or only weakly indented medially in *I. splendens*), but may be a bicoloured, variegated brown-and-black or even brown-and-orange. In Tasmania, where *I. splendens* is sympatric with *I. mattiroloi*, it can readily be distinguished from that ant by the longer antenna and the less truncate propodeum. *Iridomyrmex vicinus* represents the larger, eastern states phenotype of *I. splendens*, but can readily be associated with the western form by virtue of the small eye, evenly rounded propodeum and appressed and erect pilosity pattern. These features also distinguish these nominal taxa from the very similar *I. victorianus*. *Iridomyrmex vicina* becomes a junior synonym of *I. splendens* in this work. *Iridomyrmex splendens* is most common in southern Western Australia and south-eastern South Australia (including Kangaroo island), but also occurs in northern Western Australia, Victoria, Tasmania and New South Wales. Throughout much of its range, this is an ant of dry sclerophyll woodland. Nests are commonly found under logs, and workers are often seen foraging on tree-trunks and low vegetation. However, populations of the ant have also been recorded from eucalypt forest near the peaks of some of New South Wales' higher mountains (e.g., Mt Canobolas, Mt Kaputar and Point Lookout).

Iridomyrmex spodipilus Shattuck
(Fig. 74)

Iridomyrmex spodipilus Shattuck, 1993a: 139, fig. 18.

Types. Holotype worker from 21km WNW of William Creek, 28°49'S 136°09'E, South Australia (ANIC, ANIC32-009173, examined). Paratypes: same data as holotype (ANIC, ANIC32-009174, 28 workers, examined; BMNH, 3 workers; MCZC, 3 workers).

Worker Description. ***Head.*** Posterior margin of head strongly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular. Frontal carinae convex; antennal scape surpassing posterior margin of head by 1–2 x its diameter. Erect setae on scape present and abundant; prominence on anteromedial clypeal margin projecting as triangular spur; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae numerous (12 or more), short and bristly. Mesonotum sinuous. Erect mesonotal setae numerous (12 or more), short and bristly. Mesothoracic spiracles always prominent as small, vertical protuberances; propodeal dorsum protuberant; placement of propodeal spiracle posteriad and near propodeal declivity, or mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae numerous (12 or more), short and bristly. ***Petiole.*** Dorsum of node acuminate; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour head and mesosoma reddish with very pale blue, greenish or yellow iridescence, legs light brown, gaster black with bluish-green iridescence. Colour of erect setae pale, ashy brown.

Measurements. *Worker* (n = 25)—CI 86–95; EI 19–24; EL 0.34–0.41; EW 0.18–0.24; HL 1.65–2.07; HW 1.44–1.90; ML 0.74–1.00; PpH 0.23–0.38; PpL 0.75–1.05; SI 87–102; SL 1.48–1.71.

Comments. *Iridomyrmex spodipilus* is the only southern member of the *I. sanguineus* complex, and, like *I. spadius*, also occurs in two disjunct populations. In general appearance, this species strongly resembles a very large

I. discors, with which it shares pale, erect setae on its body parts. However, under a microscope its long anteromedian clypeal prominence, its higher scape index and its overall dimensions are sufficient to easily separate it from *I. discors*. As with *I. discors*, iridescence is weak to absent in this species, but where it occurs it is pink to purple. In his study of the *I. purpureus* species-group, Shattuck (1993a) mentions differences between *I. spodipilus* populations occurring in South Australia and those occurring in Queensland and New South Wales. South Australian workers are lighter in overall colour and head and mesosoma do not vary, whereas eastern workers are darker with the head lighter than the mesosoma. Workers of the latter are also slightly smaller on average than those of the former. Shattuck considered these differences to be intraspecific.

Specimens from Fowlers Gap, New South Wales, have been collected in low shrub and grassland, which presumably this ant favours. Otherwise there are no ecological data.

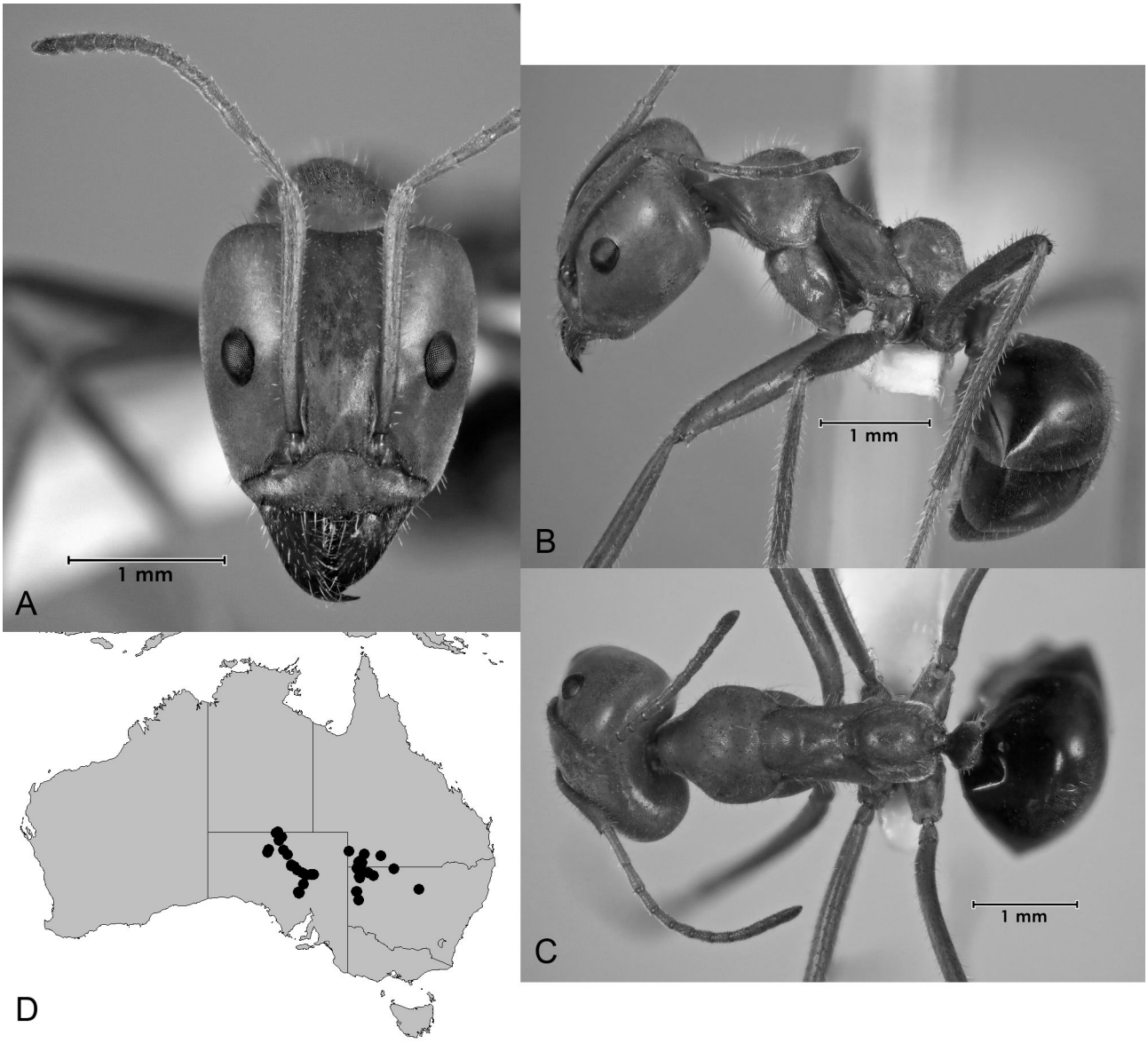


FIGURE 74. *Iridomyrmex spodipilus* (holotype, William Creek, SA, ANIC32-009173): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Iridomyrmex spurcus Wheeler

(Fig. 75)

Iridomyrmex gracilis spurcus Wheeler, W.M., 1915a: 813.

Types. Syntypes from Moorilyanna, South Australia (MCZC, 1 worker, examined; SAMA, 2 workers, examined).

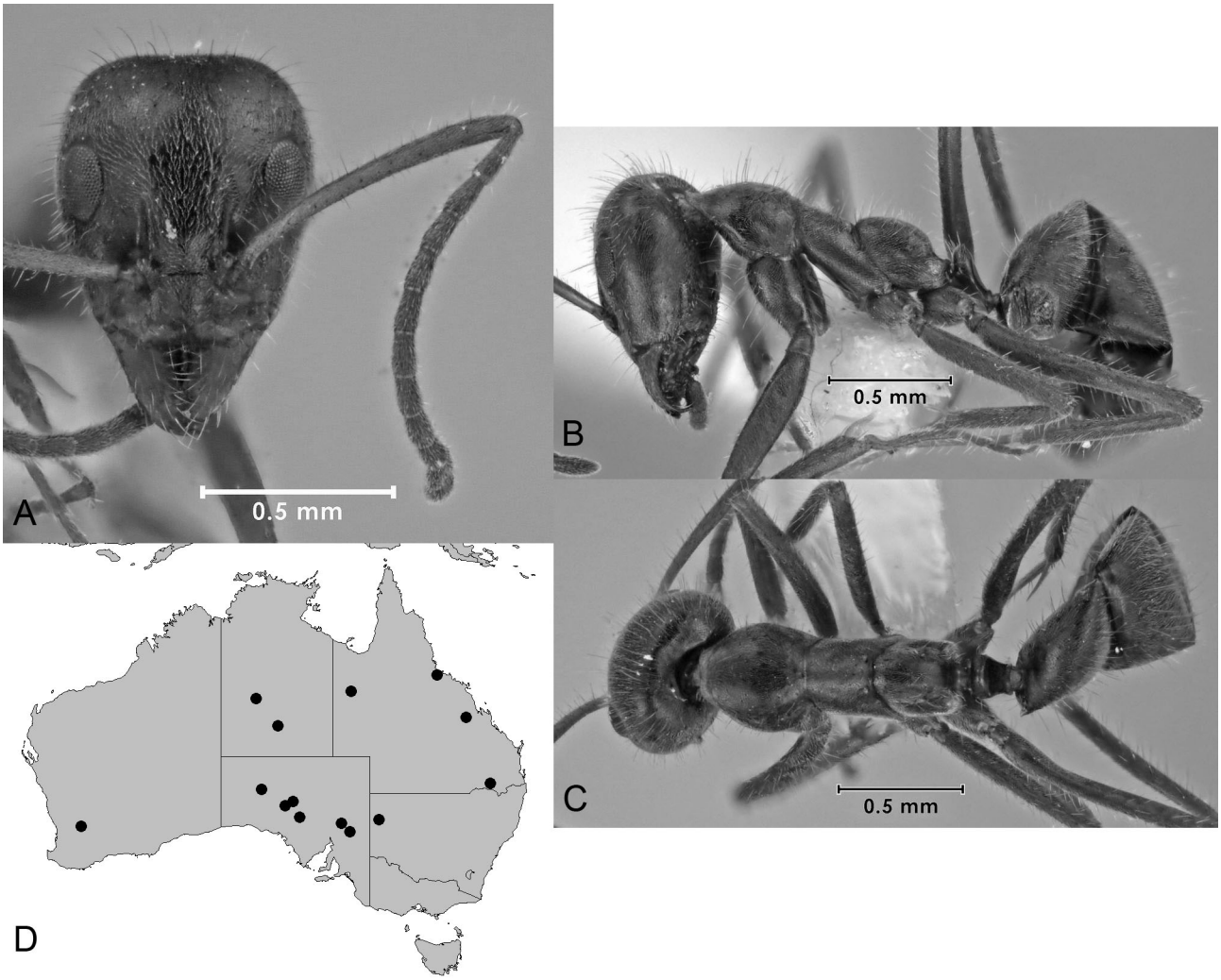


FIGURE 75. *Iridomyrmex spurcus* (Fowlers Gap Research Station, NSW, ANIC32-039583): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Worker Description. ***Head.*** Posterior margin of head planar to weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head straight or weakly convex; erect genal setae present on sides of head in full-face view. Ocelli absent; in full-face view, eyes set above midpoint of head capsule, or set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular, or asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae convex; antennal scape surpassing posterior margin of head by 0.2–0.5 x its length. Erect setae on scape present and abundant; prominence on anteromedial clypeal margin projecting as blunt but distinct protuberance; mandible regularly triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae numerous (12 or more) and longest setae elongate, flexuous and/or curved. Mesonotum straight. Erect mesonotal setae numerous (12 or more) and elongate, flexuous and/or curved. Mesothoracic spiracles always inconspicuous; propodeal dorsum straight and long (half as long again as length of propodeal declivity); placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae numerous (12 or more) and elongate, flexuous and/or curved. ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour uniformly brown. Colour of erect setae pale, whitish.

Measurements. *Worker* (n = 3)—CI 88–90; EI 26–30; EL 0.19–0.21; EW 0.16–0.17; HFL 0.94–1.16; HL 0.72–0.88; HW 0.64–0.79; ML 0.96–1.19; MTL 0.70–0.88; PpH 0.13–0.16; PpL 0.40–0.50; SI 122–124; SL 0.79–0.98.

Comments. This small-medium sized *Iridomyrmex* has much the same appearance as many workers of *I. omalonotus* but the erect setae on the mesosomal dorsum, antennal scapes and legs are distinctly longer, and the ant is very hairy overall. The habitat is invariably arid or semi-arid, all records coming from well away from the coast. The ant also has a large range, having been recorded from all Australian states except Victoria and Tasmania. *Iridomyrmex spurcus* nests in soil, but will forage on trees, one series having being taken in a yellow pan trap. Other ecological data are lacking.

Iridomyrmex suchieri Forel, stat. n.

(Figs 76, 92)

Iridomyrmex rufoniger suchieri Forel, 1907a: 291.
Iridomyrmex rufoniger suchieri centralis Forel, 1910: 52 (unavailable infrasubspecific name, see Taylor, 1986: 34).
Iridomyrmex rufoniger suchieri blackalensis Forel, 1915: 78 (unavailable infrasubspecific name, see Taylor, 1986: 34).
Iridomyrmex obscurus Crawley, 1921: 92, fig. 1. **New synonym.**

Types. *Iridomyrmex rufoniger suchieri* Forel: Lectotype worker (here designated) from Dongara (as Dongarra), Western Australia, 17.vii.1905, Hamburg SW Aust. Exped. (MHNG, ANIC32-017917). Paralectotypes from Day Dawn, Eradu, Wooroloo and Subiaco, Western Australia (MHNG, 31 workers, 14 queens, 13 males); Dongara (as Dongarra), Western Australia (MHNG, 1 worker, examined; MCZC, 3 workers, examined; MVMA, 1 queen, 1 male; WAMP, 1 queen (damaged), 1 male); southwest Australia (NHMB, 4 workers (1 missing head), 1 queen, 1 male) and Yalgoo, Western Australia (MCZC, 1 worker, examined; WAMP, 1 worker). *Iridomyrmex obscurus* Crawley: Holotype worker from Koolpinyah, Northern Territory (BMNH, examined). Paratypes: same data as holotype (MCZC, 8 workers, examined; MHNG, 3 workers; MVMA, 7 workers; OXUM, 17 workers, examined).

Worker Description. ***Head.*** Posterior margin of head weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae present on sides of head in full-face view, or absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set above midpoint of head capsule; in profile, eye set anteriad of head capsule; eye asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae convex; antennal scape surpassing posterior margin of head by 1–2 x its diameter. Erect setae on scape present and sparse, or absent, except at tip; prominence on anteromedial clypeal margin projecting as blunt but distinct protuberance; mandible regularly triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae moderate in number (6–12), longest setae elongate, flexuous and/or curved, or sparse (6 or fewer) and bristly. Mesonotum straight. Erect mesonotal setae moderate in number (6–12), short and bristly, or sparse (6 or fewer) and bristly. Mesothoracic spiracles always inconspicuous; propodeal dorsum straight and short (equal in length to propodeal declivity); placement of propodeal spiracle posteriad and near propodeal declivity, or mesad, more than its diameter away from propodeal declivity; propodeal angle present as a bluntly defined right angle, the dorsal and declivitous propodeal faces never separated by a carina, or weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae numerous (12 or more), short and bristly. ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour foreparts orange to dark brown, usually with varying degrees of brownish infuscation in the case of lighter coloured workers, gaster brown to black, often with a coppery sheen or with bluish iridescence. Colour of erect setae pale yellowish.

Measurements. *Worker* (n = 17)—CI 86–93; EI 23–28; EL 0.18–0.26; EW 0.14–0.21; HFL 0.85–1.21; HL 0.77–1.01; HW 0.67–0.94; ML 0.93–1.28; MTL 0.61–0.83; PpH 0.13–0.20; PpL 0.40–0.56; SI 95–107; SL 0.71–0.92.

Comments. *Iridomyrmex suchieri* is arguably one of the most significant *Iridomyrmex* species. Populations are found in all Australian states, and the ant is a minor peridomestic nuisance in New Zealand, where it has

become established in the North Island, in Nelson in the South Island and on some offshore islands (Don, 2007). As with most of the other small and small-medium *Iridomyrmex*, the species has no notable features. The combination of a more-or-less flattened propodeum with a distinct propodeal angle and a line of short, erect setae on the posterior margin of the head are the best ways of identifying this ant. In general, most populations of *I. suchieri* have glabrous antennal scapes and hind tibiae and lack erect setae on the sides of the head capsule. This form is represented by the two syntype workers of *I. suchieri* from Dongara. Occasional workers have hairy tibiae. In these specimens, previously treated as belonging to *I. obscurus*, the antennal scape may remain glabrous, or possess small, fine, erect and semi-erect setae, which may be evenly distributed along the scape or be concentrated towards the end of the scape. *Iridomyrmex suchieroides* is a very similar ant, but, whereas hairy populations of *I. suchieri* may have erect setae on the hind tibiae and the antennae (as stated above), even the hairiest *I. suchieroides* always have glabrous antennae and lack erect setae on the hind tibia. In addition, many populations of less hairy *I. suchieri* lack erect setae on the sides of their head capsules (except near the mandibles), whereas such setae are always present in *I. suchieroides*. The latter also has a slightly differently shaped propodeum that is narrower and more rounded.

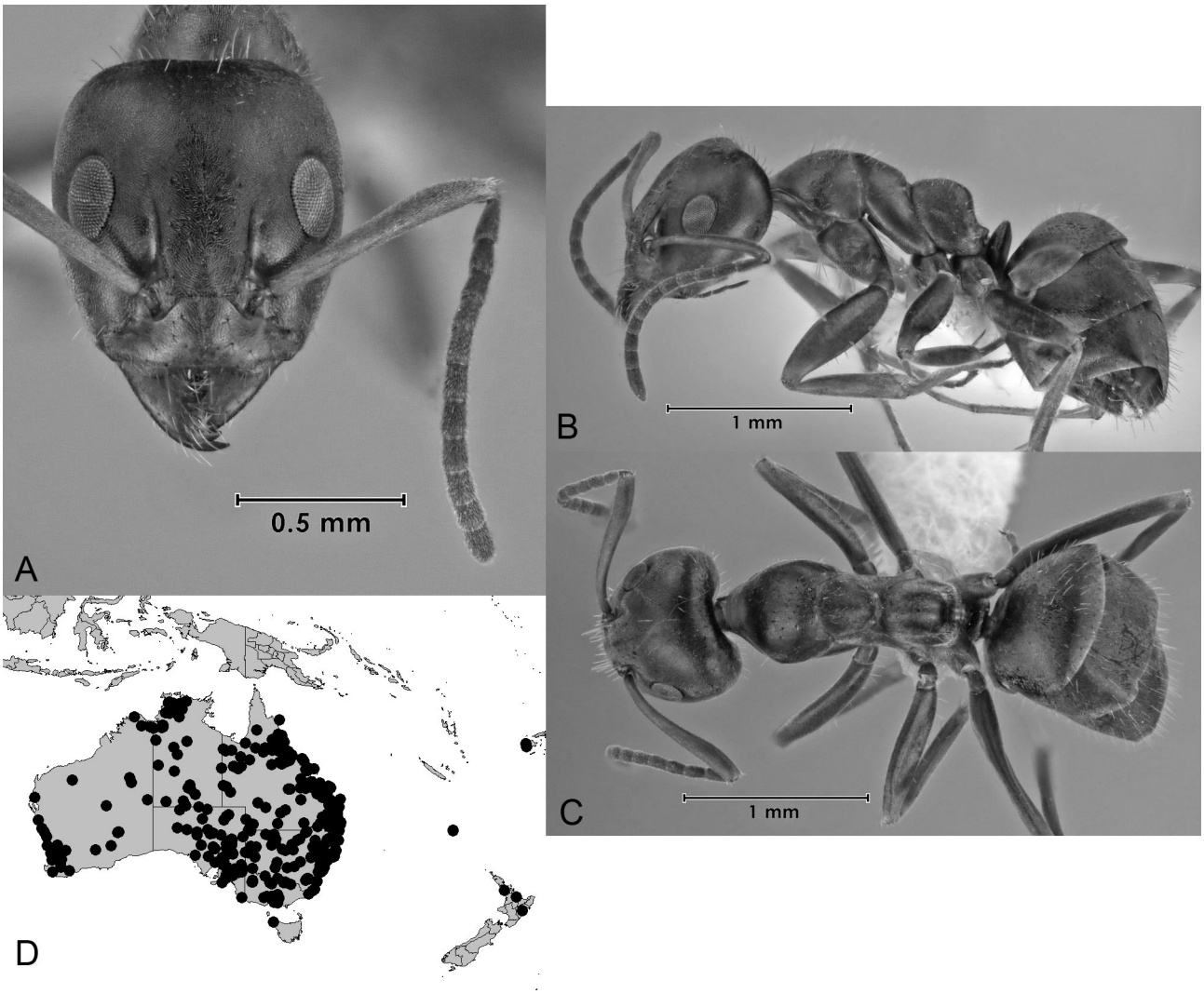


FIGURE 76. *Iridomyrmex suchieri* (Cravens Peak Station, Qld, ANIC32-036828): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Iridomyrmex obscurus represents no more than the hairier form of *I. suchieri*, where erect setae are variously present on the antennal scapes, legs and/or sides of head. However, this hairiness is part of the natural variation in *I. suchieri*, and many specimens have varying degrees of such hairiness, often with only one or two erect setae on the antennal scapes, or the sides of the head lacking in such vestiture although the hind tibiae are hairy, or other

combinations involving these structures. In fact, in a paratype series (two workers) of *I. obscurus* with the same collection data as the syntypes of *I. obscurus*, the hairy tibiae and sides of head contrast with the glabrous scape. *Iridomyrmex obscurus* is therefore treated as a junior synonym of *I. suchieri* (the earlier name) in this work.

Some populations of *I. mjobergi* are also identical in appearance to *I. suchieri*, but are virtually glabrous, and lack the setae on the posterior margin of the head mentioned above. Unfortunately, *I. suchieri* is variable is size and shape, and small workers may have a more rounded propodeum than their more typical counterparts. In these cases, care must be taken to avoid confusion with *I. splendens*. The latter nearly always has some iridescence on the body (absent or confined to the gaster in *I. suchieri*), and a planar or weakly medially indented posterior margin of the head (uniformly weakly concave in *I. suchieri*).

In Australia, *I. suchieri* is quite anthropophilic and can be found in most capital cities, where it occurs on pavements as well as in vegetated areas. Paving stones are a favoured form of cover, and, although nests are not especially large, quite a lot of sand can be removed. In more natural surroundings, stones may also be used for nest protection. ANIC label data detailing behaviour of this species in Australia is almost completely lacking, but in New Zealand it follows typical *Iridomyrmex* behaviour in tending honeydew producing Hemiptera (Don, 2007). There is a strong likelihood that Australian workers of this species also tend lycaenid caterpillars, but such data are treated with caution by Eastwood and Fraser (1999) because of the uncertainty surrounding the taxonomy of *Iridomyrmex* species to this point of time.

Iridomyrmex suchieroides sp. n.

(Fig. 77)

Types. Holotype worker from Cambrai, South Australia, 21-29 February 1972, P. J. M. Greenslade (ANIC, ANIC32-037327). Paratypes: 2 workers, same data as holotype (ANIC); 1 worker from Cambrai, South Australia, 28 January 1972, P. J. M. Greenslade (ANIC, ANIC32-037318); 1 worker from Cambrai, South Australia, 25 February 1972, P. J. M. Greenslade (ANIC, ANIC32-037321); 2 workers from Cambrai, South Australia, 16-29 February 1972, P. J. M. Greenslade (MCZC, ANIC32-037320); 1 worker from Cambrai, South Australia, 28 January–1 February 1972, P. J. M. Greenslade (BMNH, ANIC32-037323).

Worker Description. ***Head.*** Posterior margin of head weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae present on sides of head in full-face view. Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular, or asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae convex; antennal scape surpassing posterior margin of head by 1-2 x its diameter. Prominence on anteromedial clypeal margin projecting as blunt but distinct protuberance; mandible regularly triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae numerous (12 or more), short and bristly. Mesonotum sinuous, or straight. Erect mesonotal setae numerous (12 or more), short and bristly. Mesothoracic spiracles always inconspicuous; propodeal dorsum straight and short (equal in length to propodeal declivity); placement of propodeal spiracle posteriad and near propodeal declivity, or mesad, more than its diameter away from propodeal declivity; propodeal angle present as a bluntly defined right angle, the dorsal and declivitous propodeal faces never separated by a carina. Erect propodeal setae numerous (12 or more), short and bristly. ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour brown. Colour of erect setae whitish.

Measurements. *Worker* (n = 6)—CI 85–89; EI 27–29; EL 0.20–0.22; EW 0.16–0.18; HFL 0.85–1.01; HL 0.85–0.94; HW 0.72–0.81; ML 1.07–1.18; MTL 0.62–0.74; PpH 0.15–0.19; PpL 0.44–0.52; SI 99–104; SL 0.75–0.83.

Comments. *Iridomyrmex suchieroides* is likely to be the sister taxon of *I. suchieri*, and workers of both species are difficult to distinguish from one another. The diagnostic separators are described under 'Comments' under *I. suchieri* (above). *Iridomyrmex suchieroides* has a very bristly appearance, with short, erect setae extending down the sides of the head capsule being clearly visible in full-face view. The ant occurs throughout all mainland Australian states, but is absent from Tasmania. This species can occur in sympatry with *I. suchieri*, even in the same back-

yard (East Fremantle, Western Australia). The behaviour of both species is distinctly different. Whereas *I. suchieri* can be aggressive, challenging other ants (in the East Fremantle property mentioned above, *I. suchieri* workers confronted workers of *Technomyrmex jocosus* Forel hiding under capping on an asbestos fence), *I. suchieroides* forages furtively, running away timidly and hiding on human approach, and avoids contact with more aggressive species such as *I. chasei*. *Iridomyrmex suchieroides* has a small, unobtrusive nest hole. This species mainly forages on the ground but can climb in search of food: workers were collected in a malaise trap in Little Desert NP, Victoria.

Etymology. Greek: '*oides*' 'like' plus *suchieri*.

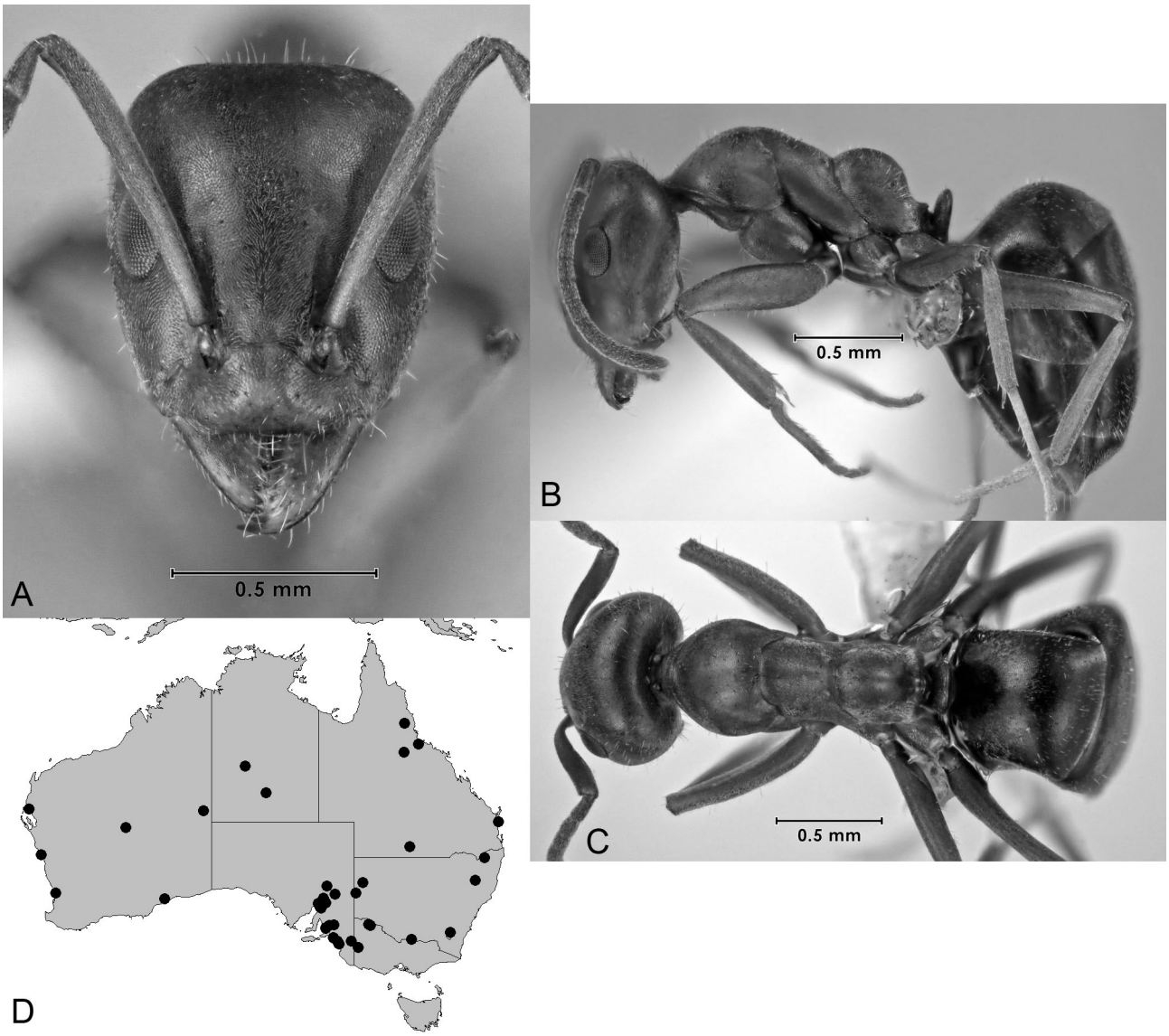


FIGURE 77. *Iridomyrmex suchieroides* (paratype, Napperby, SA, ANIC32-037120): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

***Iridomyrmex tenebrans* sp. n.**
(Fig. 78)

Types. Holotype worker from Crowdy Bay National Park, 10km S Laurieton, 31°47'S 152°45'E, New South Wales, September 1992, E. A. Davidson (ANIC, ANIC32-013752).

Worker Description. ***Head.*** Posterior margin of head planar to weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular. Frontal carinae straight; antennal scape barely attaining posterior margin of head, or surpassing it by less than 1 x its diameter. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin present as an indistinct swelling or undulation; mandible regularly triangular with oblique basal margin; long, curved setae on venter of head capsule present. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae numerous (12 or more), short and bristly. Mesonotum evenly curved. Erect mesonotal setae moderate in number (6-12), short and bristly. Mesothoracic spiracles always inconspicuous; propodeal dorsum protuberant; placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle present as a bluntly defined right angle, the dorsal and declivitous propodeal faces never separated by a carina. Erect propodeal setae numerous (12 or more), short and bristly. ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientated anteriad. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour reddish-brown. Colour of erect setae whitish.

Measurements. *Worker* (n = 1)—CI 95; EI 26; EL 0.28; EW 0.23; HFL 1.23; HL 1.11; HW 1.06; ML 1.42; MTL 0.84; PpH 0.25; PpL 0.60; SI 85; SL 0.90.

Comments. As is the case with several other members of the *I. viridigaster* complex, this species seems to be exceedingly rare, and is known only from the holotype, collected at Crowdy Bay, New South Wales. The sole worker is distinguished by its dark appearance from other members of the complex with a hairy mesosoma and erect setae on the hind tibiae. Nothing further is known of this ant.

Etymology. Latin: 'rendered obscure'.

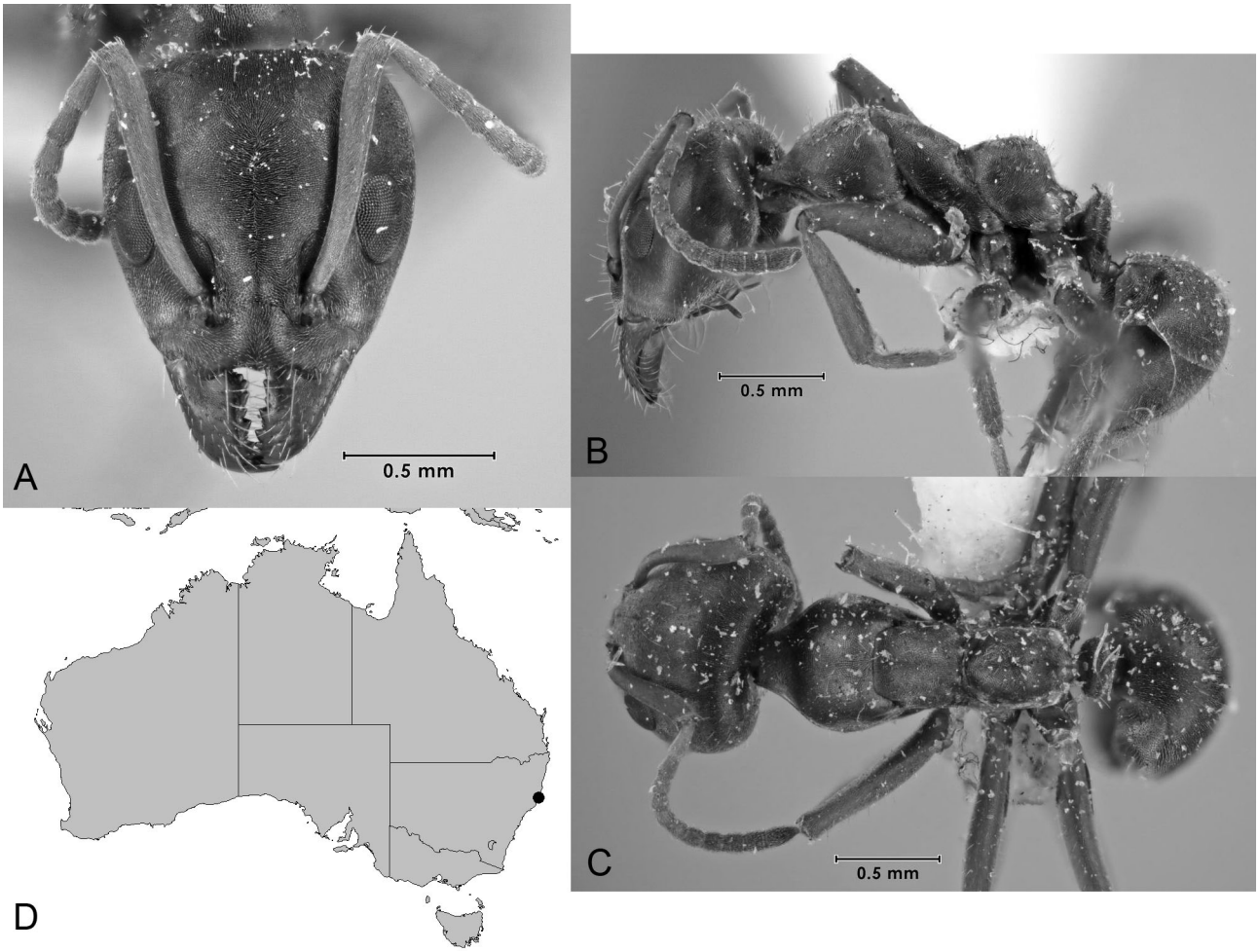


FIGURE 78. *Iridomyrmex tenebrans* (holotype, Crowdy Bay, NSW, ANIC32-013752): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

***Iridomyrmex tenuiceps* sp. n.**
(Fig. 79)

Types. Holotype worker from Lizard Island, Queensland, 19 February1992, H. Reichel (ANIC, ANIC32-039951). Paratypes: 5 workers, same data as holotype (ANIC, 2 worker; BMNH, 1 workers; MCZC, 2 workers); 2 workers, same data as holotype except 22 February 1992 (ANIC, ANIC32-039953).

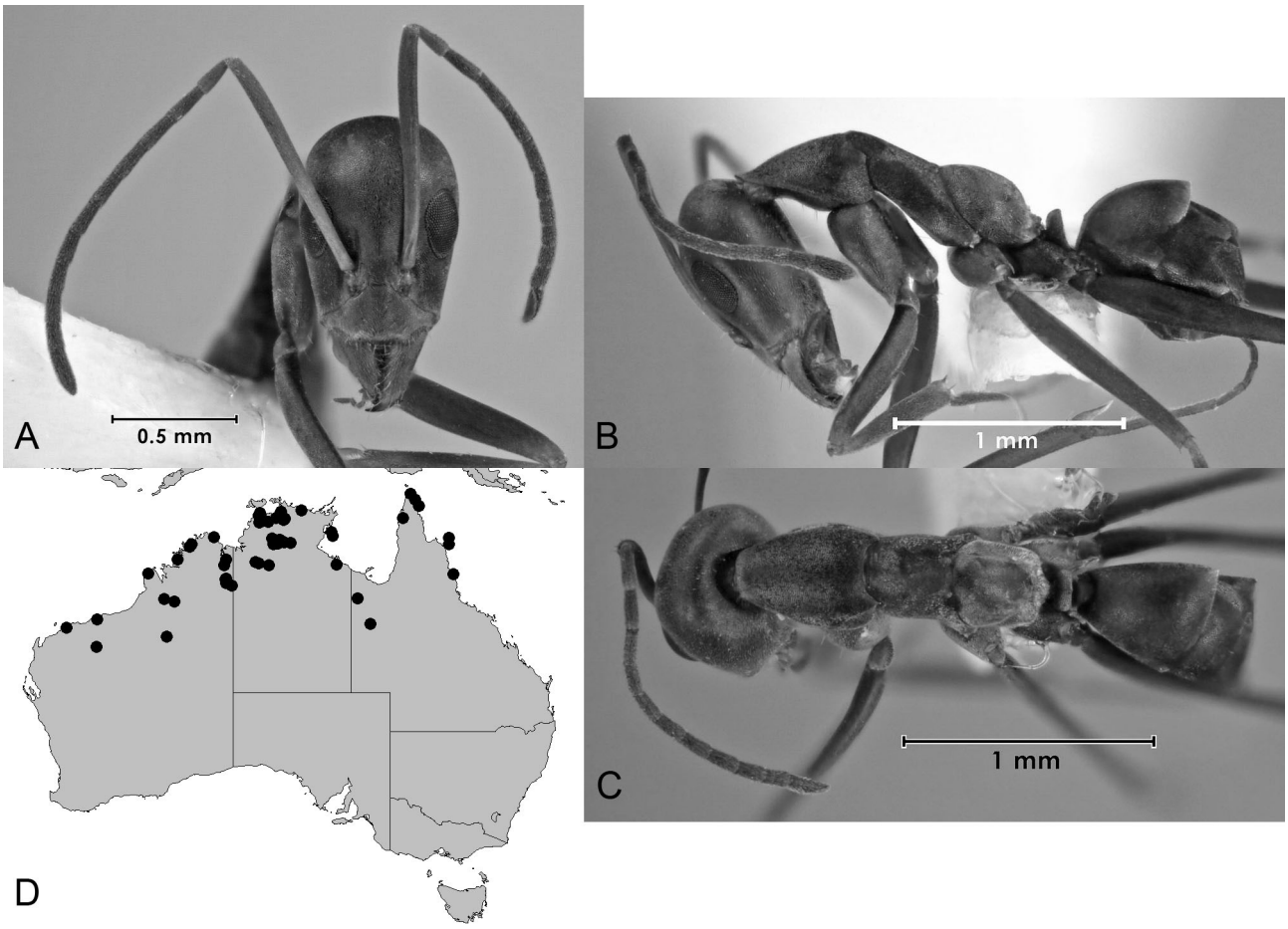


FIGURE 79. *Iridomyrmex tenuiceps* (Lizard Island, Qld, ANIC32-039951): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Worker Description. ***Head.*** Posterior margin of head strongly convex; erect setae on posterior margin absent; sides of head straight or weakly convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular, or asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae straight; antennal scape surpassing posterior margin of head by 0.2-0.5 x its length. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin projecting as triangular spur; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum weakly undulant or almost straight. Erect pronotal setae lacking or very minute (one or two tiny setae may be present). Mesonotum straight. Erect mesonotal setae lacking or very minute (one or two tiny setae present). Mesothoracic spiracles always inconspicuous; propodeal dorsum straight and long (half as long again as length of propodeal declivity); placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae lacking or very minute (one or two tiny setae present). ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientated anteriad. ***Gaster.*** Non-marginal erect setae of gaster present or absent on first gastral tergite; marginal erect

setae of gaster present on first tergite, or absent on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour grey-brown with coppery sheen, clypeal region and lower genae orange. Colour of erect setae pale yellow.

Measurements. *Worker* (n = 7)—CI 64–70; EI 40–42; EL 0.25–0.28; EW 0.20–0.21; HFL 1.46–1.74; HL 0.90–1.03; HW 0.60–0.66; ML 1.25–1.39; MTL 1.06–1.22; PpH 0.13–0.15; PpL 0.47–0.53; SI 154–175; SL 1.00–1.15.

Comments. *Iridomyrmex tenuiceps* is the sister taxon to *I. angusticeps*, but is glabrous (see 'Comments' under the latter species). *Iridomyrmex tenuiceps* is widespread across the Torresian zone of Australia (northern Western Australia, Northern Territory and Queensland), and its known range does not extend beyond Australian territories. Specimens have been collected in pitfall traps, but nothing more is known of the ecology of the species.

Etymology. Latin: '*tenuis*' 'slender' plus '*ceps*', derivative of '*caput*'—'head', referring to the slender head of the species.

Iridomyrmex trigonoceps sp. n.

(Fig. 80)

Types. Holotype worker from 32km N Renmark, 33°52'52"S 140°43'54"E, South Australia, 3.v.1995, S. O. Shattuck, mallee and *Triodia* on sand dune, ground nest with small mound (ANIC, ANIC32-038597). Paratypes: 2 workers, same data as holotype (ANIC); 3 workers from 18km E 'The Granites', Tanami Desert, Northern Territory, 19 March 1987, P. J. M. Greenslade, ANIC Ants Vial 60.15 (ANIC, ANIC32-032613); 3 workers from Tanami, Northern Territory, 25-27 March 1986; P. J. M. Greenslade (MCZC, ANIC32-032809); 1 worker from Tanami Desert, Northern Territory, 20 May 1986, P. J. M. Greenslade (BMNH, ANIC32-037606).

Worker Description. ***Head.*** Posterior margin of head planar to weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head straight or weakly convex; erect genal setae present on sides of head in full-face view. Ocelli absent; in full-face view, eyes set above midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular, or asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae convex; antennal scape surpassing posterior margin of head by 0.2–0.5 x its length, or surpassing posterior margin of head by approximately 3 x its diameter. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin always completely absent; mandible regularly triangular with oblique basal margin; long, curved setae on venter of head capsule present. ***Mesosoma.*** Pronotum weakly undulant or almost straight. Erect pronotal setae numerous (12 or more), short and bristly. Mesonotum evenly curved. Erect mesonotal setae moderate in number to numerous (6 or more), short and bristly. Mesothoracic spiracles always inconspicuous; propodeal dorsum smoothly and evenly convex; placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae numerous (12 or more), short and bristly. ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour brown. Colour of erect setae pale yellow.

Measurements. *Worker* (n = 4)—CI 91–94; EI 24–25; EL 0.21–0.24; EW 0.16–0.17; HFL 1.28–1.43; HL 0.93–1.05; HW 0.87–0.99; ML 1.28–1.54; MTL 0.89–1.02; PpH 0.15–0.19; PpL 0.48–0.57; SI 103–110; SL 0.92–1.01.

Comments. Next to *I. mirabilis*, this species is unquestionably the most aberrant *Iridomyrmex*: in full-face view, the severely triangular shape of the head, the high, lateral placement of the small eyes on the head capsule and the large mandibles ensure that this species cannot be mistaken for any other *Iridomyrmex*. However, it is the unique, elongate second and third maxillary palps that make this species difficult to place in a taxonomic context. This ant appears to be relatively uncommon, but is broadly distributed in Western Australia, South Australia and the Northern Territory. All but one of the records for the species come from desert or semi-arid areas in the northern zone, but a single series, taken from Renmark, South Australia, suggests this ant may occur across a wider range than the sparse collection data suggest. The only ecological note accompanies the Renmark specimens: they were collected in a sand dune with mallee and *Triodia* vegetative cover. The nest was indicated by a small mound.

Etymology. Greek: '*trigon*'—'triangular' plus Latin: '*ceps*' derivative of '*caput*'—'head'.

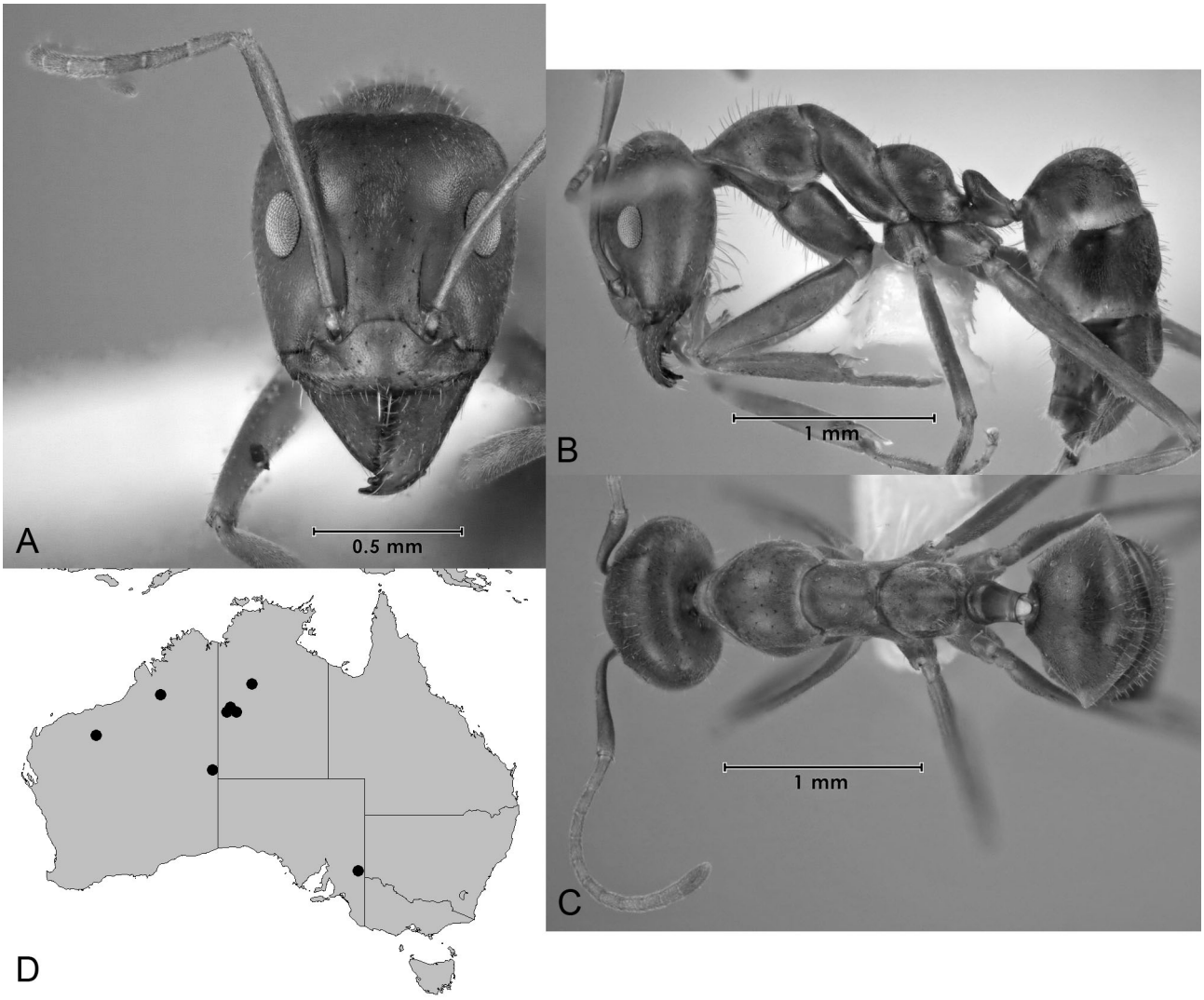


FIGURE 80. *Iridomyrmex trigonoceps* (Tanami Desert, NT, ANIC32-032614): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Iridomyrmex turbineus Shattuck & McMillan
(Fig. 81)

Iridomyrmex turbineus Shattuck & McMillan, 1998: 309, figs 11–13.

Types. Holotype worker from 5km S Dwellingup, 33°45'S 116°04'E, Western Australia (ANIC, ANIC32-000225, examined). Paratypes: same data as holotype (ANIC, ANIC32-039821, 20 workers, examined; BMNH, 3 workers; MCZC, 3 workers; WAMP, 3 workers).

Worker Description. ***Head.*** Posterior margin of head weakly concave, or strongly concave; erect setae on posterior margin in full-face view set in a row, or present in small aggregations on one or both sides of posterior margin of head; sides of head noticeably convex; erect genal setae present on sides of head in full-face view, or absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set above midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular. Frontal carinae convex; antennal scape surpassing posterior margin of head by 0.2–0.5 x its length. Erect setae on scape present and abundant, or present and sparse, or absent, except at tip; prominence on anteromedial clypeal margin present as an indistinct swelling or undulation; mandible elongate triangular with

oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum strongly inclined anteriorly, or moderately and evenly curved over its length. Erect pronotal setae moderate in number to numerous (6 or more) and longest setae elongate, flexuous and/or curved. Mesonotum sinuous, or straight. Erect mesonotal setae moderate in number (6–12), short and bristly. Mesothoracic spiracles always prominent as small, vertical protuberances; propodeal dorsum protuberant; placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle present as a bluntly defined acute angle, the propodeal dorsum conical in shape. Erect propodeal setae numerous (12 or more) and elongate, flexuous and/or curved, or moderate in number (6–12), long, often curved. ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present or absent on first gastral tergite; marginal erect setae of gaster present on first tergite, or absent on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour honey-brown to blackish-brown, gaster and sometimes head may be darker in specimens with a light coloured mesosoma. Colour of erect setae golden brown.

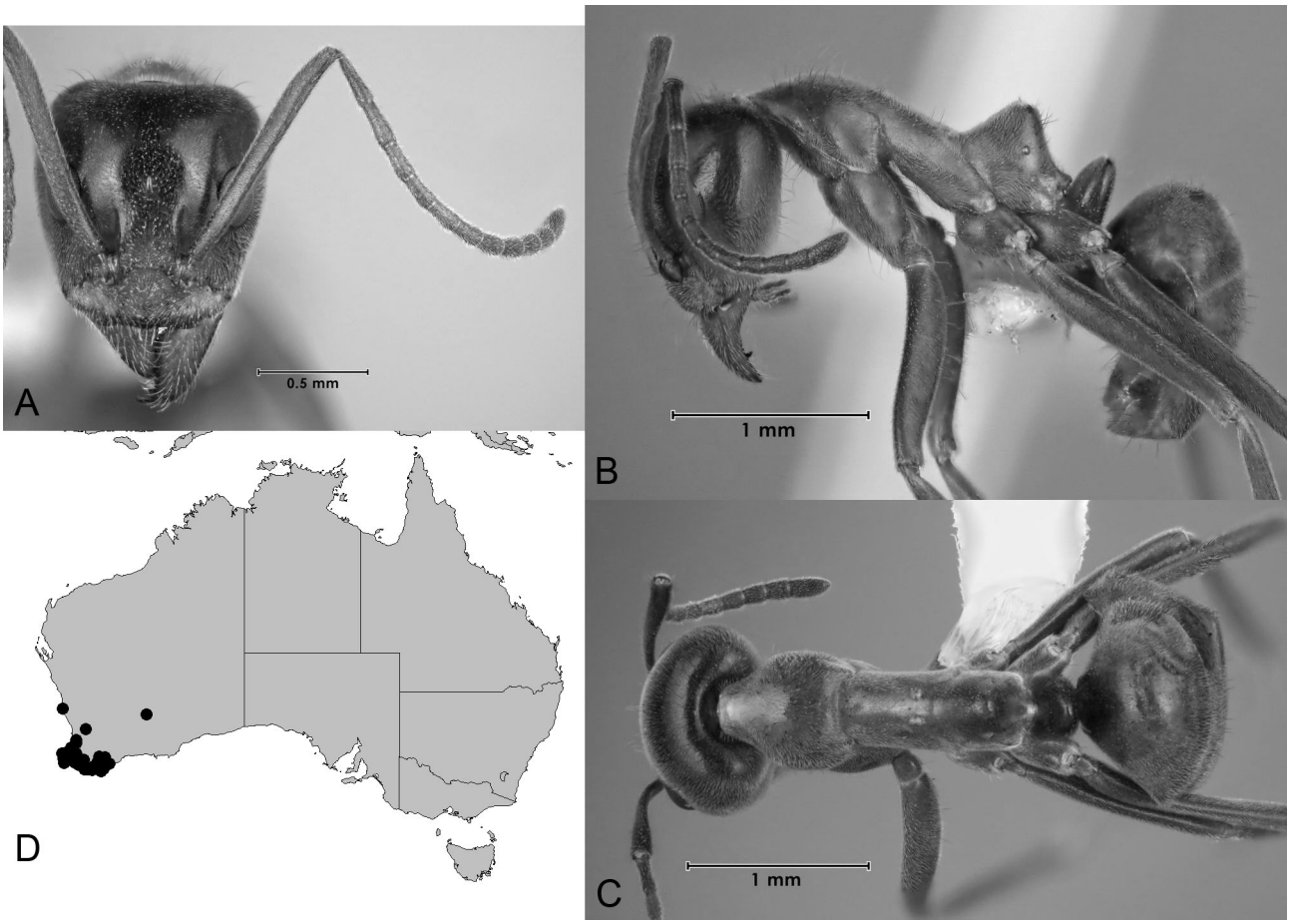


FIGURE 81. *Iridomyrmex turbineus* (holotype, Dwellingup, WA, ANIC32-000225): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Measurements. *Worker* (n = 16)—CI 96–101; EI 20–24; EL 0.24–0.27; EW 0.15–0.18; HL 1.09–1.36; HW 1.05–1.37; ML 0.53–0.70; PpH 0.25–0.40; PpL 0.61–0.75; SI 96–108; SL 1.09–1.35.

Comments. See 'Discussion' under *I. conifer* for the taxonomic characters that identify *I. turbineus*. Like *I. conifer*, this species appears to confined to largely coastal areas, and can be found between Dwellingup, south of Perth, and Borden, north-east of Albany. Additional records from Kalgoorlie and the Hamersley Range are well outside of other known distributions for this species, and are regarded as highly dubious by Shattuck & McMillan (1998). The latter two authors also note that, although the ecology of *I. turbineus* has not been studied in detail, casual observations indicate that it is likely to be similar to that of *I. conifer.*

***Iridomyrmex victorianus* Forel, stat. n.**
(Figs 82, 96)

Iridomyrmex rufoniger victorianus Forel, 1902: 466.
Iridomyrmex mattiroloi parcens Forel, 1907b: 27. **New synonym.**
Iridomyrmex emeryi Crawley, 1918: 90. **New synonym.**

Types. *Iridomyrmex rufoniger victorianus* Forel: Lectotype worker (here designated) from Ballarat, Victoria, Froggatt (MHNG, ANIC32-032053). Paralectotypes, same data as lectotype (MHNG, 2 workers (damaged), examined; MCZC, 4 workers (1 damaged), examined; NHMB, 1 worker (without locality data)). *Iridomyrmex mattiroloi parcens* Forel: Neotype worker (top specimen, here designated) from Wentworth Falls near Valley of the Waters, west end of Fletcher St., 33°24'S 150°51'E, New South Wales, 21 December 1988, S. O. Shattuck, wet sclerophyll, foraging in column on ground, ANIC Ants Vial 76.98 (ANIC, ANIC32-036181). *Iridomyrmex emeryi* Crawley: Syntypes from Healesville, Victoria (not located during study, apparently lost).

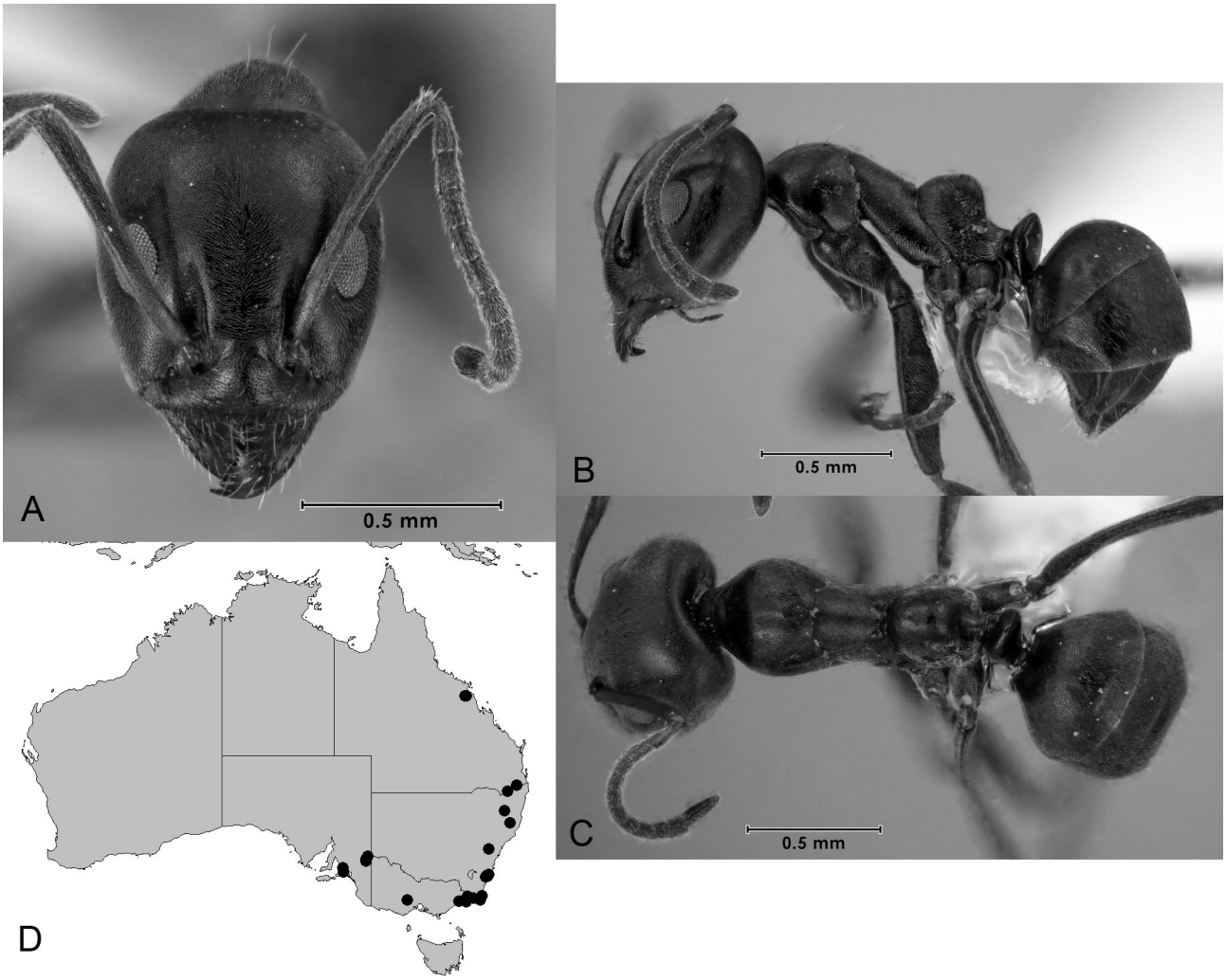


FIGURE 82. *Iridomyrmex victorianus* (Eden Burning Study Area, NSW, ANIC32-047708): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Worker Description. ***Head.*** Posterior margin of head weakly concave, or strongly concave; erect setae on posterior margin in full-face view, present in small aggregations on one or both sides of posterior margin of head; sides of head noticeably convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular, or asymmetrical, curvature of inner eye mar-

gin more pronounced than that of its outer margin. Frontal carinae convex; antennal scape surpassing posterior margin of head by approximately 2 x its diameter. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin present as an indistinct swelling or undulation; mandible regularly triangular with oblique basal margin; long, curved setae on venter of head capsule absent. Pronotum strongly inclined anteriorly, or moderately and evenly curved over its length. Erect pronotal setae moderate in number (6–12), longest setae elongate, flexuous and/or curved, or moderate in number (6–12), short and bristly. Mesonotum straight. Erect mesonotal setae sparse to absent. Mesothoracic spiracles always inconspicuous; propodeal dorsum protuberant, or smoothly and evenly convex; placement of propodeal spiracle posteriad and near propodeal declivity, or mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae sparse to absent. ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present or absent on first gastral tergite; marginal erect setae of gaster absent on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour ants of different populations variable in colour from light brownish-orange to black; gaster with weak to moderately strong bluish-green iridescence. Colour of erect setae pale to light brownish.

Measurements. *Worker* (n = 12)—CI 89–93; EI 25–27; EL 0.16–0.22; EW 0.12–0.16; HFL 0.77–1.03; HL 0.66–0.91; HW 0.60–0.83; ML 0.82–1.12; MTL 0.53–0.76; PpH 0.13–0.18; PpL 0.34–0.51; SI 91–104; SL 0.60–0.80.

Comments. In appearance, workers of *I. victorianus* resemble small *I. rufoniger* workers, the two species being closely related. However, the hind tibiae of *I. victorianus* lack genuine erect setae (tiny appressed setae may accidentally be forced into a more vertical position in some specimens). The antennal scape is also slightly longer and the posterior margin of the head generally less concave (see 'Comments' under *I. rufoniger*). Dark morphs may also be confused with eastern populations of *I. splendens*, but iridescence is confined to the gaster in the former, the posterior margin of the head in the latter is broadly if gently concave in most specimens, and the propodeum is typically more truncate and protuberant in *I. victorianus*. *Iridomyrmex victorianus* is fairly morphologically uniform throughout its range, but can vary considerably in size and colour. Most variation is seen along the New South Wales coast, and workers collected at Bateman's Bay and Lake Cowell may be almost twice the size of the very small workers found in populations in the Armidale area. Colour can vary from light brown with a slightly darker gaster to a uniform blackish. The description of *I. emeryi* by Crawley is entirely consistent with the dark form of *I. victorianus*, and CSIRO material identified as the latter includes specimens taken from within 40–50 km of where the *I. emeryi* syntype worker was collected. As discussed above, *I. emeryi* becomes a junior synonym of *I. victorianus* in this work.

The range of *I. victorianus* is limited to the east coast of mainland Australia, and mainly to the more humid coastal areas. It extends from Kangaroo Island and the Fleurieu Peninsula, South Australia eastwards, through Victoria and New South Wales and north into Queensland about as far as Eungella NP. Label data indicates that the ant will occupy a variety of habitats, although generally wet or dry sclerophyll forest is preferred, and will nest under bark or in fallen timber as well as under stones or directly in the soil. Foragers will move up tree trunks, and have been collected in malaise traps. As with many other *Iridomyrmex*, this species tends caterpillars of blue butterflies such as *Jalmenus evagoras*. These ants may opportunistically use the nests or nest mounds of much larger species, rather than excavate virgin soil: one series, collected at Yango creek, New South Wales, was found in the mound of a bulldog ant, *Myrmecia pyriformis*. Another observation from label data is that workers exhibit a death-like state (thanatosis) to evade capture. However, despite the relative wealth of observations recorded on labels attached to pins, there is no recorded evidence of association with human dwellings for this very common species.

Iridomyrmex mattiroloi parcens Forel is here treated as a synonym of *I. victorianus*. Although Forel (1907) established this name as a subspecies of *I. mattiroloi*, *I. mattiroloi* is now considered as being restricted to Tasmania. Of the *Iridomyrmex* species known to occur in the Blue Mountains, *I. victorianus* is most similar to *I. mattiroloi*, and the most likely to be confused with it. Based on this, and the above mentioned similarities, *I. parcens* is here considered to represent the same taxon as *I. victorianus*, and therefore becomes a synonym of that species in this work. Since there is a strong likelihood that the original type material for *I. mattiroloi parcens* was destroyed during WWII, a neotype is here designated (top ant on a pin containing three worker ants) to give stability to the name. The neotype was collected within 20 km of Forel's original collection site (Mt. Victoria, New South Wales), and the neotype worker and its two associates correspond well with that author's original description of the species.

The physical resemblance of this morph of *I. victorianus* to *I. mattiroloi*, apart from the differences mentioned in the key, is quite strong, and Forel's association of the two taxa (i.e., as subspecies and species) is perfectly comprehensible given the taxonomic reasoning of his day.

Iridomyrmex emeryi Crawley is also considered a synonym of *I. victorianus*. Crawley (1918) cites Healesville as the type locality of this species. However, this material could not be located during this study, and may have been lost. Nonetheless, the worker description and figure found in Crawley's article are sufficiently detailed to exclude other possibilities. As we have not conducted an exhaustive search for the types it does not seem appropriate to designate a neotype at this time.

Iridomyrmex viridiaeneus **Viehmeyer**
(Fig. 83)

Iridomyrmex detectus viridiaeneus Viehmeyer, 1914: 41 (raised to species by Wheeler, G.C. & Wheeler, J., 1974: 400; subspecies of *purpureus* by Greenslade, 1974: 247; raised to species by Shattuck, 1993a: 142).

Types. Syntypes from Killalpaninna, South Australia (ANIC, 1 worker, examined; MHNG, 2 workers, examined; NHMB, 3 workers; USNM, 1 worker).

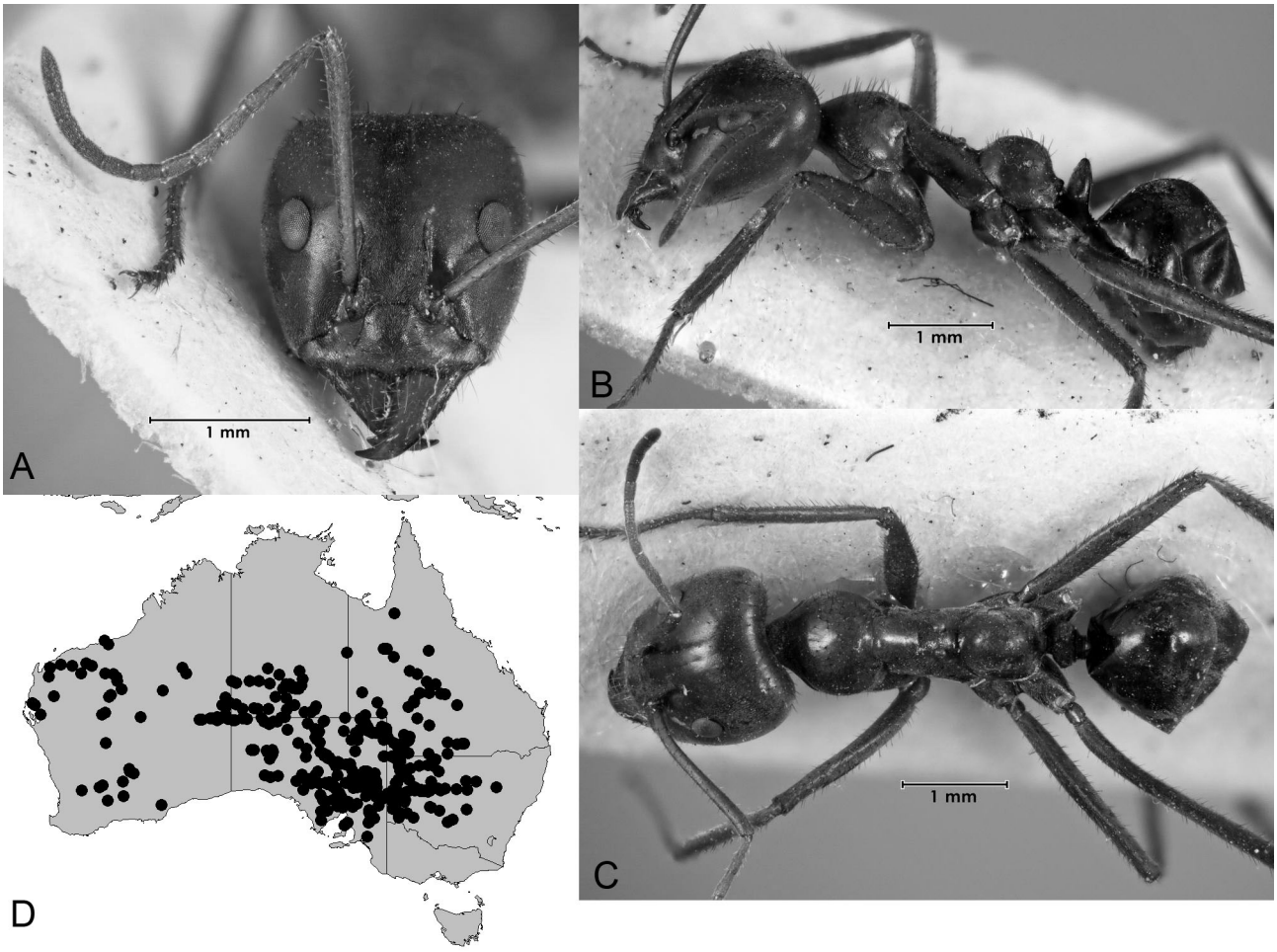


FIGURE 83. *Iridomyrmex virideaeneus* (syntype, Killalpaninna Mission Ruins, SA, ANIC32-009177): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

Worker Description. ***Head.*** Posterior margin of head weakly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set

above midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular. Frontal carinae convex; antennal scape surpassing posterior margin of head by approximately 2 x its diameter. Erect setae on scape present and abundant; prominence on anteromedial clypeal margin projecting as triangular spur; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule present in some workers. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae numerous (12 or more), short and bristly. Mesonotum sinuous. Erect mesonotal setae numerous (12 or more), short and bristly. Mesothoracic spiracles always prominent as small, vertical protuberances; propodeal dorsum smoothly and evenly convex; placement of propodeal spiracle posteriad and near propodeal declivity, or mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae numerous (12 or more), short and bristly. ***Petiole.*** Dorsum of node acuminate, or convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest present. Colour foreparts shades of reddish-brown, head often slightly lighter in colour, gaster dark reddish-brown, iridescence on head and pronotum predominantly bright yellowish-green to emerald green, mesonotum, propodeum and legs also with pink to purple iridescence in pinned material, gaster with iridescence of rainbow hues. Colour of erect setae brown.

Measurements. *Worker* (n = 71)—CI 89–101; EI 17–22; EL 0.29–0.41; EW 0.18–0.26; HL 1.55–2.37; HW 1.40–2.34; ML 0.73–1.37; PpH 0.19–0.47; PpL 0.73–1.32; SI 84–108; SL 1.51–2.05.

Comments. *Iridomyrmex viridiaeneus* is the most widely distributed of the meat ants, and occurs throughout Australia. Its compound nests and habits, at least in Western Australia, approximate those of species like *I. purpureus*. This ant is distinguished by its strong green iridescence, in addition to purple or pink iridescence, and its uniformly dark, reddish integument. With older, pinned material, workers of this species may be a little difficult to distinguish from Western Australian workers of *I. purpureus* with yellowish- to bluish-green humeri and a bluish-green frons, but the green colour in *I. viridiaeneus* is quite distinct on the sides of the head capsule when the ant is seen in profile, whereas this is not the case with the *I. purpureus* variant. Other intraspecific variations seen in Western Australian workers (i.e., a tendency to reddish iridescence, and a more arched posterior pronotum), are discussed by Shattuck (1993a). Shattuck also mentions in his monograph a small form of *I. viridiaeneus* (called 'SB' by the earlier researchers Greenslade and Halliday (1982)), which he considered to be conspecific with the typical, larger form.

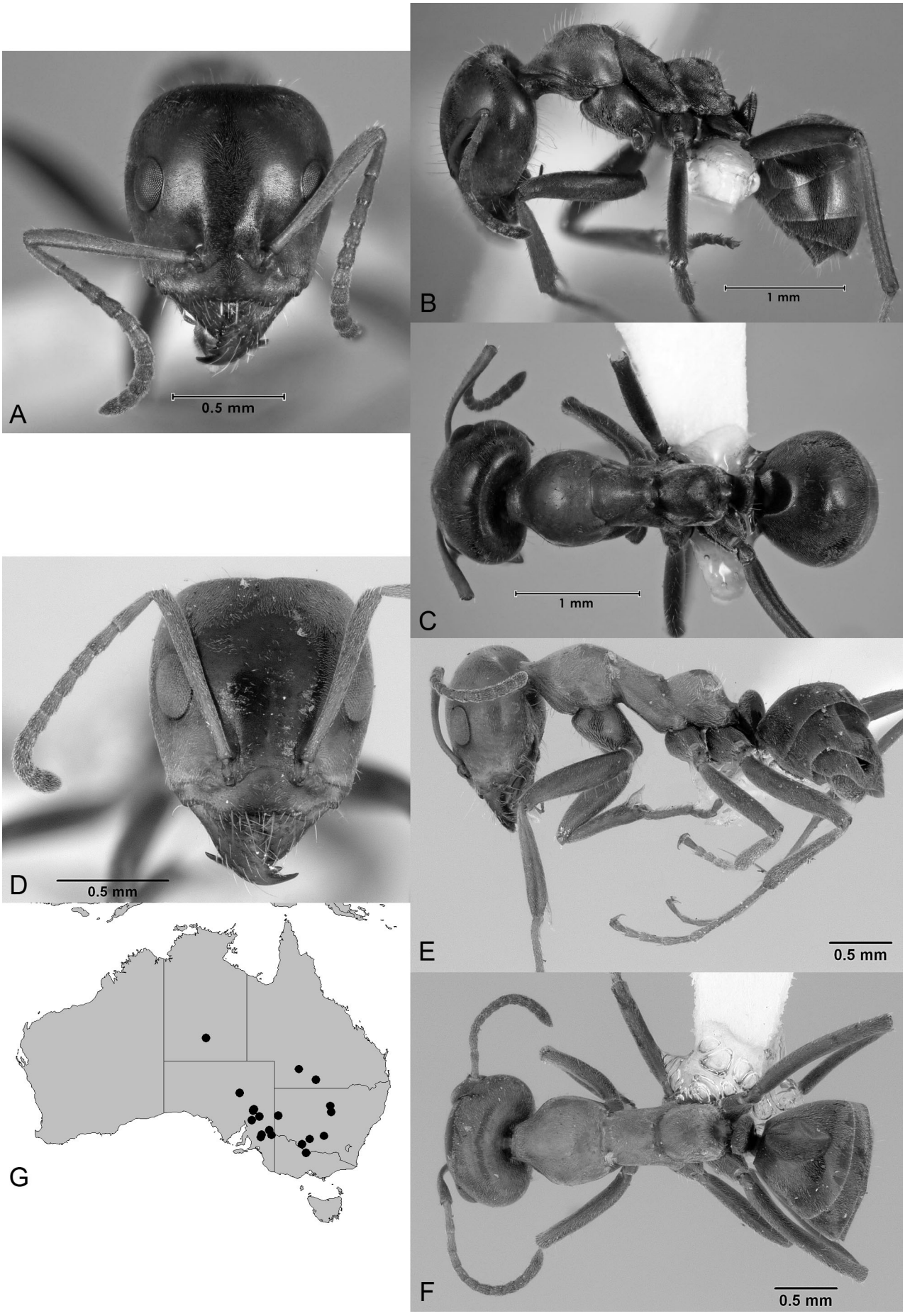
Iridomyrmex viridigaster Clark
(Figs 84, 86)

Iridomyrmex viridigaster Clark, 1941: 87, pl. 13, fig. 18.
Iridomyrmex mimulus Shattuck, 1993b: 1317, figs 14, 15, 36. **New synonym.**

Types. *Iridomyrmex viridigaster* Clark: Holotype worker from Patho, Victoria (MVMA). Paratypes: same data as holotype (ANIC, 2 workers, examined). *Iridomyrmex mimulus* Shattuck: Holotype worker from Lake Eyre (South), South Australia (ANIC, ANIC32-000079, examined).

Worker Description. ***Head.*** Posterior margin of head weakly concave; erect setae on posterior margin in full-face view set in a row, or present in small aggregations on one or both sides of posterior margin of head; sides of head noticeably convex; erect genal setae present on sides of head in full-face view, or absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set at about midpoint of head capsule; in profile, eye set anteriad of head capsule; eye asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae concave; antennal scape barely attaining posterior margin of head, or surpassing it by less than 1 x its diameter. Erect setae on scape absent, except

FIGURE 84. *Iridomyrmex viridigaster*, typical form (Morgan, SA, ANIC32-000049): A. Front of head; B. Side of body; C. Top of body. *Iridomyrmex viridigaster*, small form (*mimulus* holotype, Lake Eyre South, SA, ANIC32-000079): D. Front of head; E. Side of body; F. Top of body; G. Distribution of material examined (A. Noble, www.antweb.org).


A
0.5 mm
B
1 mm
C
1 mm
D
0.5 mm
E
0.5 mm
F
0.5 mm
G

at tip; prominence on anteromedial clypeal margin present as an indistinct swelling or undulation; mandible elongate triangular with oblique basal margin; long, curved setae on venter of head capsule present. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae numerous (12 or more), short and bristly. Mesonotum sinuous, or straight. Erect mesonotal setae numerous (12 or more), short and bristly. Mesothoracic spiracles always prominent as small, vertical protuberances; propodeal dorsum protuberant; placement of propodeal spiracle posteriad and near propodeal declivity; propodeal angle present as a bluntly defined right angle, the dorsal and declivitous propodeal faces never separated by a carina. Erect propodeal setae numerous (12 or more), short and bristly. ***Petiole.*** Dorsum of node acuminate, or convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour sides of head and usually mesosoma orange to brick-red (mesonotum and propodeum may have cloudy brownish infuscation), frons, legs and gaster brown. Colour of erect setae depigmented, whitish.

Measurements. *Worker* (n = 13)—CI 93–99; EI 24–27; EL 0.30–0.33; EW 0.15–0.19; HL 1.23–1.38; HW 1.16–1.33; ML 0.47–0.65; PpH 0.18–0.22; PpL 0.66–0.76; SI 75–80; SL 0.93–1.01.

Comments. Although it is by no means very common, *I. viridigaster* is the most frequently encountered member of the species complex that bears its name. As understood here, this taxon incorporates *I. mimulus*, erected by Shattuck (1993b), as a junior synonym. Further investigation could reveal that *I. anderseni* also belongs to this species. In terms of its critical measurements (e.g., lengths and indices pertaining to the scape and eyes), the *I. mimulus* holotype also satisfies the requirements for belonging to the species *I. viridigaster*, although its overall dimensions are rather on the small side. Additional workers of *I. viridigaster*, not recognised in the earlier study as they were among unsorted accessions, form a size-based continuum that now includes *I. mimulus*. *Iridomyrmex viridigaster* is a relatively variable member of the complex that bears its name, and the ground colour of the anterior mesosoma can vary from a rich red in the large workers that belong to populations in south-eastern Australia, to a yellowish-brown in workers from populations in the Flinders Ranges. The latter ants also tend to be hairier with erect setae on the sides of the head capsule, but such setae are usually sparse or absent in the redder south-eastern specimens. Ecological data are lacking for this species.

Iridomyrmex xanthocoxa sp. n.

(Fig. 85)

Types. Holotype worker from 13km ENE Millstream, Western Australia, 29 October 1970, J. Cardale, ANIC Ants Vial 9.92 (ANIC, ANIC32-039676). Paratypes: 8 workers, same data as holotype (ANIC, 5 workers; MCZC, 3 workers); 3 workers from 3.2km SSE Dampier, Western Australia, 18 October 1970, J. Feehan (BMNH, ANIC32-039677).

Worker Description. ***Head.*** Posterior margin of head weakly concave, or strongly concave; erect setae on posterior margin in full-face view set in a row; sides of head noticeably convex; erect genal setae absent from sides of head in full-face view (one to a few small setae may be present near mandibular insertion). Ocelli absent; in full-face view, eyes set above midpoint of head capsule; in profile, eye set anteriad of head capsule; eye semi-circular, or asymmetrical, curvature of inner eye margin more pronounced than that of its outer margin. Frontal carinae convex; antennal scape surpassing posterior margin of head by approximately 3 x its diameter. Erect setae on scape absent, except at tip; prominence on anteromedial clypeal margin projecting as triangular spur; mandible regularly triangular with oblique basal margin; long, curved setae on venter of head capsule absent. ***Mesosoma.*** Pronotum moderately and evenly curved over its length. Erect pronotal setae sparse (6 or fewer) and bristly. Mesonotum evenly curved. Erect mesonotal setae sparse (6 or fewer) and bristly. Mesothoracic spiracles prominent or inconspicuous; propodeal dorsum smoothly and evenly convex; placement of propodeal spiracle mesad, more than its diameter away from propodeal declivity; propodeal angle weakly present or absent, the confluence of the dorsal and declivitous propodeal faces indicated, if at all, by an undulation. Erect propodeal setae moderate in number (6-12), short and bristly. ***Petiole.*** Dorsum of node convex; node thin, scale-like, orientation more-or-less vertical. ***Gaster.*** Non-marginal erect setae of gaster present on first gastral tergite; marginal erect setae of gaster present on first tergite. ***General characters.*** Allometric differences between workers of same nest absent. Colour head, mesosoma and fore coxae orange or reddish-orange, legs and gaster brown, gaster with bluish iridescence.

Measurements. *Worker* (n = 4)—CI 64–70; EI 40–42; EL 0.25–0.28; EW 0.20–0.21; HFL 1.46–1.74; HL 0.90–1.03; HW 0.60–0.66; ML 1.25–1.39; MTL 1.06–1.22; PpH 0.13–0.15; PpL 0.47–0.53; SI 154–175; SL 1.00–1.15.

Comments. *Iridomyrmex xanthocoxa* is very similar to red or reddish variants of *I. minor*, but the yellowish-orange fore coxa (the same colour as the mesosoma) is diagnostic of the species throughout its relatively restricted range. The antennal scape, hind tibia and sides of the head lack erect setae. This species is confined to the Pilbara region of Western Australia, but can be quite abundant in pitfall samples from certain areas. Label data are sadly lacking in behavioural or ecological detail, but the biology of the ant may be expected to be similar to that of *I. minor*, to which it is very likely closely related.

Etymology. Greek: '*xanthos*'—'yellow' plus '*coxa*', referring to the orange-yellow coxae found in this species.

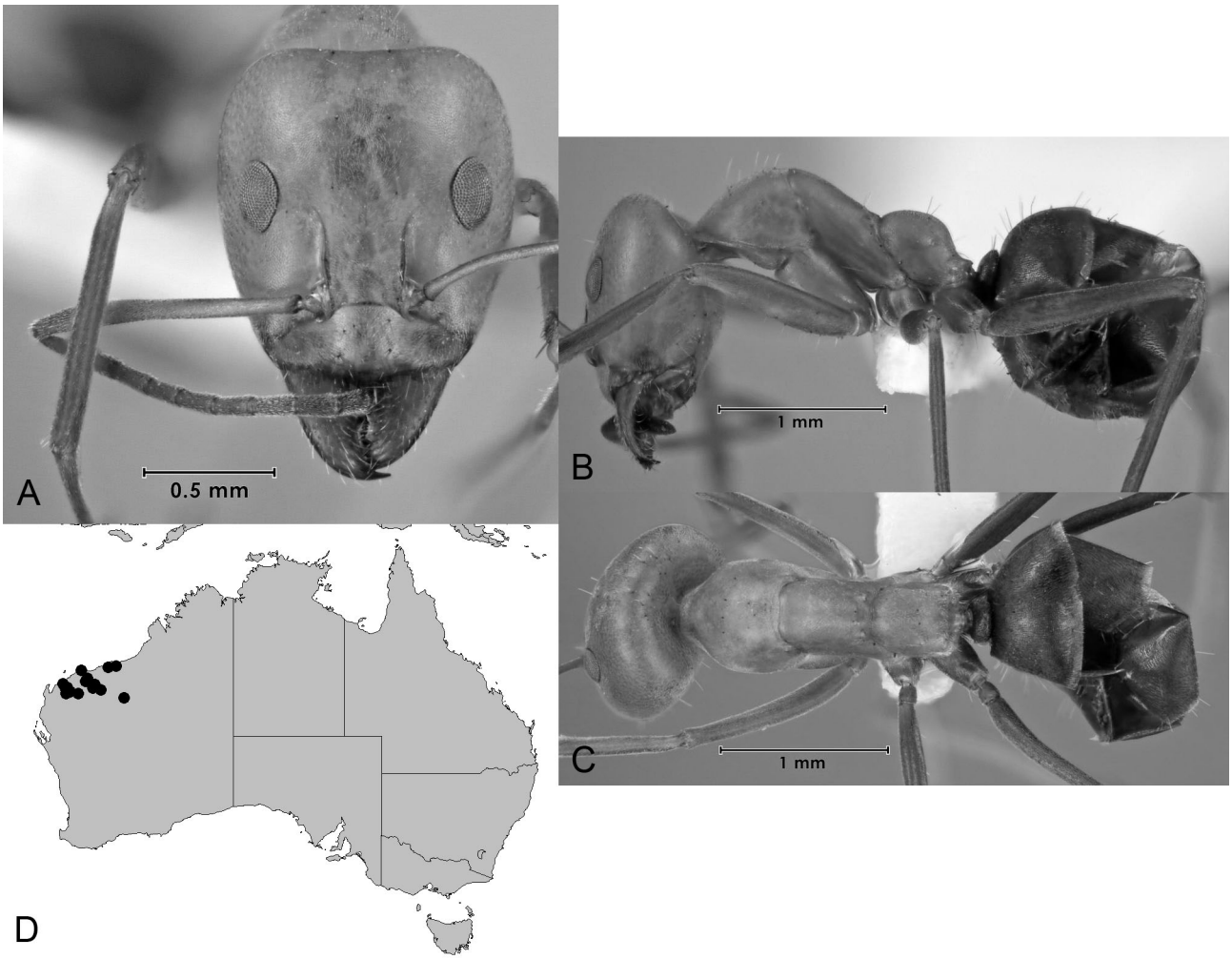


FIGURE 85. *Iridomyrmex xanthocoxa* (Millstream, WA, ANIC32-039675): A. Front of head; B. Side of body; C. Top of body; D. Distribution of material examined.

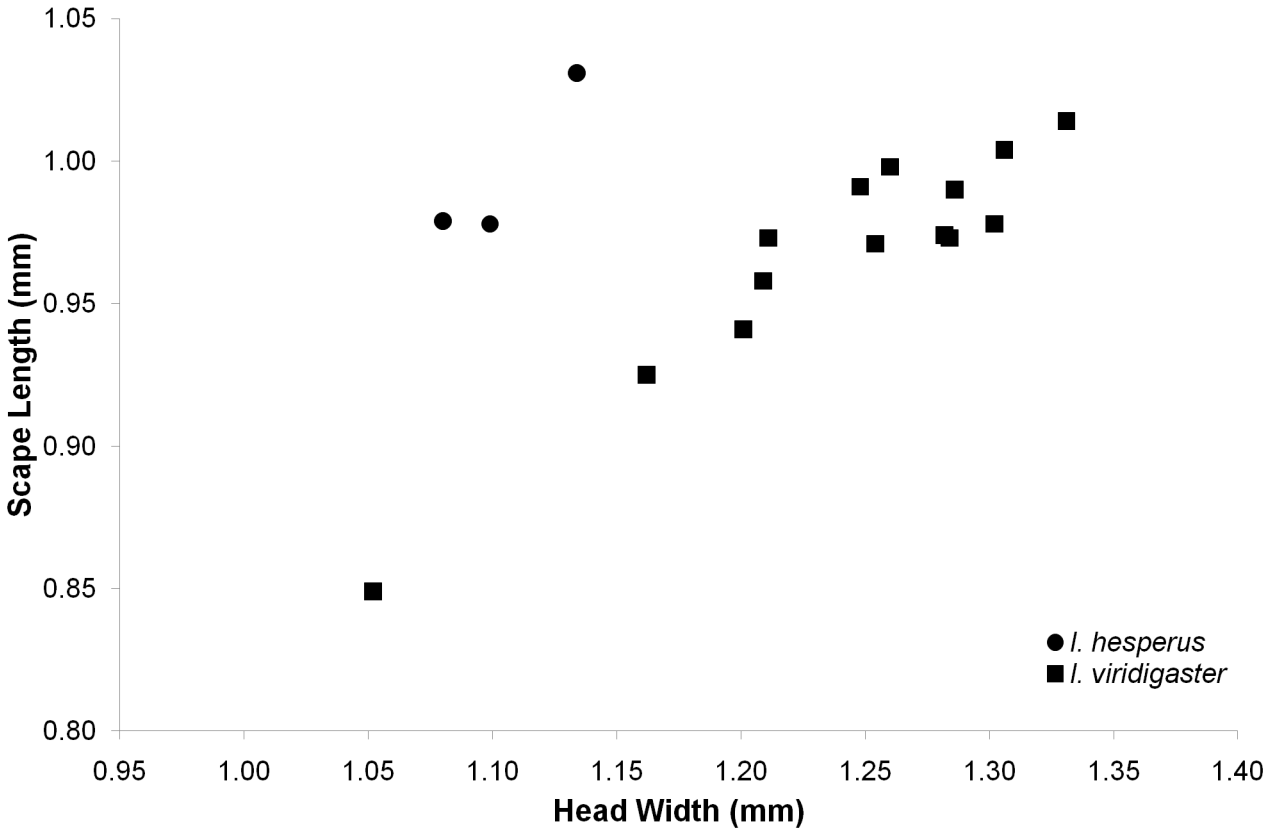


FIGURE 86. Scape length versus head width for *I. hesperus* and *I. viridigaster*.

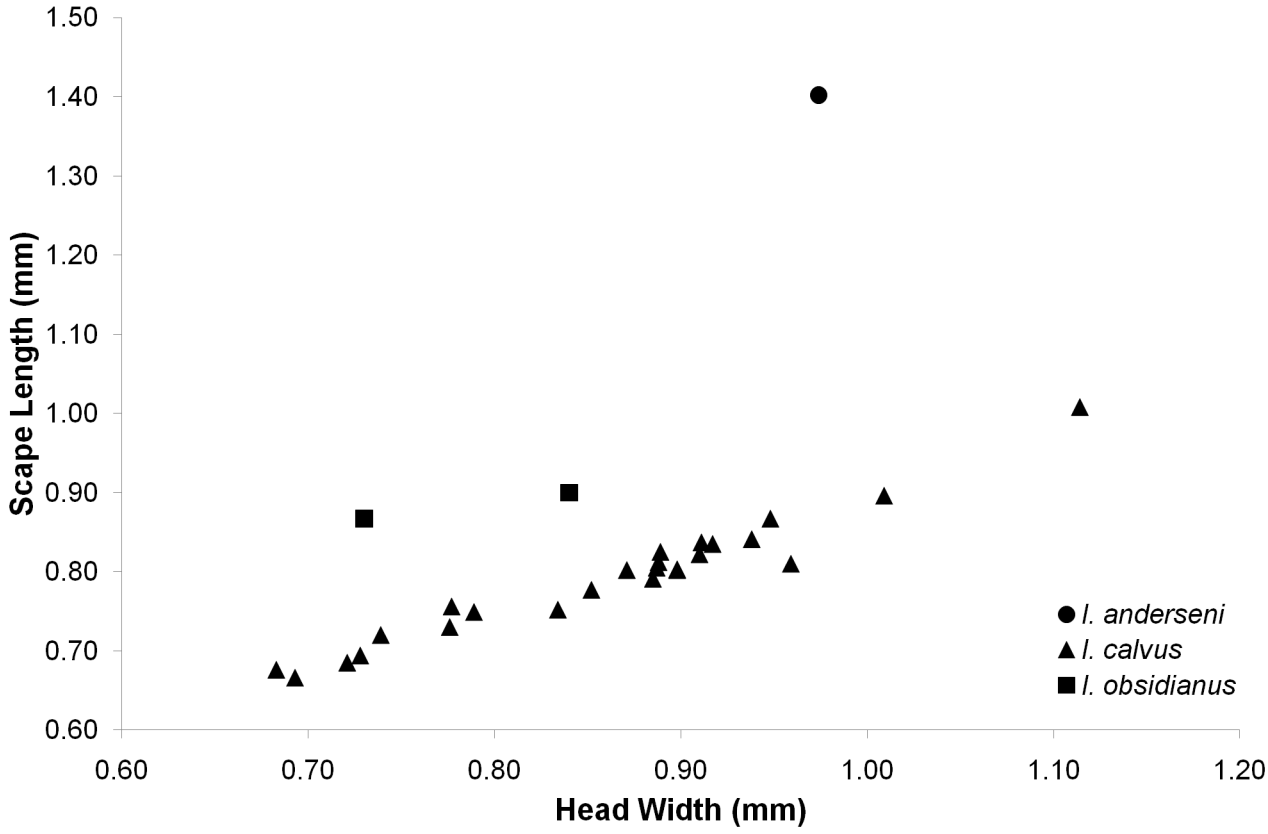


FIGURE 87. Scape length versus head width for *I. anderseni*, *I. calvus* and *I. obsidianus*.

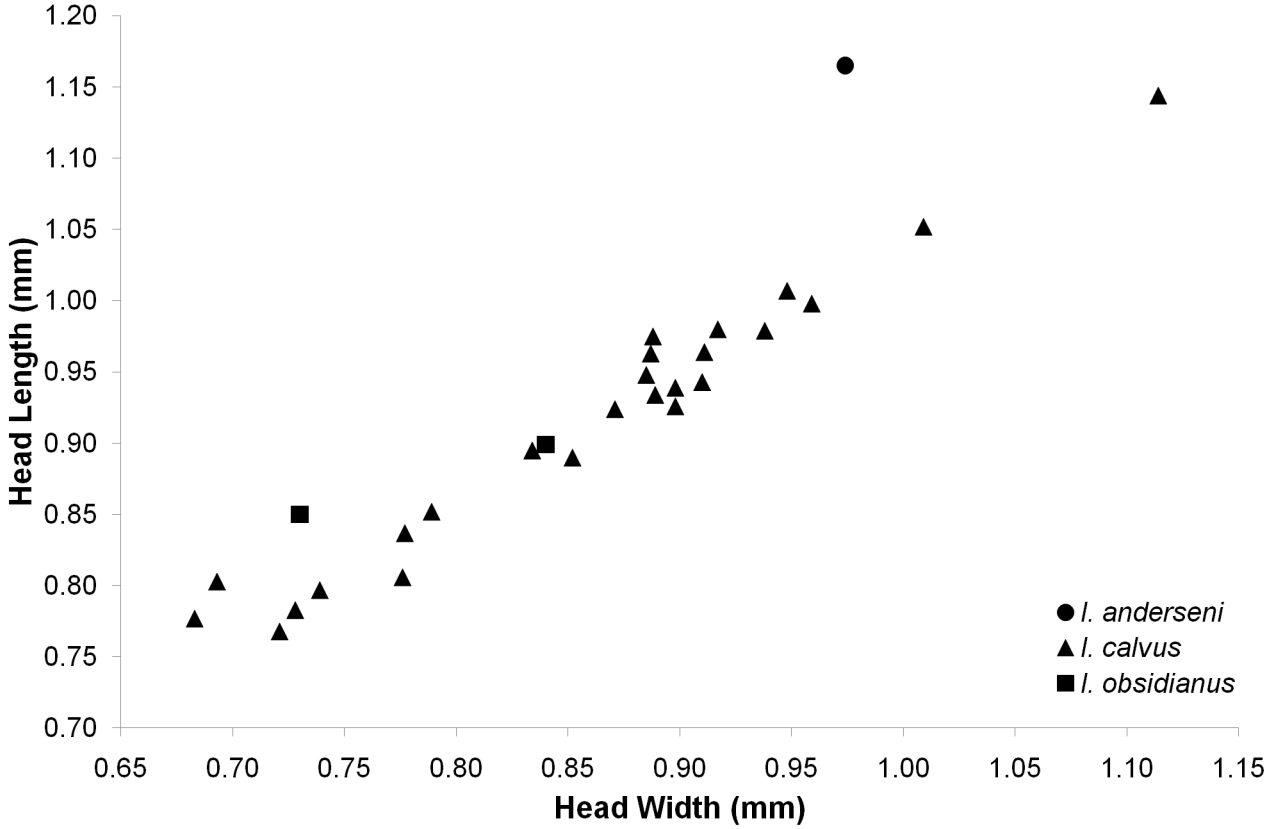


FIGURE 88. Head length versus head width for *I. anderseni*, *I. calvus* and *I. obsidianus*.

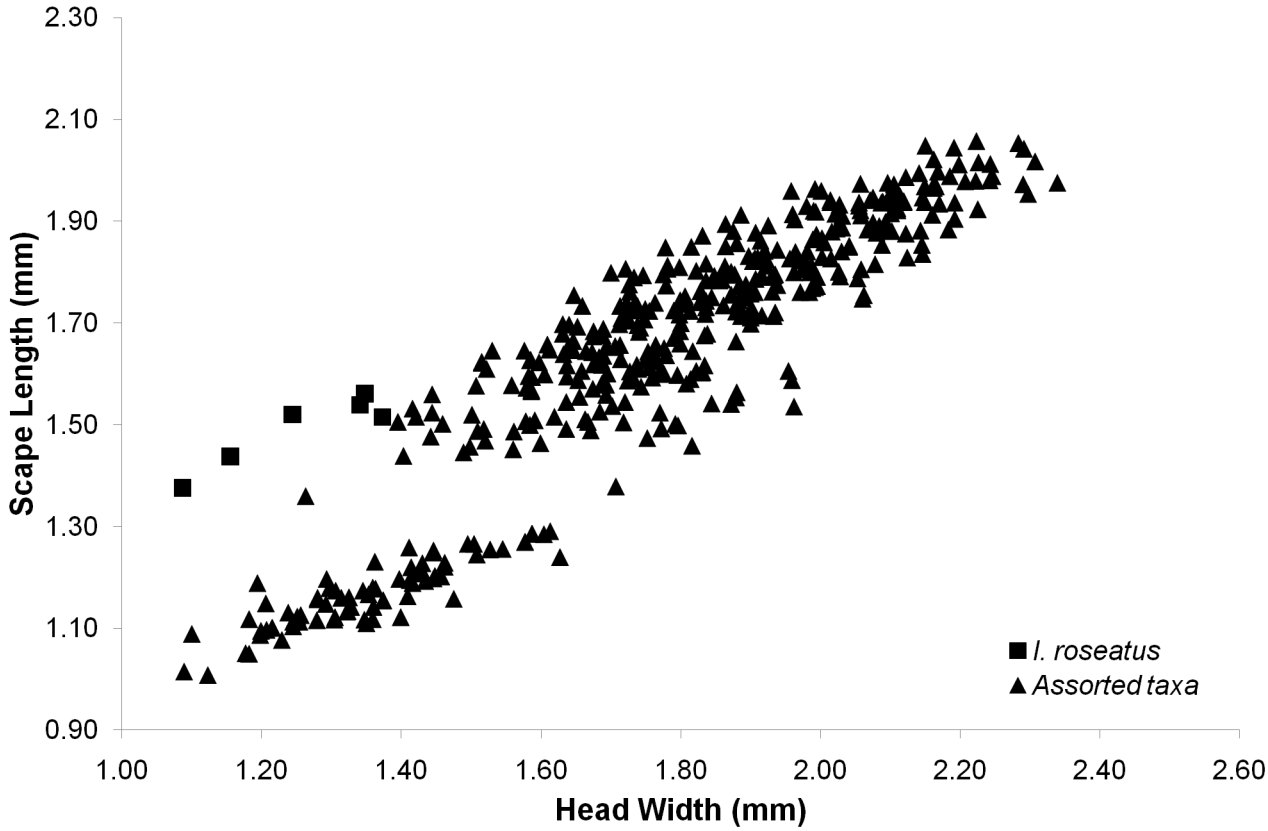


FIGURE 89. Scape length versus head width for *I. roseatus* and assorted taxa (*I. bigi*, *I. discors*, *I. galbanus*, *I. lividus*, *I. purpureus*, *I. reburrus*, *I. sanguineus*, *I. spadius*, *I. spodipilus* and *I. viridiaeneus*).

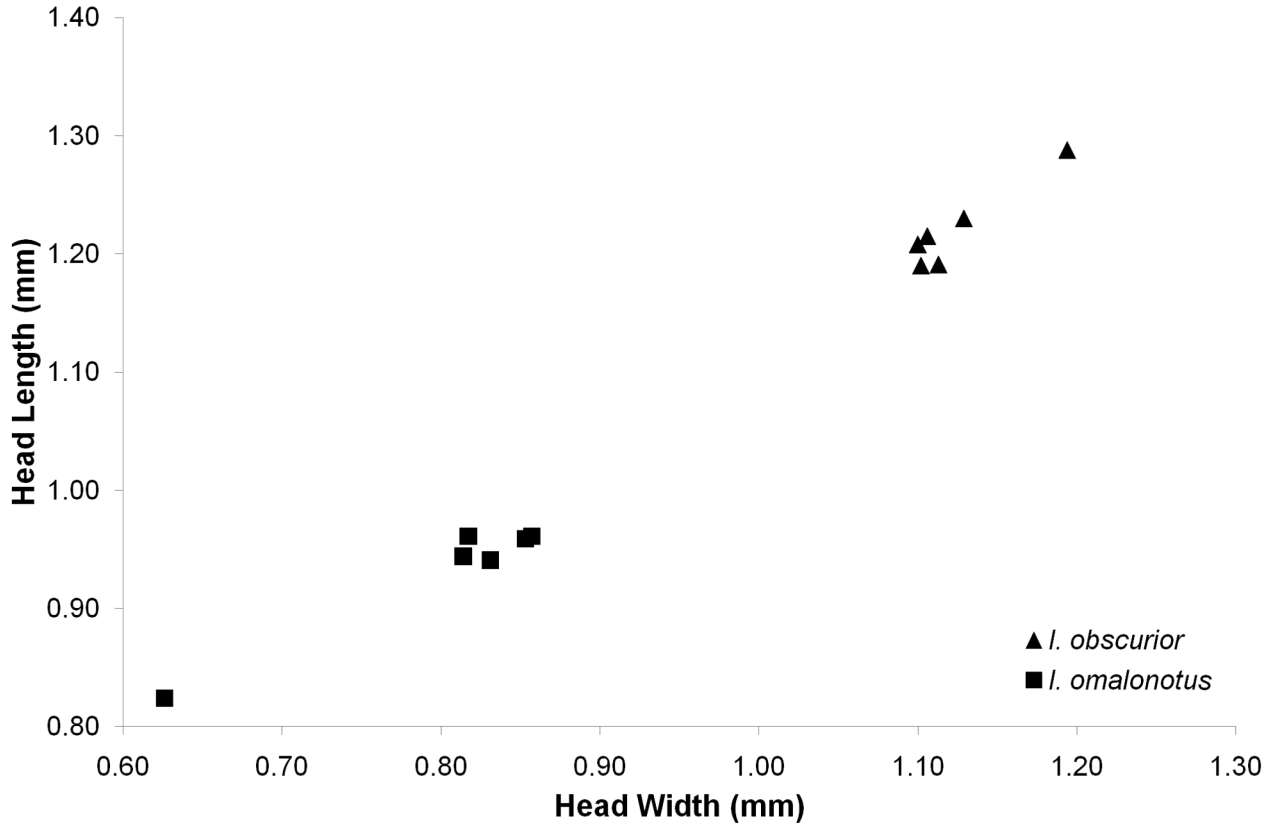


FIGURE 90. Head length versus head width for *I. obscurior* and *I. omalonotus*.

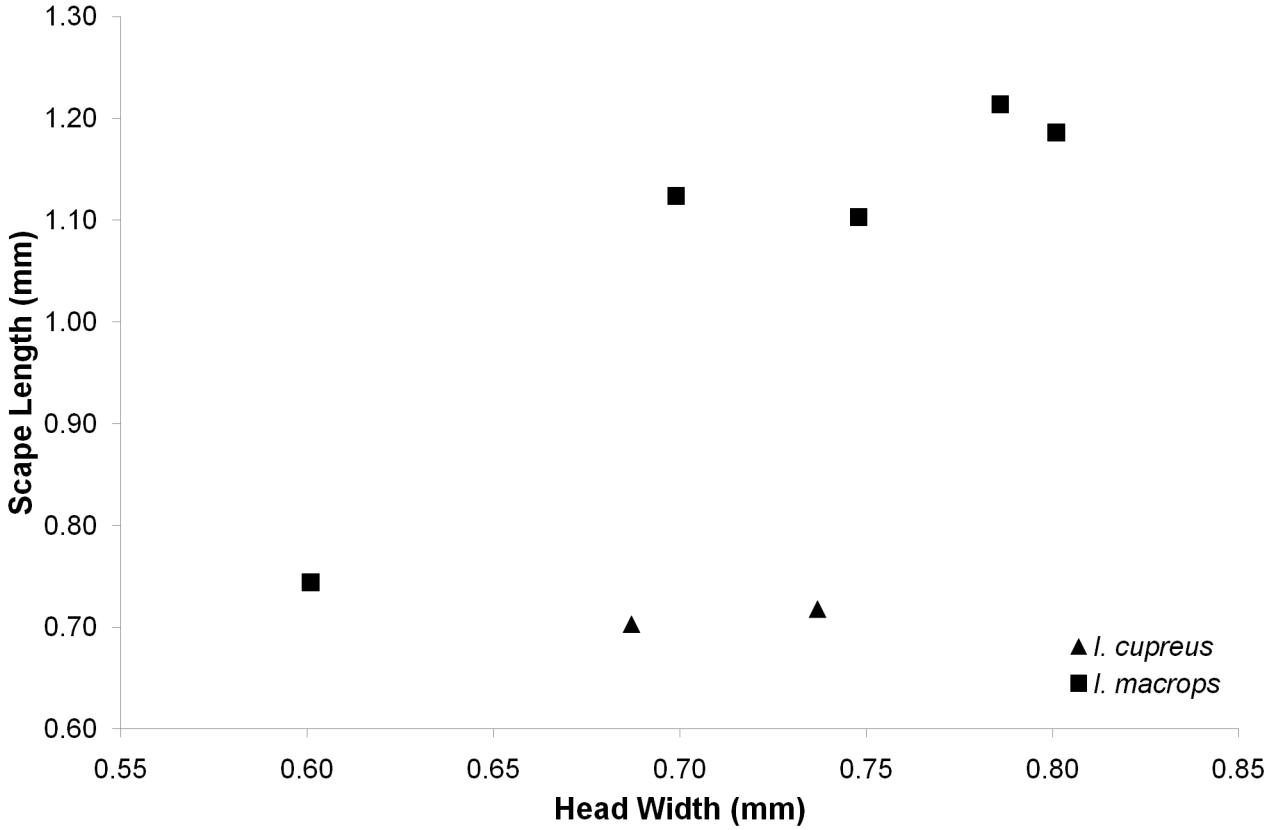


FIGURE 91. Scape length versus head width for *I. cupreus* and *I. macrops*.

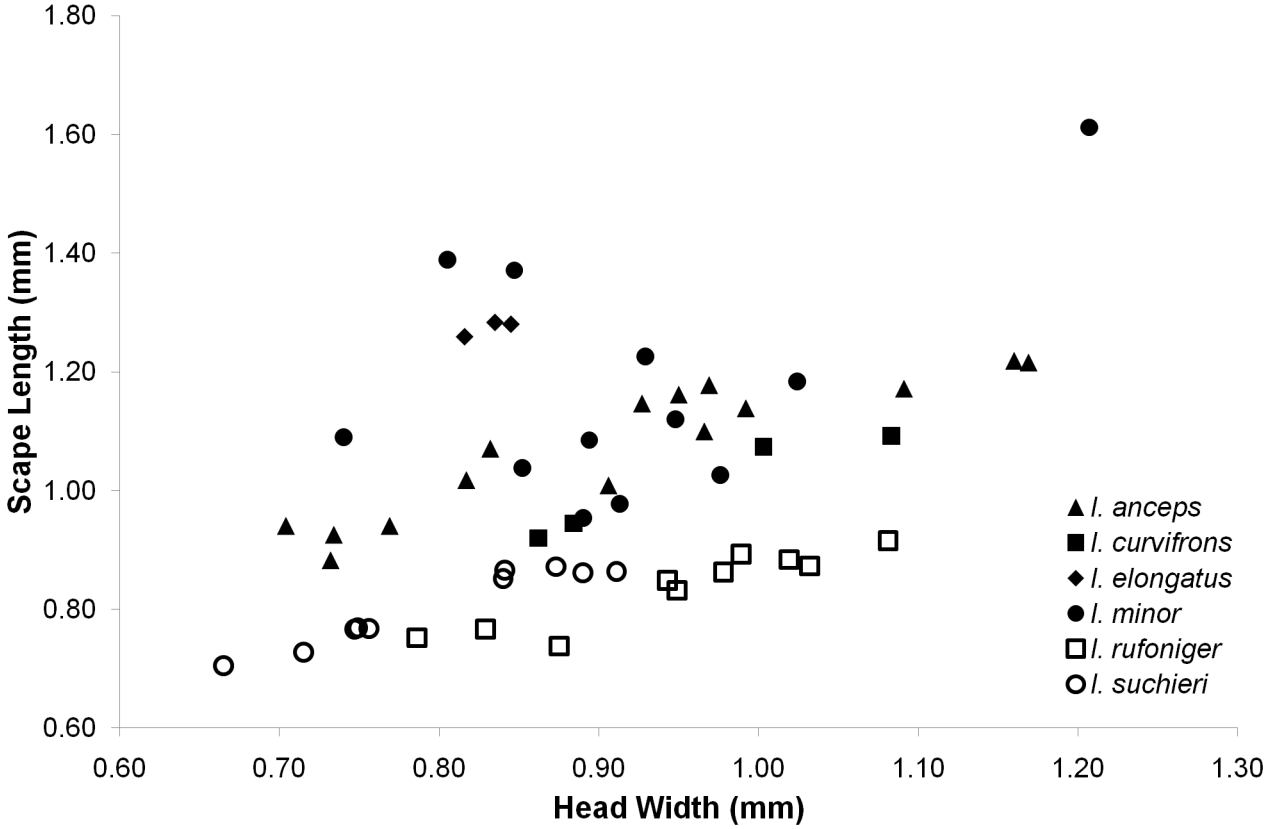


FIGURE 92. Scape length versus head width for *I. anceps*, *I. curvifrons*, *I. elongatus*, *I. minor*, *I. rufoniger* and *I. suchieri*.

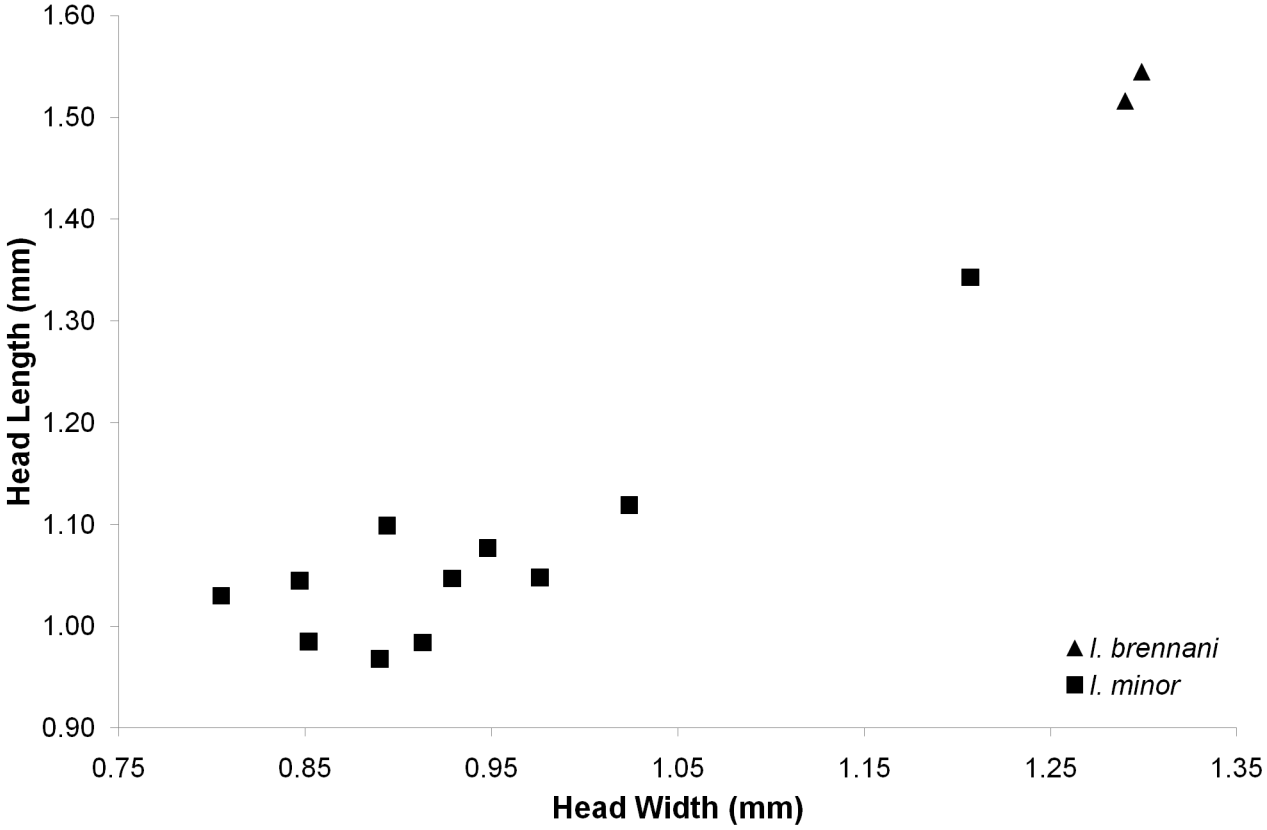


FIGURE 93. Head length versus head width for *I. brennani* and *I. minor*.

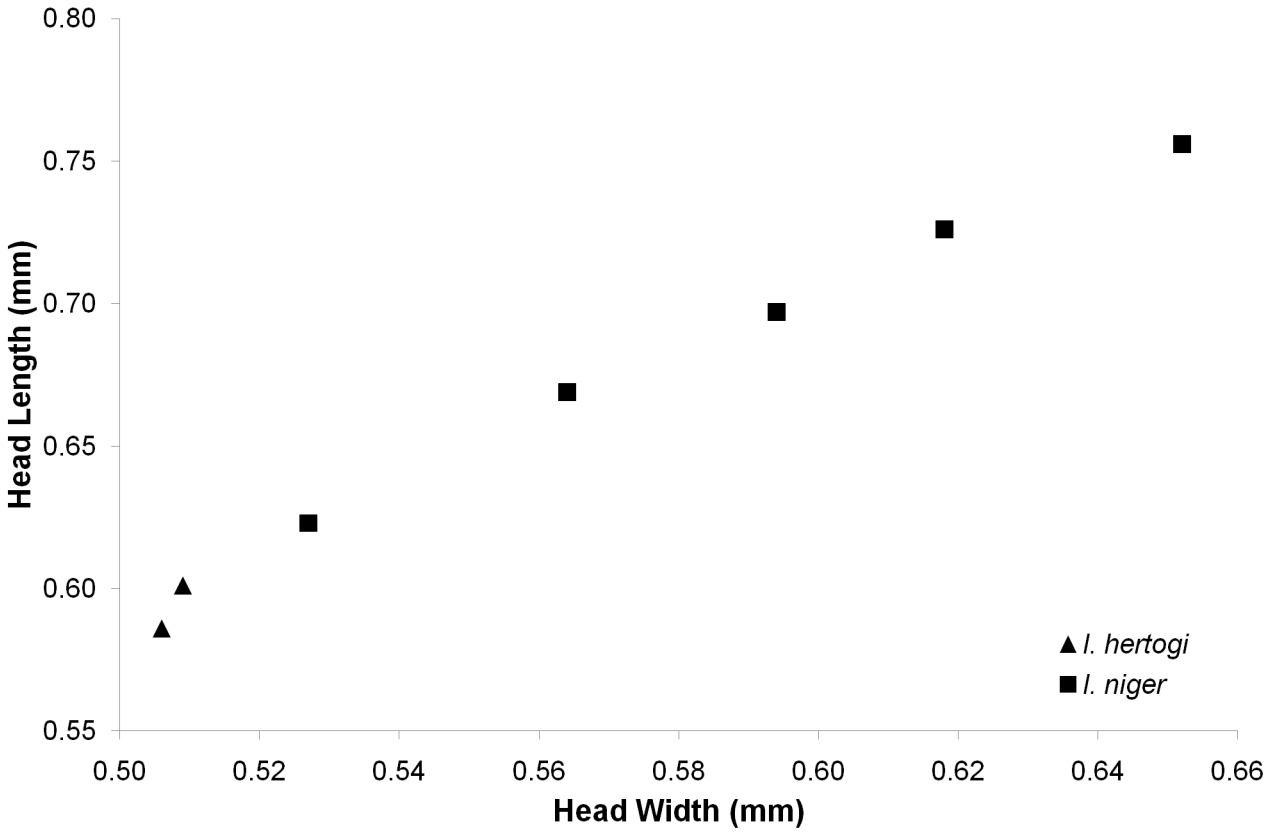


FIGURE 94. Head length versus head width for *I. hertogi* and *I. niger.*

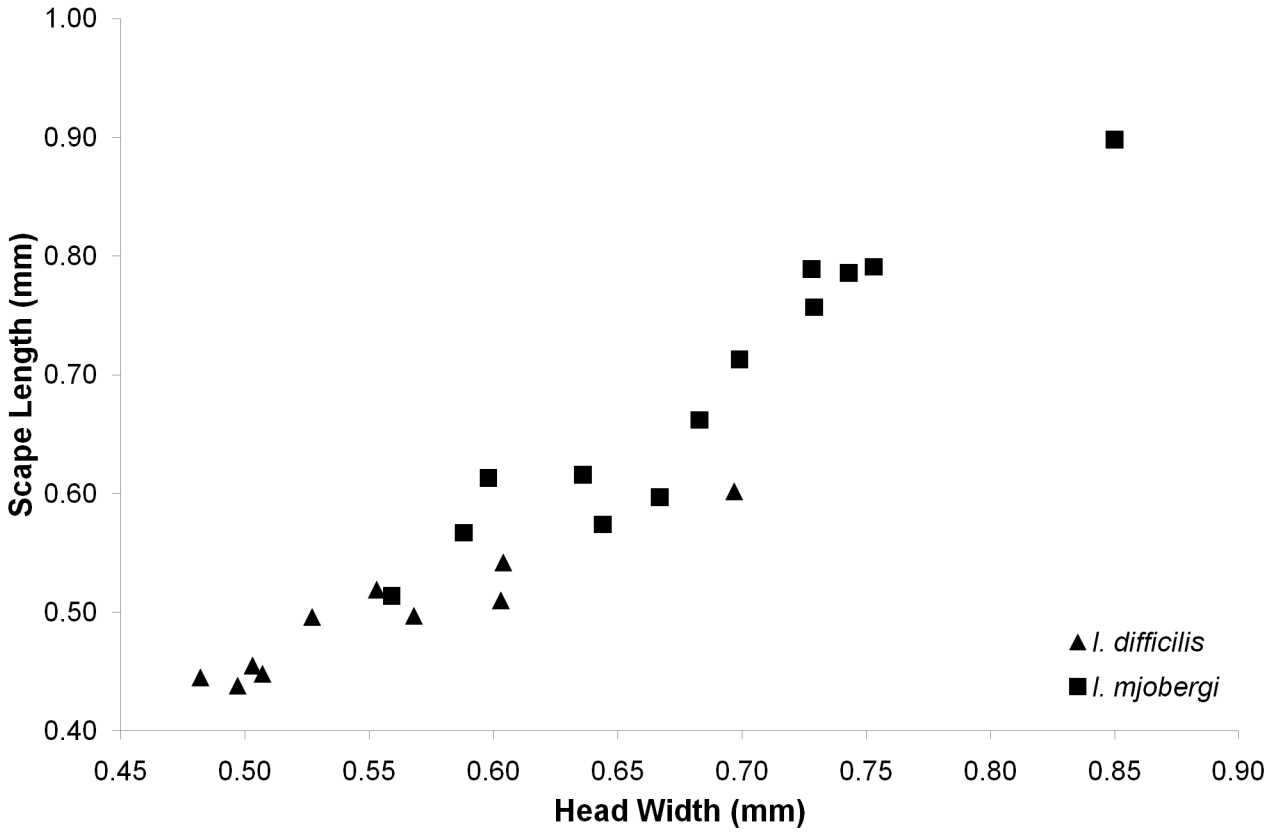


FIGURE 95. Scape length versus head width for *I. difficilis* and *I. mjobergi*.

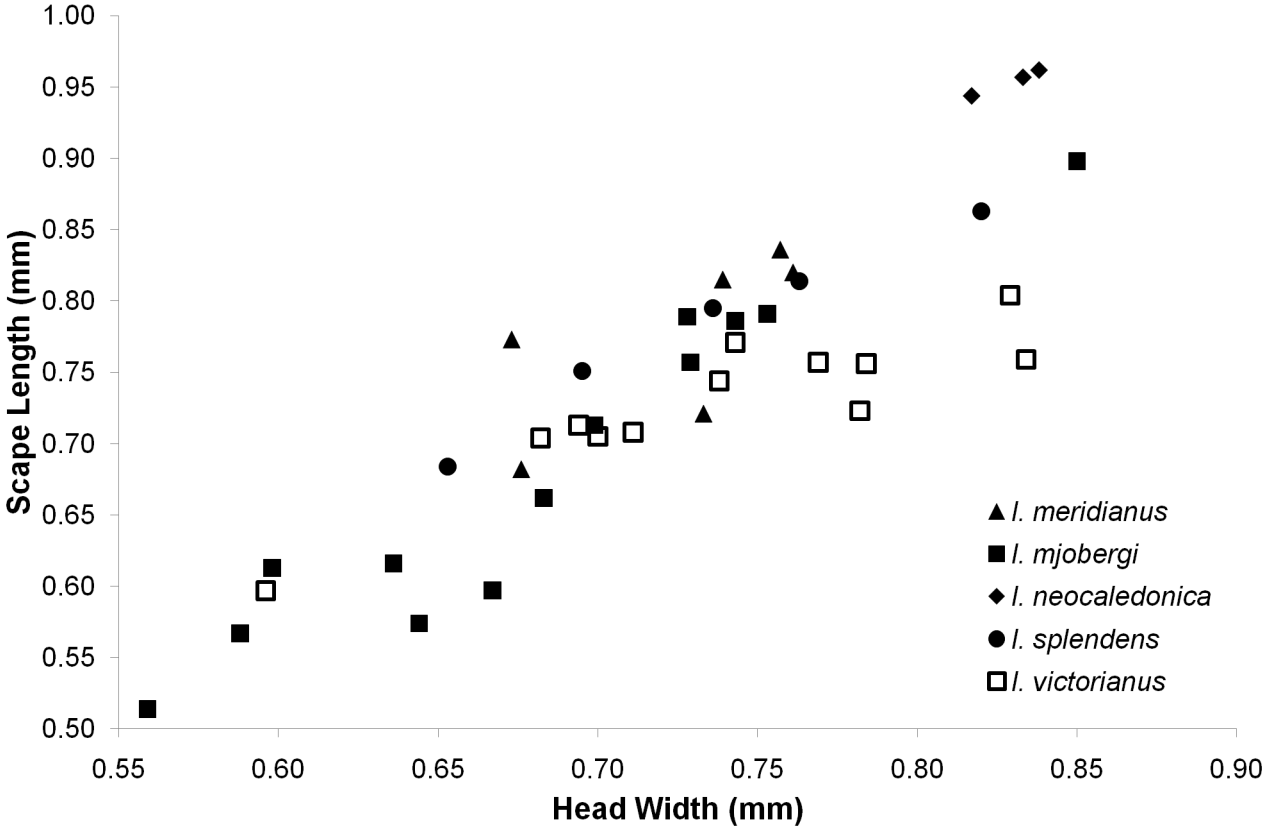


FIGURE 96. Scape length versus head width for *I. meridianus, I. mjobergi, I. neocaledonica, I. splendens* and *I. victorianus*.

Species inquirenda in *Iridomyrmex*

Iridomyrmex bicknelli luteus Forel, *species inquirenda*

Iridomyrmex bicknelli lutea Forel, 1915: 77.

Types. Holotype worker from Kimberley district, Western Australia (not located during this study, apparently lost).

Comments: Treatment of *I. bicknelli luteus* is complicated by the apparent loss of the holotype combined with an original description consisting of the single sentence (translated from German) "Completely bright red-yellow, otherwise completely like [*bicknelli*]; the head in the back somewhat less convex". Unfortunately, we are unaware of any species that is similar to *I. bicknelli* but is bright red-yellow and occurs in northern Western Australia. *Iridomyrmex bicknelli* itself is brown to black in colour and even callow or faded workers would not be described as bright red-yellow, normally being pale yellow. The description is suggestive of the pale form of *I. agilis*, but this taxon does not occur near the reported type locality of *I. luteus*. A more likely candidate would be the bright-red, narrow headed form of *I. minor*, a very common species in northern Western Australia which has a less convex posterior margin of the head when compared to *I. bicknelli*. However, without the type and with little more than a vague one line description it is impossible to determine, with any confidence, the true identity of this taxon. We therefore treat this name as *species inquirenda* within *Iridomyrmex* until the lost holotype can be located.

Species removed from *Iridomyrmex*

Anonychomyrma extensa (Emery), comb. nov.

Iridomyrmex extensus Emery, 1887: 251.

Types. Syntype workers from Hatam, New Guinea (probably SW of Manokwari, Arfak Mountains, West Papua, Indonesia (Zimmerman, 1967)) (not located during this study).

Comments. Type material of this taxon could not be located during this study. However, the figure provided by Emery (1887, fig. 26) matches specimens of *Anonychomyrma* held in ANIC and is unlike species of *Iridomyrmex* known from the vicinity of this species' type locality. In this species the pronotum is relatively high and is set off from the mesonotum by an angle, and the propodeum is high and dome-like. This configuration differs from known Indonesian species of *Iridomyrmex*. Therefore, this name is treated as belonging to *Anonychomyrma* rather than *Iridomyrmex*.

Chronoxenus butteli (Forel), comb. nov.

Turneria butteli Forel, 1913: 92 (combination in *Iridomyrmex* by Shattuck, 1990: 105).

Types. Holotype queen from Tandjong Slamat, Sumatra, Indonesia (MHNG, examined).

Comments. *Turneria butteli* Forel is here transferred to *Chronoxenus* **comb. nov.** This taxon had previously been placed in *Iridomyrmex* (Shattuck, 1990). However, the broadly arcuate anterior clypeal margin and the narrow mandible with reduced dentition exclude it from *Iridomyrmex*. Although the queen is dealated, her appearance is consistent with subtribe Bothriomyrmecina (*sensu* Dubovikoff, 2005). As the wings are not present and the palps are not visible, the important diagnostic characters for separating the members of the Bothriomyrmecina cannot be used in this case. Given the provenance of the specimen (Sumatra), the ant is unlikely to belong to *Arnoldius, Bothriomyrmex* or *Nebothriomyrmex*, although a conclusion cannot be reached for *Loweriella*, for which the queen is unknown. However, the balance of probabilities is with *Chronoxenus*—the queen in this instance is very similar morphologically to the holotype queen of *Chronoxenus wroughtoni javanus* Forel—and the holotype specimen of *I. butteli* is provisionally placed in that genus.

Note: While Dubovikoff (2005) proposed generic-level changes to the taxonomy of these ants, he did not provide details regarding the placement of individual species (with the exception of type species) within these genera. To clarify these generic combinations the species transferred from *Bothriomyrmex* to *Arnoldius* and *Chronoxenus* are listed here (all **new combinations**). Species transferred from *Bothriomyrmex* to *Arnoldius*: *pusillus* (Mayr), *pusillus* var. *aequalis* (Forel), *scissor* (Crawley). Species transferred from *Bothriomyrmex* to *Chronoxenus*: *dalyi* (Forel), *rossi* (Donisthorpe), *walshi* (Forel), *wroughtonii* (Forel), *wroughtonii formosensis* (Forel), *wroughtonii javanus* (Forel), *wroughtonii victoriae* (Forel). The species *B. wilsoni* Clark (syntype worker from Port Lincoln, South Australia (MVMA, examined)) belongs to *Plagiolepis* (**new combination)**. Both Clark (1934a), when describing this species, and Brown (1955) commented on its unusual morphology, with Brown even speculating that it might be a *Plagiolepis* rather than a *Bothriomyrmex* as originally proposed. An examination of a syntype has confirmed Brown's suspicions.

Tapinoma krakatauae (Wheeler), comb. nov

Iridomyrmex krakatauae Wheeler, W.M., 1924: 252.

Types. Holotype worker from Krakatau, Indonesia (not located during the study, apparently lost).

Comments. Type material of this taxon could not be located during this study. Wheeler's (1924) detailed description does not match any of the *Iridomyrmex* species known from the area where it was collected. Based on the original description, it seems unlikely that this taxon belongs to *Iridomyrmex*. Specifically, Wheeler (1924) notes the following: (1) The ant "lacks" a petiole (presumably he means petiolar node as a gaster is present). (2) The gaster is described as "somewhat deflective", suggesting it is positioned ventrally. This is not a common position for *Iridomyrmex* but it is a common orientation in *Tapinoma* and *Technomyrmex*. (3) There is no mention of a medial clypeal prominence or anything corresponding to it. Instead, the anterior border of the clypeus is described as "almost straight". In most of the northern *Iridomyrmex* that occur outside of Australia (for example *I. anceps* and *I. coeruleus*) this anatomical feature is distinct. (4) The ant is very small (1.5 mm). Of the *Iridomyrmex* occurring in this region, only *I. mjobergi* would be similar sized; however, *I. mjobergi* has a distinct petiolar node. (5) The

propodeum is not protuberant, a condition found in *Iridomyrmex* species from this area. (6) The antennal scapes do not reach the posterior margin of the head, a very unusual condition for *Iridomyrmex* where they normally extend at least slightly beyond the posterior margin of head. (7) The propodeum is sloping and hardly raised, a condition found in *Doleromyrma* and *Tapinoma* but not *Iridomyrmex*. (8) The ant is completely glabrous while northern *I. mjobergi* always has a few hairs. (9) The posterior margins of the eyes only meet the imaginary horizontal line intersecting the middle of the head capsule. This is much further anterior than found in *Iridomyrmex*. Taken together, these characters suggest that this taxon belongs in *Tapinoma* or possibly *Technomyrmex* rather than *Iridomyrmex*. Based on the small size we are here transferring it to *Tapinoma*. Determining the species-level identification of this taxon will require the examination of *Tapinoma* material from throughout the Krakatau region, an undertaking beyond the scope of this study.

Tapinoma latifrons (Karavaiev), comb. nov.

Iridomyrmex latifrons Karavaiev, 1933: 305, fig. 1.

Types. Holotype worker from Bantam, Java, Indonesia (UASK, examined).

Comments. *Iridomyrmex latifrons* Karavaiev is here transferred to the genus *Tapinoma*. The holotype specimen does not possess a petiolar node (this can be ascertained, despite the fact that the petiole is partially hidden by the collapsed gaster). The absence of a node requires the specimen to be removed from the genus *Iridomyrmex*, whose taxa all possess a node or a nodiform ridge. The holotype specimen can also be excluded from the dolichoderine genus *Technomyrmex* due to only four gastral tergites being visible in dorsal view (five tergites are visible in *Technomyrmex).* Finally, the insertion of the posterior sector of the clypeus between the frontal carinae is a broad arc, a feature that separates *Tapinoma* species from the Australian genus *Doleromyrma*, in which the suture demarcating the posterior clypeal border is more narrowly rectangular in appearance (Heterick, 2009). All other visible features of the worker are consistent with the genus *Tapinoma* as characterised by Bolton (1994).

Fossil-based species of *Iridomyrmex*

To date 14 fossil-based species have been either described in *Iridomyrmex* or placed within the genus at some point in time. Of these, all but five are no longer considered to belong to *Iridomyrmex*, having been transferred to the genera *Anonychomyrma* (3 species), *Ctenobethylus* (1), *Dolichoderus* (1), *Eldermyrmex* (1), *Gracilidris* (1), *Liometopum* (1) and *Technomyrmex* (1). Of the five remaining taxa, strong morphological evidence supporting placement within *Iridomyrmex* is available for only a single species, the remaining being poorly preserved and their generic assignments being based on minimal evidence. This single species, *I. shandongicus*, is known from China and is of Miocene (5-23mya) age. The remaining species are much older, being from the Oligocene (23-28mya) and Eocene (33-55mya), and predating modern *Iridomyrmex* by at least 11 million years (Ward et al., 2010). Additionally, these species occur significantly outside the modern distribution of the genus. It is unlikely that these four species are true *Iridomyrmex* but determining their proper placement has proven problematic. In this study they are considered *incertae sedis* in *Iridomyrmex*. Details of these fossil species follow.

Iridomyrmex breviantennis Théobald, *incertae sedis*

Iridomyrmex breviantennis Théobald, 1937: 209.

Types. Holotype queen from France (Oligocene).

Comments. This is an impression fossil of a queen. There is so little morphological detail available that rigorous generic placement is nearly impossible. As such, and following Shattuck (1992a), it is here left in *Iridomyrmex* but this placement is little more than speculation and it is considered *incertae sedis* in the genus.

Iridomyrmex florissantius Carpenter, *incertae sedis*

Iridomyrmex florissantius Carpenter, 1930: 50.

Types. Holotype queen from the United States (Oligocene).

Comments. This species, based on a series of impression fossil queens, is only tentatively placed in *Iridomyrmex* as very little morphological detail is available. It is unlikely that this species is related to modern *Iridomyrmex*, but so little information is available that it is extremely difficult to determine its true relationships. As such it is retained in *Iridomyrmex* as *incertae sedis* with strong reservations that it actually belongs here.

Iridomyrmex mapesi Wilson, *incertae sedis*

Iridomyrmex mapesi Wilson, 1985a: 211.

Types. Holotype worker from the United States (Eocene).

Comments. The condition of the only known specimen of this species is so poor that discussions of its morphology are limited to the most general and vague characterisation. Wilson (1985a) notes that the species possesses fewer mandibular teeth than New World species then placed in *Iridomyrmex* (now placed in *Linepethima*). He compares the mandibles with those of extant Australian species, finding them similar to *I. calvus* and *I. rufoniger*, as well as what is now *Philidris cordatus*. Essentially no other details are provided. With so little information available it is impossible to support a specific generic placement of this taxon, and it is retained here as *incertae sedis*, acknowledging that this placement in *Iridomyrmex* is unsupported and likely to be incorrect based on biogeographic considerations and the great age difference between this species and the origins of modern members of *Iridomyrmex*.

Iridomyrmex obscurans Carpenter, *incertae sedis*

Iridomyrmex obscurans Carpenter, 1930: 51.

Types. Holotype queen from the United States (Oligocene).

Comments. When describing this species Carpenter (1930) commented that it "is one of the most obscure of the Florissant ants, since nothing but the more general features are known". Unfortunately little has changed over the past 90 years and this species remains essentially unknown. While there is little rigorous data to suggest it belongs in *Iridomyrmex*, placement in another genus would be just as tenuous and therefore it remains in *Iridomyrmex* as *incertae sedis*.

Iridomyrmex shandongicus Zhang

Iridomyrmex shandongicus Zhang, 1989: 278.

Types. Holotype queen from China (Miocene).

Comments. Of all the fossils thus far placed within *Iridomyrmex*, this is the only one with strong support. While Zhang's (1989) figures are simple line drawings with minimal detail, the shape of the mandibles as well as the wing venation is consistent with extant species within the genus. Critical details such as the configuration of the anterior clypeal margin are unfortunately missing, and the location of the compound eye is slightly anterior of what might be expected, but in general, the placement of this species within *Iridomyrmex* seems plausible and is accepted in this study.

Fossil-based species removed from *Iridomyrmex*

Anonychomyrma constricta (Mayr)

Hypoclinea constricta Mayr, 1868: 60.

Types. Holotype worker from Baltic amber (Eocene).

Comments. This species was transferred from *Hypoclinea* to *Bothriomyrmex* by Dalla Torre (1893), then to *Iridomyrmex* by Wheeler (1915b) and finally to *Anonychomyrma* by Shattuck (1992a), this final treatment being accepted by Dlussky (1997). It should be noted, however, that extant species of *Anonychomyrma* are restricted to Indonesia, Papua New Guinea, Australia and the Solomon Islands (Shattuck, 1992a, 1992b; Ward et al., 2010) while this and other fossil species currently placed in *Anonychomyrma* are well outside this geographic area. The possibility that these species would be better placed in a genus other than *Anonychomyrma*, probably newly erected specifically for them, cannot be ruled out.

Anonychomyrma geinitzi (Mayr), comb. nov.

Hypoclinea geinitzi Mayr, 1868: 58.

Types. Syntype workers, queens and males from Baltic amber (Eocene).

Comments. This species was moved from *Hypoclinea* to *Bothriomyrmex* by Dalla Torre (1893) and then to *Iridomyrmex* by Wheeler (1915b), a position supported by Shattuck (1992a) and Dlussky (1997). Dlussky (1997), in a study of Baltic amber ants, provides a key to genera of ants occurring in this amber, where he states that the anterior margin of the clypeus in *Iridomyrmex* has a "small medial lobe projecting forwards". However, his illustration of the head of *H. geinitzi* (fig. 2e) clearly shows the anterior clypeal margin as being uniformly convex and not with the anteromedial clypeal prominence characteristic of typical *Iridomyrmex*. Additionally, the eyes (based on fig. 2e) are placed more anteriorly and laterally on the head compared to extant *Iridomyrmex*, where they are typically positioned more medially and posteriorly. It seems clear that this species does not belong to *Iridomyrmex*, but rather to *Anonychomyrma*, as the head is typical of that genus. The body (based on Dlussky's (1997) fig. 2d) is slightly more elongate than typical extant *Anonychomyrma*, but not unduly and approaches the morphology seen in some Papua New Guinean species of the genus. Because of this, this species is here transferred from *Iridomyrmex* to *Anonychomyrma* (noting the geographic distribution of the genus as discussed above).

Anonychomyrma samlandica (Wheeler)

Iridomyrmex samlandicus Wheeler, W.M., 1915b: 91.

Types. Holotype worker from Baltic amber (Eocene).

Comments. This species was transferred from *Iridomyrmex* to *Anonychomyrma* by Shattuck (1992a), a treatment followed by Dlussky (1997) and here.

Ctenobethylus goepperti (Mayr)

Hypoclinea goepperti Mayr, 1868: 56.

Types. Syntype workers, queens and males from Baltic amber (Eocene).

Comments. *Hypoclinea goepperti* was transferred to *Bothriomyrmex* by Dalla Torre (1893), then to *Iridomyrmex* by Wheeler (1915b), followed by *Liometopum* by Shattuck (1992a) and finally to *Ctenobethylus* by Dlussky (1997), where it is currently assigned.

Dolichoderus haueri (Mayr), comb. nov.

Hypoclinea haueri Mayr, 1867b.

Types. Holotype queen from Yugoslovia (Miocene).

Comments. Another species based on an impression fossil of a queen, the identity of this taxon remains obscure. Dalla Torre (1893) transferred it to *Iridomyrmex*, a treatment followed by Shattuck (1992a). Mayr's (1867b) figure of the type queen reveals little detail other than wing venation. While the general pattern is dolichoderine-like it differs from extant species of *Iridomyrmex* in having the Rs vein join M at 1m-cu, rather than basal to this cross vein, resulting in the cell enclosed by Rs, M and 2rs-m having three sides rather than four. A three-sided cell similar to Mayr's (1869) figure for this species is present in some *Dolichoderus* (especially species formerly placed in *Hypoclinea*), a condition not seen in *Iridomyrmex*. Because of this it would seem that this species would be better placed in *Dolichoderus* rather than *Iridomyrmex*.

Eldermyrmex Shattuck gen. n.

Type species. *Iridomyrmex oblongiceps* Wheeler, W.M., 1915b: 93.

Diagnosis. Head subrectangular with eyes low and lateral on head capsule (reminiscent of *Tapinoma*), propodeum low, with a longitudinal ridge separating the dorsal and lateral surfaces, and petiole with a low, broad cone-shaped node. This combination of characters will separate this genus from others within this subfamily.

Description. As for the single known species, *E. oblongiceps*, see Wheeler (1915b: 93).

Comments. It is curious that Wheeler (1915b) did not establish a new genus for this species. He comments that the only known species "does not seem to be a typical *Iridomyrmex*, but I know of no other genus to which it can be assigned". His hesitation was based on the observed differences between this and other species not being "very prominent". However, the shape of the head and placement of the eyes, combined with the shape of the propodeum and petiole are unique and set this species apart from those of other genera. It is clear this species does not belong in *Iridomyrmex* or any other described genus, and therefore it is here treated as belonging to a monotypic new genus.

Eldermyrmex oblongiceps (Wheeler), comb. nov.

Iridomyrmex oblongiceps Wheeler, W.M., 1915b: 93.

Types. Holotype worker from Baltic amber (Eocene).

Comments. Dlussky (1997) postulated that this species likely did not belong in *Iridomyrmex* and that it "… most probably should be placed into another genus …" However, he did not erect a new genus for it as he only had Wheeler's (1915b) drawing available and did not feel this was sufficient to establish a new genus. It is clear that this species does not belong to *Iridomyrmex*, and is, in fact, so distinct that assignment to a separate, and new, genus seems straightforward. This genus, *Eldermyrmex*, is established above.

Gracilidris humiloides (Wilson)

Iridomyrmex humiloides Wilson, 1985b: 33.

Types. Holotype worker from Dominican amber (Miocene).

Comments. While Shattuck (1992a) considered this species to belong to *Linepithema*, more recent work by Wild & Cuezzo (2006) places it in their genus *Gracilidris*.

Liometopum bogdassarovi (Nazaraw, Bagdasaraw & Uriew), comb. nov.

Iridomyrmex bogdassarovi Nazaraw, Bagdasaraw & Uriew, 1994: 106.

Types. Holotype worker from Belarus (Quaternary).

Comments. This relatively young fossil from the Quaternary period (present to 2.5mya) almost certainly belongs to the genus *Liometopum* rather than *Iridomyrmex*. The illustration of the front of the head (Nazarw et al., 1994, fig. 2a) is typical of modern *Liometopum* species, with small anteriorly placed eyes and a roughly cordate head capsule which is narrowed at the mandibles (although slightly more than modern species) (Del Toro et al., 2009). While the figure shows only a top view of the body, this is also consistent with general *Liometopum* morphology. Until a more detailed study of the actual specimen can be undertaken, it seems appropriate to transfer this species from *Iridomyrmex* to *Liometopum*.

Technomyrmex hispaniolae (Wilson)

Iridomyrmex hispaniolae Wilson, 1985b: 32.

Types. Holotype worker from Dominican amber (Miocene).

Comments. Shattuck (1992a) considered this species to belong to *Linepithema*, while Brandão et al. (1998) and Bolton (2007) recognized it as being a *Technomyrmex*.

Acknowledgements

We would like to thank Robyn Meier, Natalie Barnett and Ewa Slipinska for technical support during this project, their assistance has been invaluable to a project of this scope, size and complexity. For loans and/or donations of material we are grateful to Alan Andersen (CSIRO, Darwin), Alex Radchenko (Ukrainian Academy of Science, Kiev and Polish Academy of Sciences), Barry Bolton and Suzanne Ryder (The Natural History Museum, London), Bernhard Merz (Muséum d'histoire naturelle, Geneva), Chee Seng Chong (University of Melbourne), Chris O'Toole and James Hogan (Oxford University Museum of Natural History), Christiana Klingenberg (Staatliches Museum für Naturkunde Karlsruhe), Clive Watts (University of South Australia), Ellen Schlüns (James Cook University, Townsville), Fabio Penati (Museo Civico di Storia Naturale "Giacomo Doria", Genoa), Kate Sparks (University of Adelaide), Stefan Cover and Gary Alpert (Museum of Comparative Zoology, Harvard University), Wara Asfiya (Museum Zoologicum Bogoriense, Bogor) and the numerous collectors who have donated material to entomological collections over the years, without their efforts this study would not have been possible. For use of images we thank April Noble and Brian Fisher (California Academy of Science, www.antweb.org) and Christiana Klingenberg (Staatliches Museum für Naturkunde Karlsruhe, www.anttypes.org). A special thanks to the TRIN Ants team for their support throughout this project: Alan Andersen, Andy Austin, Chris Burwell, Stephen Cameron, Ross Crozier, Jonathan Majer, Robyn Meier, Ellen Schlüns, Kate Smith and Kate Sparks. Funding for this project has been provided by the Commonwealth Environment Research Facilities Taxonomy Research and Information Network, CSIRO Entomology, Curtin University of Technology (Perth) and the Australian Biological Resources Study. Useful comments on a draft of this manuscript, including the key, were provided by Natalie Barnett, John La Salle, Jack Longino, Archie McArthur, Ellen Schlüns, Kate Sparks, John "eXo" Weyland, Alex Wild and an anonymous reviewer.

References

Allan, R.A., Elgar, M.A., Capon, R.J. (1996) Exploitation of an ant chemical alarm signal by the zodariid spider *Habronestes bradley* Walckenaer, *Proceedings of the Royal Society, London* 263, 69–73.

Andersen, A.N. (2000). *The Ants of Northern Australia*: *a guide to the monsoonal fauna*. CSIRO Publishing, Collingwood, Victoria. v+106pp.

Andersen, A.N. (2002) Common names for ants. *Australian Journal of Entomology*, 41, 285–293.

Andersen, A.N. (2007) Ant diversity in arid Australia: a systematic overview, *In*: Snelling, R.R., Fisher, B.L. and Ward, P.S. (Eds), *Advances in ant systematics (Hymenoptera: Formicidae): homage to E. O. Wilson – 50 years of contributions*. Memoirs of the American Entomological Institute, 80, pp. 19–51.
Andersen, A.N. & Patel, A.D. (1994) Meat ants as dominant members of Australian ant communities: an experimental test of their influence on the foraging success and forager abundance of other species. *Oecologia (Berlin)*, 98, 15–24.
Barlow, B.A. (1985) A revised natural regions map for Australia. *Brunonia*, 8, 387–392.
Baroni Urbani, C. (1977) Katalog der Typen von Formicidae (Hymenoptera) der Sammlung des Naturhistorischen Museums Basel (2. Teil). Mitteilungen der Entomologischen Gesellschaft Basel, (n.s.) 27, 61–102.
Bingham, C.T. (1903) Hymenoptera II. Ants and Cuckoo Wasps. *The Fauna of British India, including Ceylon and Burma*. Taylor and Francis, London, 506pp.
Bolton, B. (1994) *Identification Guide to the Ant Genera of the World*. Harvard University Press. Cambridge, Massachusetts, 222pp.
Bolton, B. (1995) *A New General Catalogue of the Ants of the World*. Harvard University Press, Cambridge, Massachusetts, 504pp.
Bolton, B. (2007) Taxonomy of the dolichoderine ant genus *Technomyrmex* Mayr based on the worker caste. *Contributions of the American Entomological Institute*, 35(1), 1–150.
Brandão, C.R.F., Baroni Urbani, C., Wagensberg, J. & Yamamoto, C.I. (1998) New *Technomyrmex* in Dominican amber, with a reappraisal of Dolichoderinae phylogeny. *Entomologica Scandinavica*, 29, 411–428.
Brown, W.L.,Jr. (1955) The first social parasite in the ant tribe Dacetini. *Insectes Sociaux*, 2, 181–186.
Brown, W.L.,Jr. (1958) A review of the ants of New Zealand. *Acta Hymenopterologica*, 1, 1–50.
Brown, W.L.,Jr. (1977) *Ctenobethylus* (Bethylidae) a new synonym of *Iridomyrmex* (Formicidae, Hymenoptera). *Psyche*, 83, 213–215.
Carpenter, F.M. (1930) The fossil ants of North America. *Bulletin of the Museum of Comparative Zoology at Harvard College*, 70, 1–66.
Clark, J. (1930) New Formicidae, with notes on some little-known species. *Proceedings of the Royal Society of Victoria*, 43, 2–25.
Clark, J. (1934a) New Australian ants. *Memoirs of the National Museum of Victoria*, 8, 21–47.
Clark, J. (1934b) Ants from the Otway Ranges. *Memoirs of the National Museum of Victoria*, 8, 48–73.
Clark, J. (1938) Reports of the McCoy Society for field investigation and research. No. 2. Sir Joseph Banks Islands. 10. Formicidae. *Proceedings of the Royal Society of Victoria*, 50, 356–382.
Clark, J. (1941) Australian Formicidae. Notes and new species. *Memoirs of the National Museum of Victoria*, 12, 71–93.
Crawley, W.C. (1918) Some new Australian ants. *Entomologists Record and Journal of Variation*, 30, 86–92.
Crawley, W.C. (1921) New and little-known species of ants from various localities. *Annals and Magazine of Natural History*, (9)7, 87–97.
Crozier, R. (1968) Interpopulation karyotype differences in Australian *Iridomyrmex* of the "*detectus*" group (Hymenoptera: Formicidae: Dolichoderinae). *Journal of the Australian Entomological Society*, 7, 25–27.
Dalla Torre, C.G. de (1893) *Catalogus hymenopterorum hucusque descriptorum systematicus et synonymicus.* Vol. 7 *Formicidae* (*Heterogyna*). Leipzig: G. Engelmann, 289 pp.
Del Toro, I., Pacheco, J.A., Mackay, W.P. (2009) Revision of the ant genus *Liometopum* (Hymenoptera: Formicidae). *Sociobiology*, 53, 299–369.
Dlussky, G.M. (1997) Genera of ants from Baltic Amber. *Paleontological Journal*, 31(6), 616–627.
Don, W. (2007) *Ants of New Zealand*. Otago University Press, Dunedin, 240 pp.
Donisthorpe, H. (1947) Ants from New Guinea, including new species and a new genus. *Annals and Magazine of Natural History*, (11)13, 577–595.
Donisthorpe, H. (1949) A sixth instalment of the Ross Collection of ants from New Guinea. *Annals and Magazine of Natural History*, (12)1, 744–759.
Dubovikoff, D.A. (2005) The system of taxon *Bothriomyrmex* Emery, 1869 *sensu lato* (Hymenoptera: Formicidae) and relatives genera. *Kavkazskii Entomologicheskii Byulleten* 1(1), 89–94.
Eastwood, R. (2004). Successive replacement of tending ant species at aggregations of scale insects (Hemiptera: Margarodidae and Eriococcidae) on *Eucalyptus* in south-east Queensland. *Australian Journal of Entomology*, 43, 1–4.
Eastwood, R. & Fraser, A.M. (1999) Associations between lycaenid butterflies and ants in Australia. *Australian Journal of Ecology*, 24, 503–537.
Emery, C. (1887) Catalogo delle formiche esistenti nelle collezioni del Museo Civico di Genova. Parte terza. Formiche della regione Indo-Malese e dell'Australia. *Annali del Museo Civico di Storia Naturale Giacomo Doria* (*Genova*), 24, 241–256.
Emery. C. (1893) Voyage de MM. Bedot et Pictet dans l'Archipel Malais. Formicides de l'Archipel Malais. *Revue Suisse de Zoologie*, 1, 187–229.
Emery, C. (1895) Viaggio di Leonardo Fea in Birmania e regioni vicine. LXIII. Formiche di Birmania, del Tenasserim e dei Monti Carin raccolte da L. Fea. *Annali del Museo Civico di Storia Naturale Giacomo Doria* (*Genova*), (2)14(34), 450–483.
Emery, C. (1897) Viaggio di Lamberto Loria nella Papuasia orientale. XVIII. Formiche raccolte nella Nuova Guinea dal Dott. Lamberto Loria. *Annali del Museo Civico di Storia Naturale Giacomo Doria* (*Genova*), (2)18(38), 546–594.
Emery, C. (1898) Descrizioni di formiche nuove malesi e australiene; note sinonimiche. *Rendiconto delle Sessioni della R.*

Accademia delle Scienze dell'Istituto di Bologna, 2, 231–245.
Emery, C. (1914) Les fourmis de la Nouvelle-Calédonie et des îles Loyalty. *In*: Sarasin, F. & J. Roux. *Nova Caledonia Zoologie*. 1. Wiesbaden, pp. 393–437.
Ettershank, G. & Ettershank, J.A. (1982). Ritualised fighting in the meat ant Iridomyrmex purpureus (Smith) (Hymenoptera: Formicidae). *Journal of the Australian Entomological Society*, 21, 97–102.
Fabricius, J.C. (1804) *Systema Piezatorum secundum ordines, genera, species adiectis synonymis, locis, observationibus descriptionibus*. Carolum Reichard, Brunsvigae, 439 pp.
Fabricius, J.C. (1804) *Systema Piezatorum. Brunsvigae*. C. Reichard xiv. 439 pp.
Fiedler, K. (2001) Ants that associate with Lycaeninae butterfly larvae: diversity, ecology and biogeography. *Diversity and Distributions*, 7, 45–60.
Forel, A. (1878a) Der Giftapparat und die Analdrüsen der Ameisen. *Zeitschrift für Wissenschaftliche Zoologie*, 30(suppl.), 28–68.
Forel, A. (1878b) Études myrmécologiques en 1878 (première partie) avec l'anatomie du gésier des fourmis. *Bulletin de la Société Vaudoise des Sciences Naturelles*, 15, 337–392.
Forel, A. (1895) Les formicides de l'Empire des Indes et de Ceylan. Part V. Adjonction aux Camponotinae, Mayr., et *Polyrhachis*, Shuck. *Journal of the Bombay Natural History Society*, 9, 453–472.
Forel, A. (1901) Formiciden aus dem Bismark-Archipel, auf Grundlage des von Prof. Dr. F. Dahl gesammelten Materials bearbeitet. *Mitteilungen aus dem Zoologischen Museum in Berlin*, 2, 1–38.
Forel, A. (1902) Fourmis nouvelles d'Australie. *Revue Suisse de Zoologie*, 10, 405–548.
Forel, A. (1904) Miscellanea myrmecologiques. *Revue Suisse de Zoologie*, 12, 1–52.
Forel, A. (1907a) Formicidae. *In*: Michaelsen, W. & Hartmeyer, R. *Die Fauna Südwest-Australiens*. Ergebnisse der Hamburger südwest-australischen Forschungsreise 1905. 1, 263–310. Jena.
Forel, A. (1907b) Formicides du Musée National Hongrois. *Annales Historico-Naturales Musei Nationalis Hungarici*, 5, 1–42.
Forel, A. (1910) Formicides australiens reçus de M. M. Froggatt et Rowland Turner. *Revue Suisse de Zoologie*, 18, 1–94.
Forel, A. (1912) H. Sauter's Formosa-Ausbeute: Formicidae (Hym.). *Entomologische Mitteilungen*, 1, 45–81.
Forel, A. (1913) Fourmis de Tasmanie et d'Australie recoltees par MM. Lea, Froggatt, etc. *Bulletin de la Société Vaudoise des Sciences Naturelles*, 49, 173–196.
Forel, A. (1915) Results of Dr. E. Mjöberg's Swedish scientific expeditions to Australia, 1910-1913. 2 Ameisen. *Arkiv för Zoologi*, 9(16), 1–119.
Greenslade, P.J.M. (1974) The identity of *Iridomymex purpureus* form *viridiaeneus* Viehmeyer (Hymenoptera : Formicidae). *Journal of the Australian Entomological Society* 13**,** 247–248.
Greenslade, P.J.M. (1987) Environment and competition as determinants of local geographical distribution of five meat ants (*Iridomyrmex purpureus*) and allied species (Hymenoptera: Formicidae). *Australian Journal of Zoology*, 35, 259–273.
Greenslade, P.J.M., and Halliday, R.H. (1982) Distribution and speciation in meat ants, *Iridomyrmex purpureus* and related species (Hymenoptera:Formicidae). *In*: W.R. Barker and P.J.M. Greenslade (Eds.) *Evolution of the Flora and Fauna of Arid Australia*. Peacock Publishing: Frewville, South Australia. pp. 249–55.
Halliday R.B. (1979) Esterase variation at three loci in meat ants. *Journal of Heredity*, 70, 57–61.
Halliday R.B. (1981) Heterozygosity and genetic distance in sibling species of meat ants (*Iridomyrmex purpureus* group). *Evolution*, 35, 234–242.
Heterick, B.E. (2009) A Guide to the Ants of South-western Australia. *Records of the Western Australian Museum Supplement No.* 76, 205 pp.
ICZN [*International Code of Zoological Nomenclature*] (1999). The International Trust for Zoological Nomenclature 1999, London, UK. Fourth edition. 306pp.
Karavaiev, W. (1933) Ameisen aus dem Indo-Australischen Gebiet, VII. *Konowia*, 12, 260–271.
Kirby, W.F. (1896) Hymenoptera. *In*: Spencer, B. (Ed.) *Report on the Work of the Horn Scientific Expedition to Central Australia*. Melbourne. Part 1 supplement. Melville, Mullen & Slade, pp. 203–209.
Lowne, B.T. (1865a) Contributions to the natural history of Australian ants. *Entomologist*, 2, 273–280.
Lowne, B.T. (1865b) Contributions to the natural history of Australian ants. *Entomologist*, 2, 331–336.
Mann, W.M. (1921) The ants of the Fiji Islands. *Bulletin of the Museum of Comparative Zoology* 64, 401–499.
Mayr, G. (1862) Myrmecologische Studien. *Verhandlungen der Kaiserlich-Königlichen Zoologisch-Botanischen Gesellschaft in Wien*, 12, 649–776.
Mayr, G. (1867a) Adnotationes in monographiam formicidarum Indo-Neerlandicarum. *Tijdschrift voor Entomologie*, (2)2(10), 33–117.
Mayr, G. (1867b) Vorläufige Studien über die Radoboj-Formiciden, in der Sammlung der k.k. geologischen Reichsanstalt. *Jahrbuch der k.k. Geologischen Reichsanstalt*, 17, 47–62.
Mayr, G. (1868) Die Ameisen des baltischen Bernsteins. *Beiträge zur Naturkunde Preussens. Königlichen Physikalisch-Ökonomischen Gesellschaft zu Königsberg*, 1, 1–102.
Mayr, G. (1870) Neue Formiciden. *Verhandlungen der Kaiserlich-Königlichen Zoologisch-Botanischen Gesellschaft in Wien*, 20, 939–996.
Mayr, G. (1876) Die australischen Formiciden. *Journal des Museum Goddefroy* (4)12, 56–115.
Nazaraw, U.I., Bagdasaraw, A.A. & Ur'ew, I.I. (1994) First discovery of insects (Diptera, Hymenoptera) in amber from the Belarussian Polesye region. *Vyestsi Akademii Navuk Syryya Biyalahichnykh Navuk*, 2, 104–108.

Nipperess, D.A., Andersen, A.N., Pik, A.J., Bramble, R., Wilson, P., Beattie, A.J. (2008) The influence of spatial scale on the congruence of classifications circumscribing morphological units of biodiversity. *Diversity and Distributions*, 14, 917–924.
Roger, J. (1863) Die neu aufgeführten Gattungen und Arten meines Formiciden-Verzeichnisses, nebst Ergänzung einiger früher gegeben Beschreibungen. *Berliner entomologische Zeitschrift*, 7, 131–214.
Shattuck, S.O. (1990) Revision of the dolichoderine ant genus *Turneria* (Hymenoptera: Formicidae). *Systematic Entomology*, 15, 101–117.
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, 37–42.
Shattuck, S.O. (1999) Australian Ants: Their biology and identification. *Monographs in Invertebrate Taxonomy*, 3, i–xi & 1–226.
Shattuck S.O. & McMillan, P. (1998) Revision of the species of the *Iridomyrmex conifer* group (Hymenoptera: Formicidae) with notes on their biology. *Australian Journal of Zoology*, 46, 301–315.
Smith, F. (1858) *Catalogue of Hymenopterous insects in the Collection of the British Museum.* Part VI. Formicidae. London, British Museum, 216 pp.
Smith, M. R. (1957) New synonymy of a New Guinea ant. *Proceedings of the Entomological Society of Washington*, 58 (1956), 347.
Snelling, R.R. & Hunt, J.H. (1975) The ants of Chile (Hymenoptera: Formicidae). *Revista Chilena de Entomologia*, 9, 63–129.
Taylor, R.W. (1986) The quadrinomial infrasubspecific names of Australian ants. *General and Applied Entomology*, 18, 33–27.
Taylor, R.W. (1987) A checklist of the ants of Australia, New Caledonia and New Zealand. (Supplement). *CSIRO Division of Entomology* Report No. 41 (supplement), 1–5.
Taylor R.W. & Brown, D.R. (1985) Formicoidea. *In*: Walton, D.W. (Ed.) *Zoological catalogue of Australia, vol. 2. Hymenoptera: Formicoidea, Vespoidea and Sphecoidea*. Australian Government Publishing Service, Canberra. vi + 381 pp.
Théobald, N. (1937) *Les Insectes Fossiles des Terrains Oligocènes de France*. Nancy, 473 pp.
van Wilgenburg, E., van Lieshout, E. & Elgar, M.A. (2005) Conflict resolution strategies in meat ants (*Iridomyrmex purpureus*): ritualised displays versus lethal fighting. *Behaviour*, 142, 701–716.
van Wilgenburg, E. & Elgar, M.A. (2007) Colony structure and spatial distribution of food resources in the polydomous meat ant *Iridomyrmex purpureus*. *Insectes Sociaux*, 54, 5–10.
Viehmeyer, H. (1914) Neue und unvollständig bekannte Ameisen der alten Welt. *Archiv für Naturgeschichte*, (A)79(12), 24–60.
Viehmeyer, H. (1925) Formiciden der australischen Faunenregion. (Fortsetzung.). *Entomologische Mitteilungen*, 13, 219–229.
Ward, P.S., Brady, S.G., Fisher, B.L., Schultz, T.R. (2010) Phylogeny and biogeography of dolichoderine ants: Effects of data partitioning and relict taxa on historical inference. *Systematic Biology*, 59, 342–362.
Wheeler, G.C. & Wheeler, J. (1974) Ant larvae of the subfamily Dolichoderinae: second supplement. *Pan-Pacific Entomologist*, 49, 396–401.
Wheeler, W.M. (1915a) Hymenoptera. *Transactions and Proceedings of the Royal Society of South Australia*, 39, 805–823.
Wheeler, W.M. (1915b) The ants of the Baltic Amber. *Schriften der Physikalisch-ökonomischen Gesellschaft zu Königsberg in Pr.*, 55(1914), 1–142.
Wheeler, W.M. (1924) Ants of Krakatau and other islands in the Sunda Strait. *Treubia*, 5, 239–258.
Wheeler, W.M. (1927) The ants of Lord Howe Island and Norfolk Island. *Proceedings of the American Academy of Arts and Sciences*, 62, 121–153.
Wheeler, W.M. (1936). Ecological relations of ponerine and other ants to termites. *Proceedings of the American Academy of Arts and Sciences*, 71, 159–243.
Wild, A.L. & Cuezzo, F. (2006) Rediscovery of a fossil dolichoderine ant lineage and a description of a new genus from South America. *Zootaxa*, 1142, 57–68.
Wilson, E.O. & Taylor, R.W. (1967) The ants of Polynesia (Hymenoptera: Formicidae). *Pacific Insects Monograph*, 14, 1–109.
Wilson, E.O. (1985a) Ants from the Cretaceous and Eocene amber of North America. *Psyche*, 92, 205–216.
Wilson, E.O. (1985b) Ants of the Dominican amber. 3. The subfamily Dolichoderinae. *Psyche*, 92, 17–37.
Zhang, J. (1989) *Fossil Insects from Shanwang, Shandong, China*. Shandong Science and Technology Publishing House, Jinan, China, 459 pp.
Zimmerman, E.C. (1967) *Imathia* and *Amblycnemus* (Coleoptera: Curculionidae: Cryptorhynchinae). *Pacific Insects*, 9, 187–196.