



The Australian Resin Pot Bees, *Megachile* (*Austrochile*) (Hymenoptera: Megachilidae), with descriptions of 71 new species

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Abstract

The species in the subgenus *Austrochile* Michener, 1965 (genus *Megachile*) construct brood cells from resin that are stuck individually to twigs or in clusters on the bark of trees (Houston & Pike, 2013). We therefore propose 'resin pot bees' as common name for the bees in this subgenus. The species are revised and redescribed. Seven names are retained and 71 additional species are described, resulting in 78 recognised species in this subgenus. The following names are synonymised: *Chalicodoma* (*Austrochile*) *subferox* Meade-Waldo, 1915 syn. nov. = *Megachile* (*Austrochile*) *kirbyana* Cockerell, 1906 comb. nov.; *Chalicodoma* (*Austrochile*) *recisa* Cockerell, 1913 syn. nov., *Chalicodoma* (*Austrochile*) *simpliciformis* Cockerell, 1918 syn. nov., *Chalicodoma* (*Austrochile*) *kirbiella* Rayment, 1953 syn. nov. = *Megachile* (*Austrochile*) *modesta* Smith, 1892 comb. nov.; *Chalicodoma* (*Austrochile*) *subremotula* Rayment, 1934 syn. nov., *Chalicodoma* (*Austrochile*) *portlandiana* Rayment, 1953 syn. nov. = *Megachile* (*Austrochile*) *rotnestensis* Rayment, 1934 comb. nov.; *Megachile* (*Rozenapis*) *ignita* Smith, 1853 = *Chalicodoma* (*Austrochile*) *sexmaculata* Smith, 1868 syn. nov.

All descriptions are accompanied by high resolution diagnostic images and distribution maps. Data on flower visitation and phenology are given. Dichotomous keys to both sexes of the species are provided and interactive keys to the species will be available on the LUCID website.

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Introduction

The megachilid subgenus *Austrochile* was first described by Michener (1965) for a group of moderately sized, rather robust bees where both sexes had a large spine or projection on the first metasomal sternum. At the time, Michener (1965) recognised five genera within the Australian Megachilini and placed *Austrochile* in the genus *Chalicodoma*. Mitchell (1980) revised the Megachilini and proposed changes in generic and sub-generic classification. Later, Michener (2000) reduced the number of genera within the Megachilini to three and moved the subgenus *Austrochile* into *Megachile*.

The classification of Megachilini as a whole remains a subject of discussion. Trunz et al. (2016), using mitochondrial and nuclear data, favoured a classification with seven morphologically well-defined genera, with *Megachile* as a large worldwide genus divided into numerous subgenera that contain leafcutter as well as resin and dauber bees. Gonzalez et al. (2019), using phylogenetic data based on morphology, proposed a classification whereby most subgenera within the resin bee groups of *Megachile* are raised to genus level, while all leafcutter groups are proposed to remain subgenera of *Megachile*. Unfortunately, in the above-mentioned papers Australian taxa are underrepresented, which makes decisions on their classification problematic.

King's (1986) PhD thesis revised the Australian species in the genus *Chalicodoma* as defined by Michener (1965), proposed to raise the subgenera *Thaumatostoma*, *Hackeriapis* and *Austrochile* to genus level and described two new genera, as well as two new subgenera, one in *Hackeriapis*, and one in *Chalicodoma*. From this work, the revisions of *Thaumatostoma* King & Exley (1985a), *Chalicodoma* (*Rhodomegachile*) King & Exley (1985b), *Chalicodoma* (*Chalicodomoides*) King (1985c) and *Chalicodoma* (*Hackeriapis*) King (1994) were formally published.

Currently, the Australian Faunal Directory (AFD, 2023) follows the classification of Michener (2000) where a single genus, *Megachile*, including several subgenera, represent all Australian leafcutter and resin bees.

King also produced a MSc thesis (King 1991), titled "Studies on the genus *Austrochile* Michener n. stat. in Australia (Megachilidae: Hymenoptera)". This work involves species of *Megachile* (*Austrochile*) of which the males have modified fore legs. The thesis reviews the known species and provides illustrations and descriptions for 18 new species. It also mentions the existence of many other undescribed species. The present work builds on to King's MSc and PhD studies by including all now available species and additional specimens from all major collections in Australia and aims to present up to date knowledge of this group.

Methods

Specimens examined

This study is based on examination of specimens from the following institutions, referred to using acronyms:

AM Australian Museum, Sydney; **ANIC** Australian National Insect Collection, Canberra; **BMNH** The Natural History Museum, London, United Kingdom; **HU** Institute für Spezielle Zoologie und Zoologisches Museum der Humboldt Universität, Berlin, Germany; **MV** Museum of Victoria Entomology, Melbourne; **QM** Queensland Museum, Brisbane; **SAMA** South Australian Museum, Adelaide; **UQIC** University of Queensland Insect Collection, Brisbane, housed at the QM; **WADA** Department of Primary Industries, Perth, Western Australia; **WAM** Western Australia Museum, Perth.

Additional fresh specimens were collected throughout Australia by the authors and other people acknowledged below. Field collected specimens were killed and preserved in absolute ethanol, or killed by freezing and then pinned, to allow for molecular work at a later stage. A single leg from specimens collected during Bush Blitz surveys (<https://bushblitz.org.au>) in the past 16 years were submitted to the Barcode of Life Database (BOLD; Ratnasingham and Hebert, 2007) for DNA barcoding using the mitochondrial cytochrome c oxidase subunit 1 (CO1) gene. Specimen details, including DNA sequences, collecting dates and locality information are open access and available in BOLD under the project name AUSBS (Hogendoorn, Stevens & Leijs 2015, <https://www.boldsystems.org/>). The BOLD-BIN (Biological Identification Number) codes and BOLD access codes, when available, are given with the species descriptions. Species boundaries were determined using BINs as calculated in BOLD in combination with morphology. Vouchers for these specimens are kept in the AUSBS barcode reference collection at the South Australian Museum. The type specimens of the ten species listed under *Austrochile* by Michener (1965) were examined by JK.

With the species descriptions, only the data for the type specimens are given. The full data of all examined specimens can be found in the supplementary information S1, which contains full label data. Information on host plants was copied from labels and therefore plant genera/species names may not follow the current systematics.

Taxonomic methods

For species descriptions the terminology used by Michener (2007) was followed. For the outer surface of the mandible King (1994) was used. The hidden sterna of male specimens were exposed after relaxing in a 70–80 °C steam chamber for 1–2 hours (modified from Plant & Dubitzky, 2008). Character state matrices, species descriptions and construction of dichotomous and interactive keys were completed with Lucid4 Builder.

The interactive keys associated with this paper will be available at the Lucid website (<https://help.lucidcentral.org/>).

Measurements were taken using an ocular micrometer. Body length, wing length and head width were recorded as absolute measurements. Body length of type specimens was measured in lateral view, from the ventral margin of the clypeus to the petiole, and from the petiole to the tip of the metasoma. For the lower part of the clypeus (e.g. Figs. 24b, 38b), we use the term 'ventral margin', which is equivalent to 'apical', 'anterior' or 'distal' margin used by other bee-workers. Other head measurements are relative to head width, where head width was set to 100 units.

A Leica stereomicroscope with auto-montage imaging stacking software and Zerene Stacker (<https://www.zerene.com/>) was used to obtain high-resolution diagnostic images for all species.

The following abbreviations are used in the identification key and species descriptions:

T1, T2 etc. for first, second metasomal tergal segment etc.; **S1, S2** etc. for first, second metasomal sternal segment etc.; **F1, F2** etc. for first, second flagellar segment etc.; **Te1, Te2** etc. for first, second tooth on mandible etc.; **OOD** ocellular distance; **IOD** interocular distance; **VW** vertex width; **UID** upper interocular distance; **LID** lower interocular distance.

Phylogenetic analyses

Phylogenetic analyses of aligned sequence data obtained from BOLD were carried out using the program PAUP* version 4.0b8 (Swofford 2001) and MRBAYES v.3.2.4 (Huelsenbeck & Ronquist 2001). PAUP* was used for generating and editing data matrices as well as error proofing using neighbour joining runs of uncorrected sequence divergence. Bayesian analyses were performed using MRBAYES. The analyses were performed applying unlinked data partitions for each of the codons for the CO1 gene, with four simultaneous chains and three million generations per chain, sampling trees every 100 generations, until all parameters had reached their effective sample size ($ESS \geq 200$), and the potential scale reduction parameter was approximately one for all parameters, indicating that the Bayesian runs had converged and that a sufficient sample of the posterior distribution had been obtained. Parameter estimation and calculations of the >50% posterior probability consensus tree were done after discarding the first 25% of the saved trees.

Phylogenetic analyses were done primarily to test whether the species of *Megachile* (*Austrochile*) available in BOLD could be considered monophyletic relative to other *Megachile* species and subgenera in the AUSBS-BOLD dataset. Additionally, they were used to check whether there were well supported clades of species

within *Austrochile*, which would allow exploration of morphological character evolution.

Results

Specimens from all major Australian museum collections, as well as newly collected material during Bush Blitz surveys and other collecting trips, revealed 81 species.

Two species, *modesta* and *preissi* were transferred from *Megachile* (*Hackeriapis*) into *M. (Austrochile)* because of the width of the vertex in females, and the shape of T6 in both sexes.

The following synonyms were recognised:

kirbyana Cockerell, 1906,

= *subferox* Meade-Waldo, 1915 syn. nov.;

modesta Smith, 1862 comb. nov.,

= *recisa* Cockerell, 1913 syn. nov.

= *simpliciformis* Cockerell, 1918 syn. nov.

= *kirbiella* Rayment, 1953 syn. nov.;

rotnnestensis Rayment, 1934,

= *subremotula* Rayment, 1934 syn. nov.

= *portlandiana* Rayment, 1953 syn. nov.

For one species, *sexmaculata* Smith, 1868, the female was synonymised with *M. (Rozenapis) ignita* Smith, 1853, described based on the male only. The association of the sexes was based on a large series of males and females from the same locality and similarities in morphology, including in mandibular structure, thereby transferring the species from *M. (Austrochile)* to *M. (Rozenapis)* Gonzalez & Engel 2019.

Summarizing, seven names are retained in *M. (Austrochile)*, i.e. *kirbyana*, *modesta*, *preissi*, *remotula*, *resinifera*, *rotnnestensis* and *rufomaculata*, while 71 species are recognised as new.

Twenty-nine of the new species are known from both sexes. For 14 of these, the sexes were associated based on DNA-barcode data (identical BOLB BIN-codes), and for the remaining species, association of the sexes was based on a combination of locality data, body size and shared morphology.

However, sexual dimorphisms made association of sexes difficult for most species with low specimen numbers. Forty-two of the species are only known from a single sex: 25 species only from female and 17 species only from male. We choose to fully describe and name these species because the morphology was sufficiently different to treat them as additional species. However, for some species, sexes may be associated using future molecular data, or other means. In such cases, syn-

onymising one of the names would have minimal impact, because descriptions of both sexes already exist. Although we added many new species to this group, it is obvious from the large number of unmatched sexes as well as the rate with which new species in this group are still being discovered, that this remains a work in progress. We therefore decided to document the currently available material as completely as possible.

Species-level diagnostic characters

The main diagnostic characters for males of *Megachile* (*Austrochile*) are the shape of the medial carina on T6 (e.g. Fig. 41E, 41Fb), the size of the lateral teeth on T6 and the size and distance between the pair of medial teeth on the posterior margin of T6 (e.g. Fig. 41Fa). Males of many species have modified fore legs. Modifications frequently include flattened tarsi with extensive lateral bristles, often adorned with a few black dots – the number of dots varying between species. Modification of fore legs may also involve a relatively short and robust tibia, sometimes with an extended dorsal lobe and/or a smooth groove. Modification of the fore legs often coincides with modifications of the lower genal area, such as smooth hairless areas, which are frequently bordered by ridges and dense plumes of curved hairs. The ventral margin of the mandible may have an extended lobe which varies in position between species. The coxa of the fore leg often bears a spine, varying in length between species. Sternite 1 can have a median apical process that varies between a small protrusion to a large spine or a robust, laterally compressed ridge. With respect to the hidden sterna S5 and S6: the posterior margin of S5 shows various degrees of emargination, the main area is membranous and densely covered in highly modified setae, that are species specific in shape, and flanked by longer hairs. The posterior margin of S6 projects medially, and its size and shape varies between species. The main area is membranous and covered in modified setae, which differ from those on S5, with long plumes of pubescence in the posterolateral corners.

The most important diagnostic characters for females are: the shape of the ventral margin of the clypeus, the number of teeth on the mandible, the colour and width of the hair bands on the marginal zone of the terga, the presence or absence of a hair band on T4 and/or T5, the colour of the integument of T6, the colour of the pubescence of T5 and T6, and the colour of the sternal scopa.

Phylogenetic analyses and character evolution

DNA barcodes from 531 specimens of Megachilidae were extracted from the open access BOLD-AUSBS project, representing 137 species, including 37 species of *Austrochile*. For the analyses, *Anthidiellum turneri* was used as outgroup. A simple neighbour joining analysis with uncorrected sequence divergence run in PAUP* (Swofford 2001) showed *Austrochile* as a monophyletic group (supplementary data S2). However, when the

same data set was used for a Bayesian analysis with unlinked data partitions for each of the codon positions in CO1, support for *Austrochile* as a monophyletic group could not be found. A separate analysis where *Austrochile* species were constrained to be monophyletic resulted in a significantly lower likelihood (likelihood ratio test $\ln=99.4$). These results do not necessarily mean that *Austrochile* is paraphyletic, for several reasons. Firstly, CO1 barcoding data alone are not suitable to resolve divergences older than 3–4 Myr (Trunz et al. 2016), and it is reasonable to assume that divergences between clades within *Austrochile* are considerably older than that (Trunz et al. 2016). Secondly, there is sufficient support from various morphological diagnostic characters to consider *Megachile* (*Austrochile*) as a natural group.

Furthermore, there are four well supported clades (posterior probabilities (pp)>0.87) within *Megachile* (*Austrochile*) that can be used to interpret morphological character evolution, especially when there is character state variation within a clade. These clades are: (1) A group of three species from Arnhem land NT and Cape York Peninsula QLD, species *M. (A.) quinquecincta*, *M. (A.) crenulata* and *M. (A.) carinata* (pp=0.88). Within this group there is variation in relative length of male tibia and tarsus of the hind leg. One of the species, *M. (A.) crenulata*, has a modified fore tarsus, while the males of the other two species have unmodified fore legs; (2) A group (pp=1.0) of closely related species, *M. (A.) tarltoni*, *M. (A.) calcaratum*, and *M. (A.) auriterga*, in which there is some variation in the relative length of the male tibia and tarsus of the hind leg; (3) A group (pp=0.99) consisting of *M. (A.) silaceacincta* and *M. (A.) witchelinaensis*, where only the female of *M. (A.) witchelinaensis* has a horned clypeus and a dark red integument of T6; (4) A clade (pp=1.0), consisting of five species, *M. (A.) resinifera*, *M. (A.) prendergastae*, *M. (A.) multispina*, *M. (A.) maxillaris*, and *M. (A.) nigriscopa*. Within this clade males of some species have unmodified fore legs, where others have a modified fore tarsus. There is also interspecific variation in relative length of the tibia and tarsus of the male hind leg. Two closely related species within that clade, *M. (A.) maxillaris* and *M. (A.) nigriscopa* differ markedly in overall pubescence colour but share characters such as a large fore coxal spine, an expanded lobe on the ventral margin of the mandible, and a multi dentate carina of T6.

Although molecular data are available for fewer than half of the species, and high clade support was found for only 13 species, it is still possible to draw some general conclusions about character evolution in this subgenus. The clades mentioned above share character state variation for several characters, indicating convergent evolution of these characters. For example, modification of male leg characters such as relative length of the tibia and tarsus of the hind leg, and extensive modifications of male fore tibia and tarsus occur in sever-

al clades. These fore leg characters are associated with mating behaviour. In several species of megachilids, males place their fore tarsi over the eyes of a female during mating, and grooves in the tibiae fit the females' antennae (Wittmann & Blochtein 1995, Wittman et al 2004). The number and placement of the black dots may serve as a visual species recognition cue. Such sexually selected characters have been found in other megachilid subgenera (e.g. *Eutricharaea*, *Hackeriapis*), other bee (e.g. *Xylocopa*), and crabronid wasp genera (e.g. *Crabro*), indicating that such characters evolved independently. In addition, a horned clypeus in females also seems to occur in unrelated species (e.g. *M. (A.) cornuta*, *M. (A.) preissi*, and *M. (A.) rufomaculata*). While the function of this morphological adaptations is unclear, they may be related to handling and collecting of specific plant materials, such as resin or plant fibres when building brood cells.

A full analysis of morphological character state evolution, distribution patterns and floral host choice requires a resolved molecular phylogeny that includes most of the species in the subgenus.

Distribution patterns

Austrochile is found throughout Australia except Tasmania. We analysed the distribution patterns for all species with two or more different locality records (38 species out of 78) and evaluated the distribution of these species within each of the seven recognised terrestrial ecoregions in Australia DCCEEW (2025). Specimens of *Austrochile* have not been collected in montane grasslands and shrublands or in tropical and subtropical moist broad leaf forests. Seventeen species (i.e. 45%) were found in a single ecoregion, predominantly in Mediterranean forests, woodlands, and shrubs (7 species), deserts and xeric shrublands (3 species). A further three species were found in tropical and subtropical grasslands, savannas and shrublands and three species were exclusively found in a temperate habitat. Twenty-one species (55%) were found in two or more ecoregions, mostly in neighbouring ecoregions.

Therefore, *Austrochile* seems to be predominantly distributed in Mediterranean, tropical, sub-tropical and xeric habitats. Similar trends were found for the species that have single locality records (40 species), but with a higher number of species (19 species) from desert and xeric habitats. This may be the result of a habitat related difference in sampling effort, as xeric areas are mostly located in central Australia, and are therefore less well surveyed than the more accessible habitats in Australia's coastal regions.

Phenology

Species activity patterns seem to be determined by the climatic parameters of their distribution (Table 1). Most of the records are from the period August-January. Records from February-July are represented by species

with a wide distribution (e.g. *M. (A.) tarltoni*), species with distributions at lower latitudes (e.g. *M. (A.) calcarata*, *M. (A.) crenulata*), by some late summer active species in the south-west of Western Australia, and by species occurring along the east coast of Australia.

Floral Records

Species of *M. (Austrochile)* were collected on 51 genera of plants belonging to 14 families (464 records). The majority (i.e. 91.8 %) of the records involve only five plant families: Fabaceae (46.8%) represented by 15 genera of pea species, particularly *Crotalaria*, *Jacksonia*, *Pultenaea* and *Swainsona*; Scrophulariaceae (22.6%), all from *Eremophila*; Goodeniaceae (9.1%) mainly represented by *Goodenia* and *Scaevola*, but also *Lechenaultia*, *Velleia* and *Verreauxia*; Myrtaceae (17.7%) represented by *Calytrix*, *Melaleuca*, and *Leptospermum*; and Lamiaceae (4.7%) represented by *Dicrastylis*, *Newcastelia*, *Pityrodia*, and *Westringia*. *Megachile (Austrochile)* has been collected on introduced plant species.

Many *Austrochile* species with multiple flower visitation records visit a multitude of plant species, which may suggest that these species are polylectic. However, lecty is defined by pollen specialisation (Cane & Sipes 2006), and whether the females were collecting pollen or nectar has not been documented. In addition, while Fabaceae and Scrophulariaceae represent more than 75% of the female visitation records, some species seem to have preference for plant species in one or the other family. Some of these data patterns may be explained by the absence of *Eremophila* species (Scrophulariaceae) in the distribution of the bee species. For example, females of *M. (A.) remotula* (36 records) were found to visit five families, but not Scrophulariaceae, which wasn't present in their recorded range.

However, it is also possible that there is actual specialisation, as several bee species occurring in areas where plant species in both families are prevalent also show preference for one of these plant families. For example, 38% of females of *M. (A.) cirrata* (58 records) were encountered on eight plant families including Scrophulariaceae, while only 5% of the records were from Fabaceae. The only species with multiple locality and flower records that has been collected almost exclusively on Fabaceae (29 of 30 female records) is *M. (A.) tarltoni*. One species, *M. (A.) spinalta* seems to prefer to collect pollen from plant families other than the two above, such as Asphodelaceae, Goodeniaceae and Malvaceae.

Species of *Megachile (Austrochile)* were also collected in yellow pan traps, blue vane traps, Malaise traps and vehicle nets (a large insect net mounted on top of a car, e.g. Svenningsen et al. 2021).

Table 1. Phenology records for all species.

Month:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
No. of records:	80	17	22	30	26	27	5	88	192	136	128	46

Key to the species of *Megachile* (*Austrochile*)**Identification key**

Note: The following key is based on our current knowledge about the species. Considering the low number of specimens and localities of several species, the fact that for various species only a single sex is known, and that new species are still found in remote areas, one should be aware, when using the keys, of a likelihood of encountering undescribed sexes of species, or even additional species not treated in this paper.

To ease identification it is recommended to open the mandibles, extend the legs, and expose S4–S7 in males.

1()	Female	2
1()	Male	68
2(1)	T1 entirely covered with white pubescence (Fig. 53a)	<i>nigriscopa</i>
2(1)	T1 entirely covered with orange/brown pubescence (Figs 34a, 37a), or with posterior hairband and/or lateral patch (e.g. Fig. 49a)	3
3(2)	T1 entirely covered with orange/brown pubescence, body size > 9mm	4
3(2)	T1 pubescence a posterior hairband and/or lateral patch (e.g. Fig. 22a)	5
4(3)	Scopa orange, mandible with 1 tooth (Fig. 34)	<i>ferruginea</i>
4(3)	Scopa straw-coloured, mandible with 4 teeth (Fig. 37)	<i>fulvopilosa</i>
5(3)	Mandible with large basal tooth (Fig. 47b)	<i>mandibularis</i>
5(3)	Mandible without large basal tooth	6
6(5)	T3–T5 posterior hairbands absent, or obscured by same colour pubescence on discs (e.g. Figs 10c, 20c, 47c)	7
6(5)	Posterior hairbands present on one or more segments, pubescence colour different from disc (e.g. Fig. 30a)	12
7(6)	Mandible with 1 tooth (Fig. 20b)	<i>calcarata</i>
7(6)	Mandible with 4 teeth	8
8(7)	Pedicel and flagellum orange (Fig. 35b)	<i>flamea</i>
8(7)	Pedicel and flagellum black or brown	9
9(8)	T6 pubescence dense and branched (Figs 10c, 71c)	10
9(8)	T6 pubescence open and simple (Figs. 25c, 62c)	11
10(8)	T6 pubescence on disc mostly white (Fig. 71c)	<i>tarltoni</i>
10(8)	T6 pubescence on disc orange (Fig. 10c)	<i>auriterga</i>
11(9)	T2–4 pubescence orange across entire width	<i>concava</i>
11(9)	T2–4 pubescence white laterally, orange across remaining width	<i>recava</i>
12(6)	Body size large (>12 mm)	13
12(6)	Body size intermediate (9–12 mm) or small (<9 mm)	16
13(12)	Mandible without teeth (Figs. 18b, 30b)	14
13(12)	Mandible with 4 teeth	15
14(13)	T5 posterior hairband absent on most of its width (Fig. 30c)	<i>edentata</i>
14(13)	T5 posterior hairband present on most of its width (Fig. 18c)	<i>buspina</i>
15(13)	S1 median subapical process absent, T6 pubescence on disc white	<i>cafrae</i>
15(13)	S1 median subapical process present, T6 pubescence on disc consisting of orange or golden patch (Fig. 65c)	<i>resinifera</i>
16(12)	Body size intermediate (9–12 mm)	17
16(12)	Body size small (<9 mm)	48
17(16)	Clypeus laterally with large projections (e.g. Figs 26ab, 68ab)	18
17(16)	Clypeus laterally without projections	21
18(17)	Posterior hairbands on terga narrow on most of width, almost single line of branched hairs emerging from apical margin of marginal zone (e.g. Fig. 26c)	19
18(17)	Posterior hairbands on terga wide on most of width, multiple layers of hairs covering most of the marginal zone (e.g. Fig. 14c)	20
19(18)	Clypeus deeply emarginate, with robust lateral projections and a medial projection, T6 pubescence on disc white (Fig. 68g)	<i>rufomaculata</i>

19(18)	Clypeus with slender upwardly directed lateral projections without medial projection, T6 pubescence on disc orange (Fig. 26a)	<i>cornuta</i>
20(18)	T6 pubescence on disc white (Fig. 77c)	<i>witchelinaensis</i>
20(18)	T6 pubescence on disc entirely orange or gold (Fig. 14)	<i>bernierensis</i>
21(17)	Posterior hairbands on terga narrow on most of width, almost single line of branched hairs emerging from apical margin of marginal zone (e.g. Figs. 49c, 63c)	22
21(17)	Posterior hairbands on terga wide on most of width, multiple layers of hairs covering most of the marginal zone (e.g. Figs 69c, 70c)	33
22(21)	T6 pubescence on disc orange or gold	23
22(21)	T6 pubescence on disc white, straw-coloured, or brown	28
23(22)	S1 median subapical process present	24
23(22)	S1 median subapical process absent	25
24(23)	T5 pubescence with extensive coverage of orange hairs (Fig. 63c)	<i>remotula</i>
24(23)	T5 pubescence on disc mainly black with few orange hairs posteriorly (Fig. 44c)	<i>kirbyana</i>
25(23)	T4 posterior hairband orange, extensive orange pubescence on disk (Fig. 33c)	<i>fennelli</i>
25(23)	T4 posterior hairband white, hardly any orange pubescence on disk	26
26(25)	T5 orange pubescence only on posterior third (Fig. 8c)	<i>auricauda</i>
26(25)	T5 orange pubescence covering at least posterior half	27
27(25)	T5 pubescence on disc similar in colour to that of T6 (Fig. 66c)	<i>rotnnestensis</i>
27(25)	T5 pubescence on disc different in colour to that of T6 (Fig. 49c)	<i>modesta</i>
28(22)	T5 pubescence on disc similar in colour to that of T6	29
28(22)	T5 pubescence on disc different in colour to that of T6	31
29(28)	T5 posterior hairband straw-coloured (Fig. 50c)	<i>monteithi</i>
29(28)	T5 posterior hairband absent or thin and white	30
30(29)	Ventral margin of clypeus smooth, almost straight with small median projection, mandibles dull with micro-sculpture, supra-clypeal area densely punctate (Fig. 39b)	<i>hamoni</i>
30(29)	Ventral margin of clypeus shallowly emarginate with ventral margin partly projected, mandibles shiny, supra-clypeal area openly punctate (Fig. 38b)	<i>glatzi</i>
31(28)	T5 posterior hairband present on most of its width (Fig. 61c)	<i>quinquedentata</i>
31(28)	T5 posterior hairband absent on most of its width (e.g. Fig. 11c)	32
32(31)	T6 pubescence on disc brown, T6 integument colour black (Fig. 11c)	<i>badicauda</i>
32(31)	T6 pubescence on disc straw-coloured or light brown, T6 integument colour reddish (Fig. 13c)	<i>batleyi</i>
33(21)	T5 posterior hairband absent on most of its width	34
33(21)	T5 posterior hairband present on most of its width	41
34(33)	T5 pubescence on disc different in colour to that of T6	35
34(33)	T5 pubescence on disc similar in colour to that of T6	38
35(34)	T6 pubescence on disc brown (Fig. 1c)	<i>adusta</i>
35(34)	T6 pubescence on disc white or light orange and straw-coloured (Fig. 23c)	36
36(35)	T6 pubescence on disc light orange and straw-coloured (Fig. 23c)	<i>carinata</i>
36(35)	T6 pubescence on disc white	37
37(36)	Mandible with 3 teeth, ventral margin of clypeus shallowly emarginate, partly projected (Fig. 28b)	<i>crenulata</i>
37(36)	Mandible with 4 teeth, ventral margin of clypeus smooth (Fig. 19b)	<i>cafrae</i>
38(34)	Mandible with 3 teeth (Fig. 73b)	<i>tridentata</i>
38(34)	Mandible with 4 teeth	39
39(38)	T6 pubescence on disc black or dark brown (Fig. 76c)	<i>wintinnaensis</i>
39(38)	T6 pubescence on disc white	40
40(39)	Legs brown, different from general integument colour (Fig. 36a)	<i>frankeniae</i>
40(39)	Legs black, not different from general integument colour (Fig. 48a)	<i>maxillaris</i>
41(33)	Mandible without teeth (Fig. 70b)	<i>spinalta</i>
41(33)	Mandible with 4 or 5 teeth	42
42(41)	Mandible with 5 teeth (Fig. 41b)	<i>helvola</i>
42(41)	Mandible with 4 teeth	43
43(42)	Posterior hairbands on terga predominantly off-white or straw-coloured (e.g. Fig. 69c)	44
43(42)	Posterior hairbands on terga predominantly white (e.g. Fig. 32c)	47
44(43)	Ventral half of clypeus, as seen in profile, convex	<i>silaceacincta</i>
44(43)	Ventral half of clypeus, as seen in profile, flat or concave	45
45(44)	Mandible with ridges only at the apex, the remaining area concave and dull (Fig. 55b), T6 pubescence	

	off-white	<i>planimala</i>
45(44)	Mandible with several smooth ridges extending across most of its length (Fig. 15b), T6 pubescence white	46
46(45)	Posterior hairbands on terga straw-coloured (Fig. 15c)	<i>bilineata</i>
46(45)	Posterior hairbands on terga off-white (Fig. 50c)	<i>monteithi</i>
47(43)	Ventral margin of clypeus shallowly emarginate with small median projection (Fig. 32b)	<i>falcicula</i>
47(43)	Ventral margin of clypeus smooth without small emargination (Fig. 72b)	<i>tarsata</i>
48(16)	Posterior hairbands on terga narrow on most of width, almost single line of branched hairs emerging from apical margin of marginal zone (e.g. Fig. 2c)	49
48(16)	Posterior hairbands on terga wide on most of width, multiple layers of hairs covering most of the marginal zone (e.g. Fig. 52c)	57
49(48)	T5 pubescence on disc different in colour to that of T6	50
49(48)	T5 pubescence on disc similar in colour to that of T6	51
50(49)	T5 posterior hairband absent (Fig. 56c)	<i>plebeia</i>
50(49)	T5 posterior hairband present, but obscured medially (Fig. 40c)	<i>helvicauda</i>
51(49)	T6 pubescence on disc brown or black	52
51(49)	T6 pubescence on disc white, straw-coloured, orange or gold	53
52(51)	Ventral margin of clypeus shallowly emarginate with small median projection, lower clypeus in longitudinal profile concave (Fig. 52b)	<i>nigricauda</i>
52(51)	Ventral margin of clypeus crenulate, lower clypeus in longitudinal profile flat or convex (Fig. 59b)	<i>quadricincta</i>
53(51)	T6 pubescence on disc white	54
53(51)	T6 pubescence on disc straw-coloured, orange or gold	55
54(53)	T6 pubescence on disc simple and openly spaced (Fig. 12c)	<i>basidentata</i>
54(53)	T6 pubescence on disc branched and closely spaced (Fig. 2c)	<i>albicauda</i>
55(53)	T4–T6 on disc with straw-coloured or orange pubescence (Fig. 33c)	<i>fennelli</i>
55(53)	T5–T6 on disc with orange pubescence	56
56(55)	Ventral margin of clypeus crenulate (Fig. 49b)	<i>modesta</i>
56(55)	Ventral margin of clypeus deeply emarginate with large lateral projections and upper part of clypeus with medial projection (Fig. 57b,j)	<i>preissi</i>
57(48)	T5 posterior hairband present on most of its width	58
57(48)	T5 posterior hairband absent on most of its width	62
58(57)	Posterior hairbands on terga white (Fig. 51c)	<i>multispina</i>
58(57)	Posterior hairbands on terga straw-coloured (e.g. Fig. 58c)	59
59(58)	Ventral margin of clypeus with 5 small nodules (Fig. 67b)	<i>rufipes</i>
59(58)	Ventral margin of clypeus without 5 small nodules	60
60(59)	Pubescence on frons frizzy (Fig. 24b)	<i>cirrata</i>
60(59)	Pubescence on frons straight	61
61(60)	Ventral margin of clypeus almost smooth, very shallowly emarginate medially, with tiny nodule medially (Fig. 58b)	<i>prendergastae</i>
61(60)	Ventral margin of clypeus emarginate, and laterally projected as seen in profile, lower medial area smooth (Fig. 55b)	<i>planimala</i>
62(57)	T6 pubescence on disc entirely orange (Fig. 74i)	<i>trinotata</i>
62(57)	T6 pubescence on disc white, straw-coloured or light brown	63
63(62)	Mandible without teeth	<i>enoda</i>
63(62)	Mandible with 4 teeth	64
64(63)	T6 integument red or brown	65
64(63)	T6 integument black	67
65(64)	Ventral margin of clypeus shallowly emarginate with small median projection (Fig. 43b)	<i>hudsoni</i>
65(64)	Ventral margin of clypeus crenulate	66
66(65)	Posterior hairbands on terga predominantly white (Fig. 13c)	<i>batleyi</i>
66(65)	Posterior hairbands on terga predominantly straw-coloured (Fig. 16c)	<i>binotata</i>
67(64)	Ventral half of clypeus, as seen in profile, flat	<i>aurifimbriata</i>
67(64)	Ventral half of clypeus, as seen in profile, concave	<i>cardaleae</i>
68(1)	Fore leg not modified, tarsus more than 6 times as long as wide, basitarsus more than twice as long as wide (e.g. Figs 27c, 53g)	69
68(1)	Fore leg tarsus and/or tibia modified, tarsus less than 6 times as long as wide, basitarsus less than twice as long as wide (e.g. Figs 18g, 20g), tarsomeres flattened and laterally extended, often ventrally	

	covered in dense short pubescence, or body size >12 mm	104
69(68)	Ventral margin of mandible with medial tooth	<i>nigriscopa</i>
69(68)	Ventral margin of mandible without medial tooth	70
70(69)	T6 medial teeth widely separated, more than length of tooth	71
70(69)	T6 distance between medial teeth at base similar to length of tooth	96
71(70)	T6 carina multi-dentate or crenulate	72
71(70)	T6 carina bilobed and/or almost smooth	83
72(71)	Fore coxa without projection, occasionally with small protrusion	73
72(71)	Fore coxa with a distinct anteriorly directed projection	77
73(72)	S1 median subapical process absent	74
73(72)	S1 medially elevated, or with a small protrusion or spine	75
74(73)	Fore tarsus without black dots	<i>fennelli</i>
74(73)	Fore tarsus with one black dot (Fig. 75d)	<i>uninotata</i>
75(73)	T6 carina multi-dentate	<i>aurantifacies</i>
75(73)	T6 carina crenulate	76
76(75)	T6 medial teeth short (Fig. 23e,f)	<i>carinata</i>
76(75)	T6 medial teeth long (Fig. 60c,d)	<i>quinquecincta</i>
77(72)	S1 median subapical process laterally compressed	78
77(72)	S1 median subapical process a small protrusion or spine	79
78(77)	Fore tarsus with distinct black dot on tarsomere 3 (Fig. 6d)	<i>amnicola</i>
78(77)	Fore tarsus without black dots (Fig. 32g)	<i>falcicula</i>
79(77)	Fore tarsus with two dark marks	<i>cardaleae</i>
79(77)	Fore tarsus without dark marks	80
80(79)	Posterior hairbands on terga distinct, white or off-white	81
80(79)	Posterior hairbands on terga may be obscured by pubescence on disc, orange or straw-coloured	82
81(80)	T6 medial teeth short (Fig. 67e,f), integument T2–T4 laterally reddish (Fig. 67d)	<i>rufipes</i>
81(80)	T6 medial teeth longer than wide at base (Fig. 41e,f) integument colour T2–T4 laterally not different from remainder of segments	<i>helvola</i>
82(80)	T6 medial teeth short (Fig. 46c)	<i>lucidacincta</i>
82(80)	T6 medial teeth longer than wide at base (Fig. 25f)	<i>concava</i>
83(71)	Fore legs coxa without projection, occasionally with small protrusion	84
83(71)	Fore legs coxa with distinct projection	90
84(83)	S1 median subapical process absent	85
84(83)	S1 median subapical process a small protrusion or spine	86
85(84)	T5 pubescence on disk orange (Fig. 33e)	<i>fennelli</i>
85(84)	T5 pubescence on disk inconspicuous off-white (Fig. 54c)	<i>paula</i>
86(84)	Fore tarsus with 1 or 2 black dots (Fig. 16d)	87
86(84)	Fore tarsus without black dots	88
87(86)	Fore tarsus with black dot on tarsomere 3 (Fig. 78d)	<i>yeatsi</i>
87(86)	Fore tarsus with dots on tarsomeres 2 and 3 (Fig. 16d)	<i>binotata</i>
88(86)	T6 pubescence black (Fig. 76e)	<i>wintinnaensis</i>
88(86)	T6 pubescence white or straw-coloured	89
89(88)	T6 medial teeth much longer than width at base (Fig. 24f)	<i>cirrata</i>
89(88)	T6 medial teeth shorter than width at base (Fig. 23e,f)	<i>carinata</i>
90(83)	Hypostomal area with shallow raised carina	91
90(83)	Hypostomal area not modified	92
91(90)	T6 pubescence white (Fig. 4b)	<i>albipilosa</i>
91(90)	T6 pubescence black (Fig. 41e)	<i>helvola</i>
92(90)	S1 median subapical process laterally compressed with carina	<i>falcicula</i>
92(90)	S1 median subapical process absent or a small protrusion or spine	93
93(92)	T6 integument colour red (Fig. 5b)	<i>albiventralis</i>
93(92)	T6 integument colour black	94
94(93)	T2–T4 integument laterally reddish (Fig. 67d)	<i>rufipes</i>
94(93)	T2–T4 integument entirely black	95
95(94)	Terga with posterior hairbands orange or straw-coloured (Fig. 46a,b)	<i>lucidacincta</i>
95(94)	Terga with posterior hairbands white (Fig. 56d,e)	<i>plebeia</i>
96(70)	Fore leg coxa without projection, occasionally with small protrusion	97
96(70)	Fore leg coxa with distinct projection	100

97(96)	T6 integument entirely black	<i>quinquecincta</i>
97(96)	T6 integument red, brown, or black/brown	98
98(97)	T6 carina crenulate	<i>costata</i>
98(97)	T6 carina multi-dentate	99
99(98)	Terga with posterior hairbands white (Fig. 51d,e)	<i>multispina</i>
99(98)	Terga with posterior hairbands straw-coloured (Fig. 58d,e)	<i>prendergastae</i>
100(96)	Fore tarsus with 1 or more black dots (e.g. Figs. 17d, 42d)	101
100(96)	Fore tarsus without black dots	102
101(100)	Fore tarsus with 1 distinct black dot on tarsomere 3 (Fig. 42d)	<i>houstoni</i>
101(100)	Fore tarsus without dot on tarsomere 3 (Fig. 17d)	<i>boharti</i>
102(100)	S1 medially slightly elevated, median subapical process absent	<i>hudsoni</i>
102(100)	S1 median subapical process present	103
103(102)	T6 distance between medial teeth similar to width of tooth at base (Fig. 66f), T4 posterior hairband orange medially	<i>rotnnestensis</i>
103(102)	T6 distance between medial teeth circa twice width of tooth at base (Fig. 44f), T4 posterior hairband white	<i>kirbyana</i>
104(68)	Hind leg tarsus longer than tibia	105
104(68)	Hind leg tarsus as long or shorter than tibia	111
105(104)	Fore leg tibia and tarsus modified	106
105(104)	Fore leg only tarsus modified	108
106(105)	Body size large (>12 mm), T6 pubescence entirely orange (Fig. 37e)	<i>fulvopilosa</i>
106(105)	Body size intermediate (9–12 mm), T6 pubescence white or off-white	107
107(106)	T6 medial teeth broad and truncated, separated by about length of tooth (Fig. 71e,f)	<i>tarltoni</i>
107(106)	T6 medial teeth narrow and short, separated by more than length of tooth (Fig. 57f)	<i>preissi</i>
108(105)	Fore leg femur ventrally with two longitudinal lines of white dense pubescence (Fig. 63h)	<i>remotula</i>
108(105)	Fore leg femur ventrally without two longitudinal lines of white dense pubescence	109
109(108)	Fore leg tarsus without black dots	<i>rufomaculata</i>
109(108)	Fore leg tarsus with 1 black dot	110
110(109)	T5–T6 integument colour black (Fig. 65d)	<i>resinifera</i>
110(109)	T5–T6 integument colour red (Fig. 14e)	<i>bernierensis</i>
111(104)	Distance between T6 medial teeth at base equal or less than length of tooth	112
111(104)	T6 medial teeth separated by more than length of tooth	115
112(111)	T6 medial teeth shape robust, basal width equal to length of tooth	113
112(111)	T6 medial teeth shape slender, basal width less than length of tooth	114
113(112)	Fore leg femur ventrally almost bare, some sparse erect hairs, fore leg tarsus without black dots (Fig. 48g)	<i>maxillaris</i>
113(112)	Fore leg femur ventrally with two longitudinal lines of white dense pubescence, fore leg tarsus with 3 or more black dots (Fig. 74d)	<i>trinotata</i>
114(112)	Mandible ventrally without patch of dense pubescence, Fore leg tarsus with 5 black dots (Fig. 20g,j)	<i>calcarata</i>
114(112)	Mandible ventrally with patch of dense pubescence, fore leg tarsus with 2 black dots (Fig. 64e)	<i>resinicuna</i>
115(111)	Ventral margin of mandible without expansion or projection	116
115(111)	Ventral margin of mandible with basal or medial expansion	120
116(115)	Hypostomal area with raised carina and/or spine	117
116(115)	Hypostomal area not modified	118
117(116)	Mandible with 2 teeth, posterior tergal hairbands absent, T1 entirely covered with white pubescence (Fig. 3a)	<i>albinigra</i>
117(116)	Mandible with 3 teeth, posterior tergal hairbands present (Fig. 50)	<i>monteithi</i>
118(116)	Fore leg coxa with distinct projection, fore leg femur ventrally with two longitudinal lines of white dense pubescence (Fig. 49g)	<i>modesta</i>
118(116)	Fore leg coxa without projection or with small nodule, fore leg femur ventrally almost bare, some sparse erect hairs	119
119(118)	Most flagellomeres crenulate ventrally (Fig. 28d)	<i>crenulata</i>
119(118)	Flagellomeres not crenulate ventrally, last flagellomere flattened >1.5 times as wide as previous segment (Fig. 21a)	<i>calva</i>
120(115)	Fore leg femur ventrally entirely covered with white pubescence	121
120(115)	Fore leg femur ventrally with two longitudinal lines of [white] dense pubescence	123

121(120)	Fore leg tarsus with 2 black dots (Fig. 72g)	tarsata
121(120)	Fore leg tarsus without black dots	122
122(121)	Hypostomal area with large blunt process on carina (Fig. 19h)	cafrae
122(121)	Hypostomal area with raised carina, without process	lobata
123(120)	Fore leg tarsus with 3 or more black dots (Fig. 70g,h)	spinalta
123(120)	Fore leg tarsus with 1 black dot	124
124(123)	S1 median subapical process large backwards directed spine, fore tarsus ventrally with rows of strong setae (Fig. 18g)	buspina
124(123)	S1 median subapical process robust and laterally compressed, fore tarsus ventrally without rows of strong setae	125
125(124)	Ventral margin of mandible with medial projection	curvata
125(124)	Ventral margin of mandible with basal expansion	bilineata

Taxonomy

Megachile (Austrochile) Michener, 1965

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Type species: *Megachile resinifera* Meade-Waldo, 1915, by original designation.

Michener's description of this subgenus (Michener, 1965) was based on a small number of species, unified by a large median subapical process or spine on the first metasomal sternum in both sexes. However, with the inclusion of many more species in this subgenus, many of which lack this character, a revised description for the subgenus *Austrochile* is necessary.

Chalicodoma (Austrochile) Michener, 1965, p. 202.

Diagnosis:

Female *M. (Austrochile)* can be recognised by the following combination of characters: vertex noticeably short, its length less than, or occasionally up to, 1.25x OOD; metasoma narrower basally than medially, length about 1.04 to 1.68 times greatest width; mandible without cutting edges, less than twice as long as broad; T2–T3 with post-gradular grooves, grooves without pubescence.

Male *M. (Austrochile)* can be recognised by the following combination of characters: mandible with three teeth (four in *M. (A.) resinifera*, two in *M. (A.) albinigra*); T2–T5 marginal zone impunctate; T6 with medial carina prominent but not reaching the sides of the tergum; T6 posterior margin with pair of small to large teeth medially and a small to large tooth laterally.

Description:

Females:

Antennae paler ventrally than dorsally; vertex narrow, VW less than OOD in most, equal to or little larger in few species; clypeus usually flat to rounded medially (Fig 50g), elaborately modified in some species (Figs 57j, 68g); mandibles with 0–4 teeth, acetabular groove as wide as or wider than outer groove, widening basally, outer ridge parallel to ventral margin, not extending into basal half of mandible, basal interspace very finely rugose in most; metasoma wider medially than basally,

length about 1.04 to 1.68 times greatest width; T2–T3 with post-gradular grooves, without pubescence; metasomal S1 in some species with strong medial process or spine; T6 in profile distinctly concave because of projecting apex, lateral margins nearly straight.

Pubescence: Pale, dense on face laterally, genae and lower genae, more sparse, gold to brown on vertex; mesoscutum with sparse pale to brown or red hair dorsally, more dense, pale on mesopleura; spot of tomentum on pronotal lobe and posterior to tegulae; T2–T4 with hairbands in marginal zone complete or broken medially, in some species hairbands are lacking or obscured by similarly coloured pubescence on disc; hairbands on marginal zone wide, consisting of multiple layers of adjacent pubescence, or narrow, consisting medially of a single row of adjacent pubescence; T6 surface with adpressed hairs, often with sparse erect hairs, pubescence coloration on T5–T6 species specific; scopa of uniform colour.

Males:

Antennae with scape about 4x length of pedicel, apical segment of flagellum simple or flattened, expanded (Fig. 19n), if expanded ventral surface of segment smooth, shining; eyes slightly diverging dorsally; lower genae simple, pubescent, flattened or depressed, with ridge and/or spine (Fig. 19hi); mandibles tridentate (*M. (A.) albinigra* bidentate), Te3 usually strongly recurved, in some species lower margin expanded (Fig. 19i); clypeus ventral margin in most species not straight, either emarginate medially or with medial processes or both (Figs 6g, 65h); T2, T3 with post-gradular groove shallow; T2–T5 posterior margins smooth and impunctate; medial carina of T6 usually strongly projecting, apical margin weakly crenulate, medially emarginate, bilobed or with regular or irregular teeth (Figs 6e, 78c, 42c, 25i); posterior margin of T6 with pair of small to large teeth medially and large to small pointed teeth laterally, (Figs 6e, 78c, 42c, 22i); metasomal S1 in some species with strong medial subapical process (Figs 19l,m); metasoma with four exposed sterna, S4 posterior margin thin and hyaline. S5 and S6 hidden, densely covered with modified setae of which size and shape are species specific, S5 medial edge shaped differently for each species (Figs 70h, 19k, 20h, 71h, 50h), S5 laterally with fringe of longer

setae, S6 posterolateral edges with plumes of long hair. Genitalia: gonostyli usually about same length as penis valves, gonostyli apical to volsellae laterally compressed in most species, axe shaped in profile, not subdivided, with short, fine pubescence.

Legs: Fore leg ventral projection on coxa lacking or with small tubercle to large curved spine, coxal surface in most species lacking thick hairs or bristles; fore tarsus and tibia simple or modified, tarsal modifications involve dorsoventral compression of the segments often with dense bristles laterally, tibia modifications comprise shortening and thickening often with a smooth groove and/or an extended lobe on the dorsal surface; hind leg with hind tarsus longer, same length or shorter than hind tibia.

Pubescence: Dense, pale on face and genae medially, sparse gold to brown on vertex; patches of appressed tomentum at anterior angles of mesonotum, anterior and posterior to tegulae; T1–T4 with hair bands on marginal zone complete or partial; T6 with pubescence denser dorsal than ventral to the carina.

***Megachile (Austrochile) adusta* Leijs sp. nov.**

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Figure 1A–E

Examined specimens. Holotype, ♀, WAM (E17621), WA, Cape Naturaliste (33.5322°S: 115.0008°E), 12/1993, Allen, G., with resin pot.

Diagnosis. The female of this species can be recognised by the following combination of characters: ventral margin of clypeus partly projecting; T5 posterior hairband absent; T5 pubescence on disc white; T6 pubescence on disc brown with small longitudinal medial streak of straw-coloured pubescence. Male unknown.

Female. Holotype: Body length 9.1 mm; wing length 5.7 mm; head width 3.4 mm; metasoma length/width ratio 1.24. Relative head measurements: OOD 15; IOD 16; VW 15; UID 61; LID 45; face upper/lower width ratio 1.36.

Structure. Body size intermediate (9–12 mm); ventral margin of clypeus shallowly emarginate with ventral margin partly projected; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on T2–T4, general colour of hair bands white; T1 with posterior hairband and/or lateral patch; posterior hairbands on terga on most of its width wide, multiple layers of hairs covering most of the marginal zone; T5 posterior hairband on most of its width absent, pubescence on disc different in colour to T6, white; T6 pubescence on disc brown; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Flower visitation. No records.

Distribution. See map Fig. 1E.

Phenology. December (1 record).

Etymology. The specific epithet is an adjective that refers to the brown pubescence on female T6.

***Megachile (Austrochile) albicauda* Leijs sp.**

nov.

urn:lsid:zoobank.org:act:0E0E9B98-09EE-4188-9012-11421C13E4B8

Figure 2A–D

Examined specimens. Holotype, ♀, SAMA (32-46686), SA, Monarto CP (35.1661°S: 139.1257°E), 23/10/2011, R. Leijs, *Fabaceae*. Paratype, ♀, WAM (E22407), WA, 3 km W of Mount Ragged (33.4997°S: 123.4175°E), 22/10/1982, Howard, C. A. & Houston, T. F. *Other specimens.* 10 females.

Diagnosis. The female of this species can be recognised by the following combination of characters: ventral margin of clypeus smooth; legs brown, body integument black; posterior hairbands on terga narrow; hairband on T5 only present laterally; T6 pubescence white. Male unknown.

Female. Holotype: Body length 8.9 mm; wing length 5.6 mm; head width 3.3 mm; metasoma length/width ratio 1.30. Relative head measurements: OOD 13.5; IOD 15; VW 11; UID 58; LID 49; face upper/lower width ratio 1.18.

Structure. Body size small (<9 mm); ventral margin of clypeus smooth; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands white; T1 with posterior hairband and/or lateral patch; posterior hairbands on terga on most of its width narrow, almost single line of branched hairs emerging from apical margin of marginal zone; T5 posterior hairband on most of its width absent, white pubescence on disc restricted to posterior margin; T6 pubescence on disc white; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs brown; T6 integument black.

Flower visitation. small pea flowers, *Scaevola depauperata*, *Gastrolobium spinosum*, *G. oxylobioides*, *Gompholobium*, *Pultenaea affin. neurocalyx*, *P. boormanii* *Calytrix longiflora*, *Olearia subspicata*, *Phyllota phyllicoides*, *Daviesia leptophylla*.

Distribution. See map Fig. 2D.

Phenology. October (8 records), November (2 records), December (1 record).

Etymology. The specific epithet refers to white pubescence on female T6.

***Megachile (Austrochile) albinigra* Leijs sp.**

nov.

urn:lsid:zoobank.org:act:5BBB578C-3A27-44F8-80A7-4BB6A3F4B65E

Figs 3A–F

Examined specimens. Holotype, ♂, WAM (E18365), WA, 24 km WSW of Yannarie River Crossing NW Coastal Hwy (22.9366°S: 114.7342°E), 30/08/1997, Houston, T.F. & Mathiasen, P., *Pityrodia loxocarpa*. *Other specimens.* 1 male.

Diagnosis. The male of this species can be recognised by the following combination of characters: T1 pubescence white; T2–T5 pubescence black, without posterior hairbands; occiput with large transverse ridge bearing dense anteriorly directed pubescence; front tarsus ventrally with dense branched pubescence and long black fringe posteriorly. Female unknown.

Male. Holotype: Body length 13 mm; wing length 7.9 mm; head width 4 mm; hind tarsus/tibia ratio 0.91.

Structure. Body size large (>12 mm); last antennal segment flattened >1.5 times as wide as previous segment; ventral margin of mandible without projection—not expanded; mandible with two teeth; hypostomal area with transverse carina; fore leg tibia and tarsus modified; coxa with anteriorly directed projection, projection as long as or longer than coxa width; tarsus hardly flattened, ventrally with bristles and/or nodules; hind leg tarsus as long or shorter than tibia; S1 median subapical process laterally compressed; T6 medial teeth widely separated, more than length of tooth, robust, carina multi-dentate.

Pubescence. Mandible ventrally with patch of dense pubescence; hypostomal area with patch of dense curved pubescence; occiput with large transverse ridge bearing dense, anteriorly directed pubescence; fore leg femur ventrally with two longitudinal lines of white dense pubescence; posterior hairbands on terga absent, T1 with white pubescence; T2–T5 pubescence black; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs black or dark brown; femur same as body colour; fore tarsus without black dots; T6 integument black.

Flower visitation. *Pityrodia loxocarpa*, *Calytrix truncatifolia*.

Distribution. See map Fig. 3F.

Phenology. August (2 records).

Etymology. The specific epithet refers to the black and white habitus of the species.

***Megachile (Austrochile) albipilosa* Leijs sp.**

nov.

urn:lsid:zoobank.org:act:9164C0BB-7985-4E5D-BCC7-748B77178265

Figs 4A–E

Examined specimens. Holotype, ♂, WAM (E18339), WA, 25 km N of Kellerberrin, Durokoppin Nature Reserve (31.4102°S: 117.7675°E), 22/11/1996, Houston, T.F., *Jacksonia racemosa*. *Other specimens.* 1 male.

Diagnosis. The male of this species can be recognised by the following combination of characters: occiput smooth and shiny, only anterior part with long white pubescence; T1 pubescence only postero-laterally; T2–T4 posterior hairbands much wider laterally, narrow or absent medially; T6 carina bilobed. Female unknown.

Male. Holotype: Body length 9.2 mm; wing length 5.8 mm; head width 3.5 mm; hind tarsus/tibia ratio 1.1 2.

Structure. Body size intermediate (9–12 mm); antennae not modified; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area with raised hypostomal carina, without spine; fore legs not modified; coxa with posteriorly or downwardly directed projection, projection shorter than coxa width; tarsi not modified; hind leg tarsi longer than tibia; S1 median subapical process a small protrusion or spine; T6 medial teeth widely separated, more than length of tooth, robust, carina bilobed.

Pubescence. hypostomal area with long erect white pubescence; fore leg femur ventrally almost bare, some sparse erect hairs; posterior hairbands on terga present; general colour of tergal hair bands white; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs black or dark brown; femur same as body colour; fore metatarsus and tarsi without black dots; T6 integument black.

Flower visitation. *Jacksonia racemosa*.

Distribution. See map Fig. 4E.

Phenology. November (2 records).

Etymology. The specific epithet refers to extensive white pubescence of the species.

***Megachile (Austrochile) albiventralis* Leijs sp.**

nov.

urn:lsid:zoobank.org:act:899EAF7B-6028-441D-B761-27751B3B2811

Figure 5A–E

Examined specimens. Holotype, ♂, AM (K 517223), NSW, Garigal NP (33.7587°S: 151.1928°E), 28/12/2002, M. Batley, *Pultenaea tuberculata*. *Other specimens.* 5 males.

Diagnosis. The male of this species can be recognised by the following combination of characters: fore legs not modified; sterna with extensive white pubescence; T6 medial teeth short, carina bilobed, integument red. Female unknown.

Male. Holotype: Body length 7.7 mm; wing length 5.3 mm; head width 3 mm; hind tarsus/tibia ratio 0.12.

Structure. Body size small (<9 mm); antennae not modified; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area not modified; fore legs not modified; coxa with small anterior directed projection; projection shorter than coxa width; tarsus hardly flattened, ventrally with bristles and/or nodules; hind leg tarsus longer than tibia; S1 median subapical process absent, a small protrusion or spine; T6 medial teeth widely separated, more than length of tooth, short, carina bilobed.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with long erect white pubescence; fore leg femur ventrally almost bare, some sparse erect hairs; posterior hairbands on terga present; general colour of tergal hair bands white; T6 pubescence short, pale coloured; sterna with extensive white pubescence.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs black or dark brown; femur same as body colour; fore tarsus without black dots; T6 integument red or orange.

Flower visitation. *Pultenaea tuberculata*, *P. elliptica*, *Lepidospermum*.

Distribution. See map Fig. 5E.

Phenology. October (2 records), November (2 records), December (2 records).

Etymology. The specific epithet refers to the extensive white pubescence on the sterna in males of this species.

***Megachile (Austrochile) amnicola* Leijs & King sp. nov.**

urn:lsid:zoobank.org:act:9ED01E89-5AB4-4361-9A21-40A69C922692

Figure 6A–I

Examined specimens. Holotype, ♂, WAM (E22536), WA, 16 km W SW of Lyons River (24.6875°S: 115.1894°E), 30/08/1980, Howard, C.A. & Houston, T.F., *Frankenia magnifica*.

Diagnosis. The male of this species can be recognised by the following combination of characters: ventral margin clypeus laterally smooth and shiny, two small horns medially, front leg femur with large patch of adpressed white pubescence; hypostomal area smooth and shiny; fore legs not modified. Female unknown.

Male. Holotype: Body length 9.2 mm; wing length 6.1 mm; head width 3.2 mm; hind tarsus/tibia ratio 1.35.

Structure. Body size intermediate (9–12 mm); antennae not modified; ventral margin of mandible without projection—not expanded; mandible with three teeth; ventral margin clypeus laterally smooth and shiny with two small horns medially; hypostomal area smooth and shiny, with shallow hypostomal carina, without spine; fore legs not modified; coxa with anteriorly directed projection, projection shorter than coxa width; tarsus hardly modified, but with one or more black dots; hind leg tarsus longer than tibia; S1 median subapical process laterally compressed; T6 medial teeth widely separated, more than length of tooth, teeth short, carina multi-dentate.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with long erect white pubescence; front leg femur with large patch of adpressed white pubescence; posterior hairbands on terga present; general colour of tergal hair bands white; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs femur black or dark brown, tibia and tarsus orange red or brown; femur same as body colour; fore tarsus with one black dot; T6 integument black.

Flower visitation. *Frankenia magnifica*.

Distribution. See map Fig. 6I.

Phenology. August (1 record).

Etymology. The specific epithet is an adjective meaning besides a river and refers to the type locality of the species.

***Megachile (Austrochile) aurantifacies* Leijs sp. nov.**

urn:lsid:zoobank.org:act:8D7ED1C7-6B80-4B76-9C22-623F7842F865

Figure 7A–F

Examined specimens. Holotype, ♂, WAM (E22520), WA, 108 mi NNE of Carnarvon (23.4469°S: 114.3142°E), 22/08/1971, Houston, T.F., *Crotalaria*.

Diagnosis. The male of this species can be recognised by the following combination of characters: face with long orange pubescence; fore legs not modified; T2–T5 posterior margins, depressed, wide and transparent orange. Female unknown.

Male. Holotype: Body length 11.2 mm; wing length 7.5 mm; head width 4 mm; hind tarsus/tibia ratio 1.20.

Structure. Body size intermediate (9–12 mm); last antennal segment flattened and little wider than previous segment; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area not modified; fore legs not modified; coxa without projection, occasionally with small nodule; projection shorter than coxa width; tarsus not modified; hind leg tarsus longer than tibia; S1 median subapical

process a small protrusion or spine; T6 medial teeth widely separated, more than length of tooth, robust, carina multi-dentate.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with long erect white pubescence; face with long, orange pubescence; fore leg femur ventrally almost bare, some sparse erect hairs; posterior hairbands on terga present; general colour of tergal hair bands off-white or straw-coloured; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; femur same as body colour; fore tarsus without black dots; T6 integument black.

Flower visitation. *Crotalaria*.

Distribution. See map Fig. 7F.

Phenology. August (1 record).

Etymology. The specific epithet is an adjective that refers to the orange hairs on the face in males of this species.

***Megachile (Austrochile) auricauda* Leijs sp. nov.**

urn:lsid:zoobank.org:act:0032F4B1-FE47-4523-8C99-E31EA080AEE7

Figure 8A–O

Examined specimens. Holotype, ♀, AM (K.195179), SA, Kangaroo Island (35.7611°S: 137.6222°E), 22/11/2002, M. Batley, *Dillwynia* sp. **Other specimens.** 1 female.

Diagnosis. The female of this species can be recognised by the following combination of characters: female: ventral margin of clypeus crenulate; posterior hairbands on terga narrow, white; T5 hairband absent, but some golden hairs on apical margin. T6 pubescence orange. Male unknown.

Female. Holotype: Body length 9.8 mm; wing length 6.4 mm; head width 3.5 mm; metasoma length/width ratio 1.32. Relative head measurements: OOD 15; IOD 12; VW 14; UID 57; LID 54; face upper/lower width ratio 1.06.

Structure. Body size intermediate (9–12 mm); ventral margin of clypeus crenulate; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands white; T1 with posterior hairband and/or lateral patch; posterior hairbands on terga on most of its width narrow, almost single line of branched hairs emerging from apical margin of marginal zone; T5 posterior hairband on most of its width absent, pubescence on disc only prevalent on posterior half; T6 pubescence on disc consisting of orange or golden patch; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Flower visitation. *Dillwynia*.

Distribution. See map Fig. 8D.

Phenology. November (2 records).

Etymology. The specific epithet is an adjective that refers to the orange golden pubescence on female T6.

***Megachile (Austrochile) aurifimbriata* Leijs sp. nov.**

urn:lsid:zoobank.org:act:3F183055-BA6D-4C53-8B31-44869B8CBA0B

Figure 9A–D

Examined specimens. Holotype, ♀, AM (K.395961), VIC, Corryong, Towong Hill Station (36.2°S: 147.9°E), 27/02/2004, B. Meek. **Other specimens.** 4 females.

Diagnosis. The female of this species can be recognised by the following combination of characters: posterior hairbands on terga wide and straw-coloured, T5–T6 entirely with orange pubescence. Male unknown.

Female. Holotype: Body length 5.6 mm; wing length 3.7 mm; head width 1.9 mm; metasoma length/width ratio 1.53. Relative head measurements: OOD 14.5; IOD 14; VW 13; UID 60; LID 55; face upper/lower width ratio 1.09.

Structure. Body size small (<9 mm); ventral margin of clypeus crenulate; ventral half of clypeus as seen in profile flat; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands off-white or straw-coloured; T1 with posterior hairband and/or lateral patch; posterior hairbands on terga on most of its width wide, multiple layers of hairs covering most of the marginal zone; T5 posterior hairband on most of its width absent, pubescence on disc similar in colour to T6; T6 pubescence on disc straw-coloured or light brown; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Flower visitation. No records.

Distribution. See map Fig. 9D.

Phenology. February (5 records).

Etymology. The specific epithet is an adjective that refers to the fringe of golden hairs on the mandible in females of this species.

***Megachile (Austrochile) auriterga* Leijs sp. nov.**

urn:lsid:zoobank.org:act:E2CB7FA7-A760-4105-B9B0-89D63A872BA9

BOLD-BIN (AUSBS): AEC5950

Figure 10A–D

Examined specimens. Holotype, ♀, MAGNT (I011695), NT, Wongalara ST Homestead, Australian Wildlife Conservancy (14.1404°S: 134.475°E), 29/05/2012, R. Leijs. *Other specimens.* 1 female.

Diagnosis. The female of this species can be recognised by the following combination of characters: T3–6 entirely covered in orange pubescence, obscuring posterior hairbands. This species is closely related to *M. tarltoni*, DNA uncorrected sequence divergence only 2.46%, but it differs from *M. tarltoni* in that T5–T6 pubescence is similar in colour. In *M. tarltoni*, the T6 pubescence is lighter in colour than that of T5. Male unknown.

Female. Holotype: Body length 9.1 mm; wing length 5.45 mm; head width 3.25 mm; metasoma length/width ratio 1.26. Relative head measurements: OOD 16; IOD 16; VW 15; UID 61; LID 46; face upper/lower width ratio 1.33.

Structure. Body size intermediate (9–12 mm); ventral margin of clypeus shallowly emarginate with small medium projection; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga absent, general colour of hair bands off-white or straw-coloured; T1 with posterior hairband and/or lateral patch; T5 posterior hairband on most of its width absent, pubescence on disc similar in colour to T6; T6 pubescence on disc straw-coloured or light brown; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Flower visitation. No records.

Distribution. See map Fig. 10D.

Phenology. May (2 records).

Etymology. The specific epithet is an adjective that refers to the extensive orange pubescence on the terga in females of this species.

***Megachile (Austrochile) badicauda* Leijs sp. nov.**

urn:lsid:zoobank.org:act:63FAC24B-56A8-4202-B677-BB419566CEDF

Figure 11A–D

Examined specimens. Holotype, ♀, WAM (E22558), WA, Widgiemooltha (31.4969°S: 121.5769°E), 03/10/1962, Douglas, A.M.

Diagnosis. The female of this species can be recognised by the following combination of characters: posterior hairband on T5 absent, disc only with a few short hairs; T6 with brown pubescence. Male unknown.

Female. Holotype: Body length 9 mm; wing length 6.1 mm; head width 3.4 mm; metasoma length/width ratio

1.21. Relative head measurements: OOD 14; IOD 15; VW 12; UID 57; LID 50; face upper/lower width ratio 1.14.

Structure. Body size intermediate (9–12 mm); ventral margin of clypeus shallowly emarginate with small medium projection; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process present.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands white; T1 with posterior hairband and/or lateral patch; posterior hairbands on terga on most of its width narrow, almost single line of branched hairs emerging from apical margin of marginal zone; T5 posterior hairband on most of its width absent, pubescence on disc absent; T6 pubescence on disc brown; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Flower visitation. No records.

Distribution. See map Fig. 11D.

Phenology. October (1 record).

Etymology. The specific epithet refers to the chestnut brown pubescence on female T6.

***Megachile (Austrochile) basidentata* Leijs sp. nov.**

urn:lsid:zoobank.org:act:D6DFF9B9-92E9-4B6E-9545-6D761B9A767F

Figure 12A–D

Examined specimens. Holotype, ♀, AM (K.361489), NT, 96 km S Elliott (18.4042°S: 133.8492°E), 08/05/2008, M. Batley, *Scaevola virgata*. *Other specimens.* 1 female.

Diagnosis. The female of this species can be recognised by the following combination of characters: mandible at inner base with large tooth; T2–T5 post-gradular areas covered with short, branched pubescence; T6 with open, short white pubescence. Male unknown.

Female. Holotype: Body length 5.8 mm; wing length 3.9 mm; head width 2.1 mm; metasoma length/width ratio 1.32. Relative head measurements: OOD 17; IOD 18; VW 14; UID 67; LID 51; face upper/lower width ratio 1.31.

Structure. Body size small (<9 mm); ventral margin of clypeus smooth and shallowly emarginate with ventral margin partly projected; ventral half of clypeus as seen in profile flat; mandible with two teeth; S1 median subapical process absent.

Pubescence. T2–T5 post-gradular areas covered with short, branched pubescence, posterior hairbands only prevalent laterally; posterior hairbands on terga present on one or more segments, general colour of hair bands white; T1 with posterior hairband and/or lateral patch; posterior hairbands on terga on most of its width narrow, almost single line of branched hairs emerging from

apical margin of marginal zone; T5 posterior hairband on most of its width absent, pubescence on disc similar in colour to T6; T5–T6 pubescence on disc white; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; integument of T6 and T5 partly orange/red.

Flower visitation. *Scaevola virgata*.

Distribution. See map Fig. 12D.

Phenology. May (2 records).

Etymology. The specific epithet is an adjective that refers to the large tooth at the inner base of the female mandible.

***Megachile (Austrochile) batleyi* Leijs sp. nov.**

urn:lsid:zoobank.org:act:0E7272CE-F781-42AD-B181-7014208559BB

Figure 13A–D

Examined specimens. Holotype, ♀, AM (K.517215), NSW, Warrah Lookout (33.5519°S: 151.2917°E), 27/10/2000, M. Batley. **Other specimens.** 1 female.

Diagnosis. The female of this species can be recognised by the following combination of characters: posterior margins of T4–T5 slightly transparent; T5 posterior hairband absent; T6 integument orange/red, pubescence straw-coloured. Male unknown.

Female. Holotype: Body length 9.1 mm; wing length 5.8 mm; head width 3.1 mm; metasoma length/width ratio 1.37. Relative head measurements: OOD 15; IOD 15; VW 14; UID 62; LID 54; face upper/lower width ratio 1.15.

Structure. Body size small (< 9 mm) to intermediate (9–12 mm); ventral margin of clypeus crenulate; ventral half of clypeus as seen in profile flat or convex; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands white; T1 with posterior hairband and/or lateral patch; posterior hairbands on terga on most of its width wide; T5 posterior hairband on most of its width absent, pubescence on disc almost lacking but similar in colour to that on disc of T6; T6 pubescence on disc light straw-coloured; scopa light straw-coloured.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument orange/red.

Flower visitation. *Pultenaea microphylla*.

Distribution. See map Fig. 13D.

Phenology. October (2 records).

Etymology. The specific epithet refers to Michael Batley, in recognition of his contributions to Australian bee

research, and to acknowledge his collection of specimens of this species.

***Megachile (Austrochile) bernierensis* Leijs & King sp. nov.**

urn:lsid:zoobank.org:act:E983F287-2540-4116-B5E6-DA5D24857DFE

Figure 14A–K

Examined specimens. Holotype, ♂, WAM (E22474), WA, Dorre Island (25.0572°S: 113.1014°E), 06/1954, Douglas, A.M. Allotype, ♀, WAM (E22472), WA, Bernier Island (24.8491°S: 113.1375°E), 06/1959, Douglas, A.M. **Other specimens.** 1 male.

Diagnosis. The female of this species can be recognised by the following combination of characters: clypeus smooth medially, with large ventral emargination and lateral projections; T5 posterior hairband absent; T5–T6 covered in orange pubescence. The male of this species can be recognised by the following combination of characters: fore leg coxa with very small process, tarsus modified with single black dot ventrally; all tarsi orange; occiput with small nodule midway on inner rim; integument T5–T6 reddish.

Male. Holotype: Body length 10.1 mm; wing length 5.9 mm; head width 3.2 mm; hind tarsus/tibia ratio 1.06.

Structure. Body size intermediate (9–12 mm); last antennal segment flattened and little wider than previous segment; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area not modified; fore legs only tarsus modified; coxa without projection, occasionally with small nodule; projection shorter than coxa width; tarsus flattened; hind leg tarsus longer than tibia; S1 median subapical process absent; T6 medial teeth widely separated, more than length of tooth, short, carina bilobed.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with long erect white pubescence; fore leg femur ventrally almost bare, some sparse erect hairs; posterior hairbands on terga present; general colour of tergal hair bands white; T6 pubescence completely orange.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs black or dark brown; femur same as body colour; fore tarsus with one black dot; T6 integument red or orange.

Female. Allotype: Body length 11.7 mm; wing length 7.6 mm; head width 3.9 mm; metasoma length/width ratio 1.20. Relative head measurements: OOD 16; IOD 16; VW 16; UID 59; LID 58; face upper/lower width ratio 1.02.

Structure. Body size intermediate (9–12 mm); ventral margin of clypeus with median process, also large lateral projections; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands white; T1 with posterior hairband and/or lateral patch; posterior hairbands on terga on most of its width wide, multiple layers of hairs covering most of the marginal zone; T5 posterior hairband on most of its width absent; T5–T6 pubescence on disc entirely orange or gold; scopa white or light straw-coloured.

Colouration. Integument of head, mesosoma and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument orange/red.

Association of sexes. Based on collecting data and from the colour of the integument and pubescence of T6.

Flower visitation. No records.

Distribution. See map Fig. 14K.

Phenology. June (3 records).

Etymology. The specific epithet refers to Bernier Island, where the female allotype was collected.

***Megachile (Austrochile) bilineata* Leijs sp. nov.**

urn:lsid:zoobank.org:act:549500D0-45FE-4BE4-8D56-44CD78A6E1EC

BOLD-BIN (AUSBS): AEC5646

Figure 15A–I

Examined specimens. Holotype, ♂, AM (K.516349), QLD, Bowra Station (27.9597°S: 145.5772°E), 03/09/2015, M. Batley, *Eremophila goodwinii*. Allotype, ♀, SAMA (32-37509), SA, Great Victoria Desert (29.0067°S: 130.2600°E), 20/09/2017, R. Leijs. **Other specimens.** 2 males, 4 females.

Diagnosis. The female of this species can be recognised by the following combination of characters: posterior hairbands on terga wide, straw-coloured; T5 hairband present; T6 pubescence white. The male of this species can be recognised by the following combination of characters: ventral margin of mandible with basal expansion; coxa with large anteriorly directed projection; hypostomal area with large hypostomal carina and spine; fore leg metatarsus anteriorly with extended lobe; tarsus ventrally with one black dot; T6 with robust medial teeth and multi-dentate carina.

Male. Holotype: Body length 10.4 mm; wing length 6.8 mm; head width 3.5 mm; hind tarsus/tibia ratio 1.00.

Structure. Body size intermediate (9–12 mm); last antennal segment flattened >1.5 times as wide as previous segment; ventral margin of mandible with basal projection, mandible with three teeth; hypostomal area with large hypostomal carina, including spine; fore leg tibia and tarsus modified; coxa with anteriorly directed projection, projection as long as or longer than coxa width; metatarsus with dorsally extended lobe; hind leg tarsus as long or shorter than tibia; S1 median subapical

process laterally compressed; T6 medial teeth widely separated, more than length of tooth, robust, carina multi-dentate.

Pubescence. Mandible ventrally with patch of dense pubescence; hypostomal area with patch of dense curved pubescence; fore leg femur ventrally with two longitudinal lines of white dense pubescence; posterior hairbands on terga present; general colour of tergal hair bands orange medially, white laterally; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs femur black or dark brown, tibia and tarsus orange red or brown; femur same as body colour; fore tarsus with one black dot; T6 integument black.

Female. Body length 9.5 mm; wing length 6.4 mm; head width 3.1 mm; metasoma length/width ratio 1.47. Relative head measurements: OOD 16; IOD 16; VW 15; UID 60; LID 60; face upper/lower width ratio 1.00.

Structure. Body size intermediate (9–12 mm); ventral margin of clypeus crenulate; ventral half of clypeus as seen in profile flat; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands off-white or straw-coloured; T1 with posterior hairband and/or lateral patch; posterior hairbands on terga on most of its width wide, multiple layers of hairs covering most of the marginal zone; T5 posterior hairband on most of its width present, pubescence on disc restricted to short straw-coloured coloured branched hairs on posterior half; T6 pubescence on disc white; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Association of sexes. Confirmed using DNA data.

Flower visitation. *Acacia ixodes*, *Eremophila goodwinii*.

Distribution. See map Fig. 15I.

Phenology. August (1 record), September (4 records), October (4 records), November (4 records).

Etymology. The specific epithet is an adjective that refers to the two lines of white pubescence on the fore femur ventrally.

***Megachile (Austrochile) binotata* Leijs sp. nov.**

urn:lsid:zoobank.org:act:857D779A-7D70-48A1-B49B-A2242C94018B

Figure 16A–H

Examined specimens. Holotype, ♂, SAMA (32-46698), SA, Wintinna Station Panorama tank (27.6044°S:

133.8106°E), 12/08/2021, R. Leijs & K. Hogendoorn, *Eremophila freelingii*. Allotype, ♀, SAMA (32-46700), SA, Wintinna Station Panorama tank (27.6044°S: 133.8106°E), 11/08/2021, R. Leijs & K. Hogendoorn, *Eremophila freelingii*. Other specimens. 1 male.

Diagnosis. The female of this species can be recognised by the following combination of characters: T2–T5 integument colour posterior margins brown, T2–T4 posterior hairbands wide; T5 posterior hairband absent; T6 pubescence straw-coloured or light brown. The male of this species can be recognised by the following combination of characters: fore legs not modified, but with two black dots on tarsus ventrally; T1–T4 posterior hairbands white laterally, light straw-coloured medially; T5–T6 with orange integument, T6 median and lateral teeth blunt.

Male. Holotype: Body length 8.6 mm; wing length 5.2 mm; head width 2.7 mm; hind tarsus/tibia ratio 1.46.

Structure. Body size small (<9 mm); antennae not modified; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area not modified; fore legs not modified; coxa without projection, occasionally with small nodule; projection shorter than coxa width; tarsus not modified, but with two black dots; hind leg tarsus longer than tibia; S1 median subapical process a small protrusion or spine; T6 medial teeth widely separated, more than length of tooth, short, carina bilobed.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with long erect white pubescence; fore leg femur ventrally almost bare, some sparse erect hairs; T1–T4 posterior hairbands white laterally, light straw-coloured medially; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs black or dark brown; femur same as body colour; fore tarsus with two black dots; T5–T6 integument red or orange.

Female. Allotype: Body length 8.8 mm; wing length 5.9 mm; head width 2.8 mm; metasoma length/width ratio 1.25. Relative head measurements: OOD 16; IOD 17; VW 12; UID 63; LID 57; face upper/lower width ratio 1.11.

Structure. Body size small (<9 mm); ventral margin of clypeus crenulate; ventral half of clypeus as seen in profile convex; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands off-white or straw-coloured; T1 with posterior hairband and/or lateral patch; T2–T4 posterior hairbands on most of their width wide, multiple layers of hairs covering most of the marginal zone; T5 posterior hairband on most of its width absent, pubescence on disc restricted to openly spaced branched light orange hairs; T6 pubes-

cence on disc simple, straw-coloured or light brown; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; T2–T5 integument of posterior margins reddish; peduncle of antennae black; legs same as general body colour; T6 integument black or orange/red.

Flower visitation. *Eremophila freelingii*.

Distribution. See map Fig. 16E.

Phenology. August (3 records).

Etymology. The specific epithet is an adjective that refers to the two dark dots on the male front tarsi.

***Megachile (Austrochile) boharti* Leijs & King sp. nov.**

urn:lsid:zoobank.org:act:E9ED9968-391E-4F32-8277-5D868890AAF5

Figure 17A–F

Examined specimens. Holotype, ♂, QM (T258733), WA, Yallingup (33.6487°S: 115.6326°E), 16/12/1979, R.M. Bohart, *Melaleuca*. Other specimens. 2 males.

Diagnosis. The male of this species can be recognised by the following combination of characters: fore legs hardly modified but with two or more vague dots on tarsus ventrally; T6 medial teeth robust, carina bilobed, and extensive white pubescence. Female unknown.

Male. Holotype: Body length 10.1 mm; wing length 5.8 mm; head width 3.55 mm; hind tarsus/tibia ratio 1.00.

Structure. Body size intermediate (9–12 mm); antennae not modified; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area with shallow hypostomal carina, without spine; fore legs not modified; coxa with anteriorly directed projection, projection shorter than coxa width; tarsus hardly modified, but with two or more black dots; hind leg tarsus longer than tibia; S1 median subapical process a small protrusion or spine; T6 medial teeth intermediate, similar to length of tooth, robust or short, carina multi-dentate or bilobed.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with long erect white pubescence; fore leg femur ventrally almost bare, some sparse erect hairs; posterior hairbands on terga present; general colour of tergal hair bands white; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs black or dark brown; femur same as body colour; fore tarsus with two black dots; T6 integument black.

Flower visitation. *Melaleuca*.

Distribution. See map Fig. 17F.

Phenology. December (3 records).

Etymology. The species is named after its collector, the distinguished American entomologist R.M. Bohart.

***Megachile (Austrochile) buspina* Leijs sp.**

nov.

urn:lsid:zoobank.org:act:78368561-C2E8-4151-BD0B-2B9AAEA3C04A

Figure 18A–I

Examined specimens. Holotype, ♂, MAGNT (I011696), NT, Henbury Stn McMinn Ck (24.3682°S: 132.7727°E), 20/10/2022, R. Leijs, *Crotalaria*. Allotype, ♀, AM (K.361616), QLD, 54 km N Quamby (19.9231°S: 140.2294°E), 15/05/2008, M. Batley, *Crotalaria smithiana*. **Other specimens.** 2 males, 2 females.

Diagnosis. The female of this species can be recognised by the following combination of characters: mandible without teeth; pubescence on mesosoma and vertex short adpressed and straw-coloured; terga with wide straw-coloured-coloured posterior hairbands; T6 with white pubescence. The male of this species can be recognised by the following combination of characters: ventral margin of mandible with basal projection; fore legs coxa with large spine, tibia and tarsus strongly modified, tarsus ventrally with rows of strong setae; S1 with large spine.

Male. Holotype: Body length 13.4 mm; wing length 8.4 mm; head width 4.1 mm; hind tarsus/tibia ratio 0.70.

Structure. Body size large (>12 mm); last antennal segment flattened >1.5 times as wide as previous segment; ventral margin of mandible with basal projection, mandible with three teeth; hypostomal area with large hypostomal carina, including spine; fore leg tibia and tarsus modified; coxa with anteriorly directed projection, projection as long as or longer than coxa width; tarsus hardly flattened, ventrally with bristles and/or nodules; hind leg tarsus as long or shorter than tibia; S1 median subapical process a large backwardly directed spine; T6 medial teeth widely separated, more than length of tooth, slender, carina multi-dentate.

Pubescence. Mandible ventrally with patch of dense pubescence; hypostomal area with patch of dense curved pubescence; fore leg femur ventrally with two longitudinal lines of white dense pubescence; posterior hairbands on terga present; general colour of tergal hair bands white; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs black or dark brown; femur same as body colour; fore tarsus with one black dot; T6 integument black.

Female. Allotype: Body length 12.6 mm; wing length 7.2 mm; head width 3.9 mm; metasoma length/width ratio 1.23. Relative head measurements: OOD 13; IOD 14; VW 13.5; UID 54; LID 54; face upper/lower width ratio 1.00.

Structure. Body size large (>12 mm); ventral margin of clypeus crenulate and shallowly emarginate with small

medium projection; ventral half of clypeus as seen in profile convex; mandible without teeth; S1 median subapical process absent.

Pubescence. Hairs on mesosoma and vertex short, adpressed and straw-coloured; posterior hairbands on terga present on one or more segments, general colour of hair bands light orange or straw-coloured; T1 with posterior hairband and/or lateral patch; posterior hairbands on terga on most of its width wide, multiple layers of hairs covering most of the marginal zone; T5 posterior hairband on most of its width present, pubescence on disc almost lacking; T6 pubescence on disc white; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Association of sexes. Based on collecting data from where males and females were collected on the same flowers, as well as the wide posterior hairbands, and the short brown pubescence on the thorax.

Flower visitation. *Crotalaria smithiana*, *Crotalaria*.

Distribution. See map Fig. 18I.

Phenology. May (1 record), October (5 records).

Etymology. The specific epithet is an adjective that refers to the large spine on male S1.

***Megachile (Austrochile) cafrae* Leijs & King sp. nov.**

urn:lsid:zoobank.org:act:D390F187-AD5A-4EA7-B4C1-71C15A86EF95

Figure 19A–O

Examined specimens. Holotype, ♂, QM (T258680), NSW, Warrumbungle NP, vehicle track near woolshed (31.2714°S: 148.9617°E), 11/10/1997, S. Winterton, C. Lambkin, J. Skevington. Allotype, ♀, QM (T258702), QLD, Washpool Ck, 17 km S Leyburn (28.1945°S: 151.5637°E), 15/10/1984, J. King, *Swainsona*. **Other specimens.** 2 males, 1 female.

Diagnosis. The female of this species can be recognised by the following combination of characters: ventral margin of clypeus smooth; posterior hairbands on terga wide, straw-coloured coloured; T5 posterior hairband absent, pubescence on disc orange; T6 pubescence on disc white. The male of this species can be recognised by the following combination of characters: ventral margin of mandible expanded medially; hypostomal area with hypostomal carina and blunt spine; fore legs strongly modified, tibia with large lobe ventrally. S1 with robust median subapical process.

Male. Holotype: Body length 13.1 mm; wing length 8.5 mm; head width 4.4 mm; hind tarsus/tibia ratio 0.67.

Structure. Body size large (>12 mm); last antennal segment flattened >1.5 times as wide as previous segment;

ventral margin of mandible with median projection; mandible with three teeth; hypostomal area with large hypostomal carina, and a blunt spine; fore leg tibia and tarsus modified; coxa with anteriorly directed projection, projection shorter than coxa width; metatarsus with dorsally extended lobe; hind leg tarsus as long or shorter than tibia; S1 median subapical process robust; T6 medial teeth widely separated, more than length of tooth, short, carina bilobed.

Pubescence. Mandible ventrally with patch of dense pubescence; hypostomal area with patch of dense curved pubescence; fore leg femur ventrally entirely covered with white pubescence; posterior hairbands on terga present; general colour of tergal hair bands off-white or straw-coloured; T6 pubescence long, white.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs black or dark brown; femur same as body colour; fore tarsus without black dots; T6 integument black.

Female. Allotype: Body length 13.8 mm; wing length 8.4 mm; head width 4.3 mm; metasoma length/width ratio 1.27. Relative head measurements: OOD 13; IOD 13; VW 12; UID 57; LID 55; face upper/lower width ratio 1.04.

Structure. Body size large (>12 mm); ventral margin of clypeus smooth; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands off-white or straw-coloured; T1 with posterior hairband and/or lateral patch; posterior hairbands on terga straw-coloured, on most of its width wide, multiple layers of hairs covering most of the marginal zone; T5 posterior hairband on most of its width absent, pubescence on disc different in colour to T6, orange; T6 pubescence on disc white; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Association of sexes. Based on collecting data from where males and females were collected on the same flowers.

Flower visitation. *Swainsona*.

Distribution. See map Fig. 190

Phenology. September (1 record), October (3 records).

Etymology. The specific epithet is a composite of the initials of JK's husband and children, Chris, Andrew, Fran, and Rebecca. All have helped with fieldwork and encouraged her during her studies of Megachilidae.

***Megachile (Austrochile) calcarata* Leijs & King sp. nov.**

urn:lsid:zoobank.org:act:D95EA84E-D776-468C-92CD-D994A7A119F0

BOLD-BIN (AUSBS): ACC9498

Figure 20A–K

Examined specimens. Holotype, ♂, WAM (E22539), WA, 30 km S of Mt Bruce, Coppin Pool area (22.8894°S: 118.1408°E), 10/05/1980, Houston, T.F. et al. Allotype, ♀, WAM (E112643), WA, Cane River CP (22.0018°S: 115.8611°E), 26/06/2011, R. Leijs, *Indigofera monophylla*. **Other specimens.** 5 males, 6 females.

Diagnosis. The female of this species can be recognised by the following combination of characters: mandibles with patches of golden hairs on both sides of outer ridge, basal half covered in dense white pubescence; patches of golden hairs under ventral margin of clypeus; T3–T5 without posterior hairbands, but extensively covered in short, branched light straw-coloured pubescence; T6 pubescence white. The male of this species can be recognised by the following combination of characters: hypostomal area smooth and shiny with short plume of stiff hairs on transverse ridge; fore leg tarsus little flattened with 4 or more black dots ventrally; T6 with slender medial teeth and four droplet-like teeth.

Male. Holotype: Body length 10.3 mm; wing length 7 mm; head width 3.3 mm; hind tarsus/tibia ratio 0.86.

Structure. Body size intermediate (9–12 mm); last antennal segment flattened and little wider than previous segment; ventral margin of mandible with basal projection, mandible with three teeth; hypostomal area with transverse carina; fore leg tibia and tarsus modified; coxa with anteriorly directed projection, projection as long as or longer than coxa width; tarsus hardly flattened, ventrally with bristles and/or nodules, and with four or more black dots; hind leg tarsus as long or shorter than tibia; S1 median subapical process a small protrusion or spine; T6 medial teeth close, less than length of tooth, slender, carina multi-dentate.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area almost without pubescence, but with short plume of stiff hairs on transverse ridge; fore leg femur ventrally almost bare, some sparse erect hairs; posterior hairbands on terga present; general colour of tergal hair bands off-white or straw-coloured; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs black or dark brown; femur same as body colour; fore tarsus with three or more black dots; T6 integument black.

Female. Allotype: Body length 9 mm; wing length 5.2 mm; head width 3.25 mm; metasoma length/width ratio 1.41. Relative head measurements: OOD 15; IOD 17; VW 11; UID 61; LID 48; face upper/lower width ratio 1.27.

Structure. Body size intermediate (9–12 mm); ventral margin of clypeus crenulate and broadly emarginate with small medial projection; ventral half of clypeus as

seen in profile flat or convex; mandible with one tooth; S1 median subapical process absent.

Pubescence. Mandibles with patches of golden hairs on both sides of outer ridge, basal half covered in dense white pubescence; golden hairs and under ventral margin of clypeus; T3–T6 without posterior hairbands, but extensively covered in short, branched light straw-coloured pubescence; T5 pubescence on disc different in colour to T6, straw-coloured; T6 pubescence on disc white; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs different from general body colour; T6 integument black.

Association of sexes. Based on males and females reared from resin pot cells cemented separately on grass stalks.

Flower visitation. *Indigofera monophylla*, *Calytrix exstipulata*.

Distribution. See map Fig. 20I.

Phenology. April (1 record), May (6 records), June (4 records), October (1 record).

Etymology. The name suggested by Tarlton Rayment for the Wyndham specimen has been retained.

***Megachile (Austrochile) calva* Leijs sp. nov.**

urn:lsid:zoobank.org:act:94CAF350-4D94-486D-93C2-353A02AEF0F7

Figure 21A–E

Examined specimens. Holotype, ♂, WAM (E18368), WA, Koolyanobbing (30.8180°S: 119.5167°E), 19/09/1995, McMillan, R.P., *Eremophila*.

Diagnosis. The male of this species can be recognised by the following combination of characters: flagellum orange-brown, last segment black, smooth ventrally and wider than previous segment; T1 covered in erect white pubescence; T2 white apical hairband restricted to lateral patches; remaining terga with black pubescence, hairbands absent; S4 smooth without pubescence. Female unknown.

Male. Holotype: Body length 12.3 mm; wing length 7.1 mm; head width 3.7 mm; hind tarsus/tibia ratio 1.00.

Structure. Body size large (>12 mm); last antennal segment flattened >1.5 times as wide as previous segment; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area not modified; fore legs only tarsus modified; coxa without projection, occasionally with small nodule; projection shorter than coxa width; tarsus hardly flattened, ventrally with bristles and/or nodules; hind leg tarsus as long or shorter than tibia; S1 median subapical process absent; T6 medial teeth widely separated, more than length of tooth, short, carina almost smooth.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with long erect white pubescence; fore leg femur ventrally almost bare, some sparse erect hairs; posterior hairbands on terga absent, T1 with erect white pubescence; general colour of tergal hair bands white; T6 pubescence short, dark coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs black or dark brown; flagellum orange-brown, last segment black; femur same as body colour; fore tarsus without black dots; T6 integument black.

Flower visitation. *Eremophila*.

Distribution. See map Fig. 21E.

Phenology. September (1 record).

Etymology. The specific epithet is an adjective that refers to the bare and flat S4 in males of this species.

***Megachile (Austrochile) cardaleae* Leijs & King sp. nov.**

urn:lsid:zoobank.org:act:338CEFC0-AC4B-4350-96B3-33A523EFC774

Figure 22A–J

Examined specimens. Holotype, ♂, ANIC (32-163445), NT, 56 km SE of Alice Springs (24.1833°S: 134.0167°E), 03/10/1978, J.C. Cardale, malaise trap. Allotype, ♀, ANIC (32-163446), NT, 56 km SE of Alice Springs (24.1833°S: 134.0167°E), 03/10/1978, J.C. Cardale, malaise trap. *Other specimens.* 1 female.

Diagnosis. The female of this species can be recognised by the following combination of characters: ventral margin of clypeus shallowly emarginate with small medium projection; T2–T5 posterior hairbands wide, straw-coloured; T5 pubescence on disc, short, branched, and straw-coloured; T6 pubescence simple white. The male of this species can be recognised by the following combination of characters: fore legs not modified, tarsus with one vague brown dot; T6 medial teeth slender, carina multi-dentate.

Male. Holotype: Body length 7.7 mm; wing length 5.2 mm; head width 2.85 mm; hind tarsus/tibia ratio 1.38.

Structure. Body size small (<9 mm); last antennal segment flattened and little wider than previous segment; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area not modified; coxa with posteriorly or downwardly directed projection, projection shorter than coxa width; tarsus hardly modified, but with one vague black dot; hind leg tarsus longer than tibia; S1 median subapical process a small protrusion or spine; T6 medial teeth widely separated, more than length of tooth, teeth slender, carina multi-dentate.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with long erect white pubescence; fore leg femur ventrally almost bare, some

sparse erect hairs; posterior hairbands on terga present; general colour of tergal hair bands off-white or straw-coloured; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs black or dark brown; femur same as body colour; fore tarsus with two black dots; T6 integument black.

Female. Allotype: Body length 8.7 mm; wing length 5.8 mm; head width 3.05 mm; metasoma length/width ratio 1.53. Relative head measurements: OOD 17; IOD 18; VW 16; UID 62; LID 56; face upper/lower width ratio 1.11.

Structure. Body size small (<9 mm); ventral margin of clypeus shallowly emarginate with small medium projection; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on T2–T5, general colour of hair bands off-white or straw-coloured; T1 with posterior hairband and/or lateral patch; posterior hairbands on terga on most of its width wide, multiple layers of hairs covering most of the marginal zone; T5 posterior hairband on most of its width absent, pubescence on disc short, branched, straw-coloured; T6 pubescence on disc simple, white; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Association of sexes. Based on collecting data.

Flower visitation. No records.

Distribution. See map Fig. 22J.

Phenology. October (3 records).

Etymology. The specific epithet refers to Josephine Cardale to acknowledge her contributions to Australian bee research.

***Megachile (Austrochile) carinata* Leijs sp.**

nov.

urn:lsid:zoobank.org:act:45EAE8DE-4F1B-4919-BA36-F7537362F382

BOLD-BIN (AUSBS): AEC2909

Figure 23A–H

Examined specimens. Holotype, ♂, QM (T260271), QLD, Split Rock art site 11 km SE of Laura (15.6455°S: 144.5100°E), 15/03/2017, R. Leijs. Allotype, ♀, AM (K.581108), QLD, 25 km SW of Pentland (20.6833°S: 145.2350°E), 31/08/2019, M. Batley, *Jacksonia ramosissima*. **Other specimens.** 1 male, 1 female.

Diagnosis. Both sexes vertex posteriorly with sharp, erect ridge. The female of this species can be recognised by the following combination of characters: mandible broad; ventral margin clypeus partly projected; T2 pos-

terior hairband narrow; T3 posterior hair band wide, T4–T5 posterior hairbands obscured by extensive orange pubescence on discs. The male of this species can be recognised by the following combination of characters: fore legs and hypostomal area not modified; T6 medial teeth short and rounded, carina smooth.

Male. Holotype: Body length 9.4 mm; wing length 5.6 mm; head width 3.6 mm; hind tarsus/tibia ratio 1.13.

Structure. Body size intermediate (9–12 mm); antennae not modified; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area not modified; fore legs not modified; coxa without projection, occasionally with small nodule; projection shorter than coxa width; tarsus not modified; hind leg tarsus longer than tibia; S1 median subapical process a small protrusion or spine; T6 medial teeth widely separated, more than length of tooth, short, carina almost smooth or multi-dentate.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with long erect white pubescence; fore leg femur ventrally almost bare, some sparse erect hairs; posterior hairbands on terga present; general colour of tergal hair bands off-white, straw-coloured or orange; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs black or dark brown; femur same as body colour; fore tarsus without black dots; T6 integument black.

Female. Allotype: Body length 9.6 mm; wing length 6.3 mm; head width 3.8 mm; metasoma length/width ratio 1.26. Relative head measurements: OOD 16.5; IOD 14; VW 14.5; UID 60; LID 51; face upper/lower width ratio 1.18.

Structure. Body size intermediate (9–12 mm); ventral margin of clypeus shallowly emarginate with ventral margin partly projected; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands off-white or straw-coloured; T1 with posterior hairband and/or lateral patch; posterior hairbands on terga on most of its width wide, multiple layers of hairs covering most of the marginal zone; T5 posterior hairband obscured by extensive orange pubescence, pubescence on disc slightly different in colour to T6; T5 pubescence orange anteriorly; T6 pubescence light straw-coloured; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Association of sexes. Based on collecting data and similarity in orange-red pubescence on T4–T6.

Flower visitation. *Jacksonia ramosissima*.

Distribution. See map Fig. 23H.

Phenology. March (1 record), August (3 records).

Etymology. The specific epithet is an adjective that refers to the sharp posterior ridge on the vertex in both sexes of this species.

***Megachile (Austrochile) cirrata* Leijs sp. nov.**

urn:lsid:zoobank.org:act:25078A37-08B6-45F5-8122-436F80BA17F1

Figure 24A–D

BOLD-BIN (AUSBS): ACD1291

Examined specimens. Holotype, ♂, SAMA (32-46693), SA, Wintinna Station Panorama tank (27.6 044°S: 133.8106°E), 11/08/2021, R. Leijs & K. Hogendoorn, *Eremophila freelingii*. Allotype, ♀, SAMA (32-37691), SA, Aroona Dam (30.5945°S: 138.3600°E), 27/09/2014, R. Leijs. *Other specimens.* 72 males, 58 females.

Diagnosis. The female of this species can be recognised by the following combination of characters: ventral margin of clypeus shallowly emarginate with ventral margin partly projected; frizzy pubescence on clypeus, supra-clypeus, and frons; T2–T5 posterior hairbands wide, straw-coloured; T6 pubescence white and openly placed long brown setae. The male of this species can be recognised by the following combination of characters: fore legs not modified; T5–T6 with white pubescence; T6 medial teeth robust, widely separated, carina bilobed.

Male. Holotype: Body length 10.3 mm; wing length 6.4 mm; head width 3.25 mm; hind tarsus/tibia ratio 1.00.

Structure. Body size intermediate (9–12 mm); antennae not modified; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area not modified; fore legs not modified; coxa without projection, occasionally with small nodule; projection shorter than coxa width; tarsus not modified; hind leg tarsus longer than tibia; S1 median subapical process a small protrusion or spine; T6 medial teeth widely separated, more than length of tooth, robust, carina bilobed.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with long erect white pubescence; fore leg femur ventrally almost bare, some sparse erect hairs; posterior hairbands on terga present; general colour of tergal hair bands straw-coloured; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs femur black or dark brown, tibia and tarsus orange red or brown; femur same as body colour; fore tarsus without black dots; T6 integument black.

Female. Allotype: Body length 8.3 mm; wing length 5.8 mm; head width 2.95 mm; metasoma length/width ratio

1.24. Relative head measurements: OOD 17; IOD 20; VW 14; UID 65; LID 52; face upper/lower width ratio 1.25.

Structure. Body size small (<9 mm); ventral margin of clypeus shallowly emarginate with ventral margin partly projected; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process absent.

Pubescence. Pubescence on clypeus, supra-clypeus and frons curly; posterior hairbands on terga present on one or more segments, general colour of hair bands off-white or straw-coloured; T1 with posterior hairband and/or lateral patch; T2–T5 posterior hairbands on terga on most of its width wide, multiple layers of hairs covering most of the marginal zone; T5 pubescence almost lacking, few sparsely placed short branched straw-coloured hairs; T6 pubescence on disc white with openly placed long brown setae; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Association of sexes. Confirmed using DNA data.

Flower visitation. *Ptilotus*, *Dipteracanthus*, blue *Eremophila*, *E. goodwinii*, *E. freelingii*, *E. scoparia*, *Stemodia florulenta*, *Dicrastylis lewellinii*, *Daviesia*, *Dampiera lanceolata*, *Newcastelia bracteosa*, *Swainsona laxa*, *Swainsona* sp. West5513, also caught in blue vane trap.

Distribution. See map Fig. 24H.

Phenology. February (1 record), March (9 records), April (5 records), July (1 record), August (29 records), September (72 records), October (12 records), November (3 records).

Etymology. The specific epithet is an adjective that refers to frizzy hairs on the frons of the female.

***Megachile (Austrochile) concava* Leijs sp.**

nov.

urn:lsid:zoobank.org:act:200C2C6F-2028-4891-B6EB-0CADAA3F8AD7

Figure 25A–I

Examined specimens. Holotype, ♂, WAM (E22530), WA, 18 km WSW Mulline (29.8686°S: 120.3506°E), 23/09/1982, Houston, T.F. & Hanich, B., *Eremophila pantonii*. Allotype, ♀, WAM (E22531), WA, 70 mi E of Onslow (22.6527°S: 115.1117°E), 23/08/1971, Houston, T. F., *Eremophila*. *Other specimens.* 3 males, 4 females.

Diagnosis. Both sexes: T3–T5 discs with adpressed pubescence same colour as posterior hairbands; T2 disc almost without pubescence. Female: T5 pubescence close and branched; T6 pubescence open and simple. Male: T6 medial slender and widely separated, carina multi-dentate.

Male. Holotype: Body length 10.2 mm; wing length 5.6 mm; head width 3.2 mm; hind tarsus/tibia ratio 1.33.

Structure. Body size intermediate (9–12 mm); antennae not modified; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area not modified; fore legs not modified; coxa with anteriorly directed projection, projection shorter than coxa width; tarsus not modified; hind leg tarsus as longer than tibia; S1 median subapical process a small protrusion or spine; T6 medial teeth widely separated, more than length of tooth, slender, carina multi-dentate.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with long erect white pubescence; fore leg femur ventrally almost bare, some sparse erect hairs; posterior hairbands on terga present; general colour of tergal hair bands off-white or straw-coloured; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs black or dark brown; femur same as body colour; fore tarsus without black dots; T6 integument black.

Female. Allotype: Body length 8.7 mm; wing length 5.9 mm; head width 2.9 mm; metasoma length/width ratio 1.41. Relative head measurements: OOD 16; IOD 16; VW 16; UID 60; LID 58; face upper/lower width ratio 1.03.

Structure. Body size intermediate (9–12 mm); ventral margin of clypeus crenulate and shallowly emarginate with small medium projection; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga absent, general colour of hair bands off-white or straw-coloured; T1 with posterior hairband and/or lateral patch; posterior hairbands on terga on most of its width wide, multiple layers of hairs covering most of the marginal zone; T5 posterior hairband on most of its width absent; T5–T6 pubescence on disc straw-coloured or light brown, close and branched on T5, open and simple on T6; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Association of sexes. Based on collecting data and similarity in orange-red pubescence on T3–T5.

Flower visitation. *Eremophila* affin. *freelingii*, *E. pantonii*, *Eremophila*, *Swainsona*.

Distribution. See map Fig. 25I.

Phenology. August (2 records) September (7 records).

Etymology. The specific epithet is an adjective that refers to concave shape of the lower clypeus in females of this species.

***Megachile (Austrochile) cornuta* Leijs sp. nov.**

urn:lsid:zoobank.org:act:63F18757-294C-4116-92C5-C1C2D111FF6F

Figure 26A–D

Examined specimens. Holotype, ♀, ANIC (32-072193), WA, 29 km NNE of Geraldton (28.7078°S: 114.8832°E), 27/09/1972, N. McFarland.

Diagnosis. The female of this species can be recognised by the following combination of characters: clypeus deeply emarginated with slender slightly dorsally directed horns; posterior hairbands narrow; T5 posterior hairband absent; T5–T6 with extensive orange or gold pubescence. Male unknown.

Female. Holotype: Body length 9.2 mm; wing length 6 mm; head width 3.4 mm; metasoma length/width ratio 1.09. Relative head measurements: OOD 16; IOD 16; VW 14; UID 61; LID 56; face upper/lower width ratio 1.09.

Structure. Body size intermediate (9–12 mm); ventral margin of clypeus deeply emarginate with large lateral projections; mandible with five teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands white; T1 with posterior hairband and/or lateral patch; posterior hairbands on terga on most of its width narrow, almost single line of branched hairs emerging from apical margin of marginal zone; T5 posterior hairband on most of its width absent; T5–T6 pubescence on disc entirely orange or gold; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Flower visitation. No records.

Distribution. See map Fig. 26D.

Phenology. September (1 record).

Etymology. The specific epithet is an adjective that refers to the two horns on the clypeus of the female.

***Megachile (Austrochile) costata* Leijs sp. nov.**

urn:lsid:zoobank.org:act:594F6A27-7D05-4BEE-9CE5-26D3894121E5

Figure 27A–D

Examined specimens. Holotype, ♂, AM (K.517213), NSW, Marramarra NP (33.5639°S: 151.0700°E), 24/10/1998, M. Batley, *Pultenaea ferruginea*.

Diagnosis. The male of this species can be recognised by the following combination of characters: fore leg not modified; posterior margins of T2–T5 transparent orange; T6 medial teeth robust, carina smooth and little crenulate. Female unknown.

Male. Holotype: Body length 8.5 mm; wing length 5.6 mm; head width 3.1 mm; hind tarsus/tibia ratio 1.19.

Structure. Body size small (<9 mm); antennae not modified; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area not modified; fore legs not modified; coxa without projection, occasionally with small nodule; projection shorter than coxa width; tarsus hardly flattened, ventrally with bristles and/or nodules; hind leg tarsus longer than tibia; S1 median subapical process a small protrusion or spine; T6 medial teeth intermediate, similar to length of tooth, robust, carina almost smooth and little crenulate.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with long erect white pubescence; fore leg femur ventrally almost bare, some sparse erect hairs; posterior hairbands on terga present; general colour of tergal hair bands white; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs black or dark brown; femur same as body colour; fore tarsus without black dots; posterior margins of T2–T5 transparent orange; T6 integument black.

Flower visitation. *Pultenaea ferruginea*.

Distribution. See map Fig. 27D.

Phenology. October (1 record).

Etymology. The specific epithet refers to the raised posterior margin of S3 in males of this species.

***Megachile (Austrochile) crenulata* Leijs sp. nov.**

rn:lsid:zoobank.org:act:1229F375-72F9-4121-B6C4-DF4453D40C29

BOLD-BIN (AUSBS): AEC5951

Figure 28A–H

Examined specimens. Holotype, ♂, MAGNT(I011697), NT, Wongalara St, Australian Wildlife Conservancy (14.2042°S: 134.1884°E), 04/06/2012, R. Leijs, *Jacksonia odontoclada*. Allotype, ♀, MAGNT (I011698), NT, Wongalara St, Australian Wildlife Conservancy (14.1821°S: 134.2810°E), 28/05/2012, R. Leijs. **Other specimens.** 7 males, 15 females.

Diagnosis. The female of this species can be recognised by the following combination of characters: mandible with three teeth; T1 with narrow posterior hairband; wide on T2–T3; T4–T5 without apical hairbands but with short light straw-coloured pubescence on disc; T6 pubescence white. The male of this species can be recognised by the following combination of characters: antennae crenulate; fore leg tarsus with three or more black dots.

Male. Holotype: Body length 9.5 mm; wing length 5.8 mm; head width 3.3 mm; hind tarsus/tibia ratio 0.83.

Structure. Body size intermediate (9–12 mm); most antennal segments crenulate ventrally; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area not modified; fore leg tibia and tarsus modified; coxa without projection, occasionally with small nodule; projection shorter than coxa width; tarsus flattened; hind leg tarsus as long or shorter than tibia; S1 median subapical process a large backwardly directed spine; T6 medial teeth widely separated, more than length of tooth, short, carina almost smooth or multi-dentate.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with long erect white pubescence; fore leg femur ventrally almost bare, some sparse erect hairs; posterior hairbands on terga present; general colour of tergal hair bands white; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs femur black or dark brown, tibia and tarsus orange red or brown; fore tarsus with three or more black dots; T6 integument black.

Female. Allotype: Body length 9.7 mm; wing length 5.5 mm; head width 3.35 mm; metasoma length/width ratio 1.30. Relative head measurements: OOD 15; IOD 15.5; VW 11; UID 59; LID 50; face upper/lower width ratio 1.18.

Structure. Body size intermediate (9–12 mm); ventral margin of clypeus shallowly emarginate with ventral margin partly projected; ventral half of clypeus as seen in profile concave; mandible with three teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands white; T1 with narrow posterior hairband and/or lateral patch; wide on T2–T3; T4–T5 without apical hairbands but with short light straw-coloured pubescence on disc; T5 pubescence on disc different in colour to T6, straw-coloured; T6 pubescence on disc white; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Association of sexes. Confirmed using DNA data.

Flower visitation. *Jacksonia dilatata*, *J. thesioides*, *J. odontoclada*.

Distribution. See map Fig. 28H.

Phenology. May (8 records), June (16 records).

Etymology. The specific epithet is an adjective that refers to the crenulated antennae of the males of this species.

***Megachile (Austrochile) curvata* Leijs sp. nov.**

urn:lsid:zoobank.org:act:6C5F56F3-3E82-475D-B828-00D5F3823C80

Figure 29A–E

Examined specimens. Holotype, ♂, WAM (E21826), WA, 10 km WNW of Eurardy (27.5383°S: 114.5817°E), 21/10/1998, Houston, T.F. & Mueller, O., *Pityrodia atriplicina*.

Diagnosis. The male of this species can be recognised by the following combination of characters: fore legs modified, femur ventrally with two broad lines of dense white pubescence covering most of the ventral surface; fore tibia at apical half with wide longitudinal groove; tarsus with single black dot. S1 with large, curved spine. Female unknown.

Male. Holotype: Body length 9.8 mm; wing length 6.1 mm; head width 3.3 mm; hind tarsus/tibia ratio 0.85.

Structure. Body size intermediate (9–12 mm); last antennal segment flattened >1.5 times as wide as previous segment; ventral margin of mandible with median projection; mandible with three teeth; hypostomal area with transverse carina; fore leg tibia and tarsus modified; coxa with anteriorly directed projection, projection as long as or longer than coxa width; tarsus flattened and metatarsus with dorsally extended lobe; hind leg tarsus as long or shorter than tibia; S1 median subapical process laterally compressed and robust; T6 medial teeth widely separated, more than length of tooth, slender, carina almost smooth or multi-dentate.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with patch of dense curved pubescence; fore leg femur ventrally with two longitudinal lines of white dense pubescence; posterior hairbands on terga present; general colour of tergal hair bands white; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs orange, red or brown; femur same as body colour; fore tarsus with one black dot; T6 integument black.

Flower visitation. *Pityrodia atriplicina*.

Distribution. See map Fig. 29E.

Phenology. October (1 record).

Etymology. The specific epithet is an adjective that refers to the curved spine in S1 in the males of this species.

***Megachile (Austrochile) edentata* Leijs sp. nov.**

urn:lsid:zoobank.org:act:55DF9F39-4AFA-4044-8440-904BC519D05A

BOLD-BIN (AUSBS): ACC9471

Figure 30A–D

Examined specimens. Holotype, ♀, WAM (E112644), WA, Cane River CP (22.0142°S: 115.6314°E), 28/06/2011, R. Leijs, *Indigofera monophylla*.

Diagnosis. The female of this species can be recognised by the following combination of characters: mandible

without teeth; T2–T4 posterior hairbands wide; T5 posterior hairband absent; T6 pubescence open simple and white. Male unknown.

Female. Holotype: Body length 13.1 mm; wing length 7.7 mm; head width 4.1 mm; metasoma length/width ratio 1.55. Relative head measurements: OOD 14; IOD 14; VW 13; UID 59; LID 53; face upper/lower width ratio 1.11.

Structure. Body size large (>12 mm); ventral margin of clypeus crenulate; ventral half of clypeus as seen in profile concave; mandible without teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands white; T1 with posterior hairband and/or lateral patch; T2–T4 posterior hairbands on terga on most of its width wide, multiple layers of hairs covering most of the marginal zone; T5 posterior hairband on most of its width absent; T5–T6 pubescence on disc white; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Flower visitation. *Indigofera monophylla*.

Distribution. See map Fig. 30D.

Phenology. June (1 record).

Etymology. The specific epithet is an adjective that refers to the female mandibles that are without teeth.

***Megachile (Austrochile) enoda* Leijs sp. nov.**

urn:lsid:zoobank.org:act:A2C04603-0495-4E6B-AF9C-38BFD480E4A4

Figure 31A–D

Examined specimens. Holotype, ♀, WAM (E16806), WA, Exmouth (21.9336°S: 114.1264°E), 22/09/1985, McMillan, R.P., *Frankenia*.

Diagnosis. The female of this species can be recognised by the following combination of characters: mandible without teeth; T2–T4 posterior hairbands wide; T5 posterior hairbands narrow; T5–T6 with extensive white pubescence on discs; integument of T5 posteriorly, T6 entirely orange/red. Male unknown.

Female. Holotype: Body length 7.9 mm; wing length 5.1 mm; head width 3 mm; metasoma length/width ratio 1.26. Relative head measurements: OOD 14.5; IOD 17; VW 11; UID 60; LID 52; face upper/lower width ratio 1.15.

Structure. Body size small (<9 mm); ventral margin of clypeus crenulate; ventral half of clypeus as seen in profile concave; mandible without teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands white; T1 with posterior hairband and/or lateral patch;

posterior hairbands on terga on most of its width wide, multiple layers of hairs covering most of the marginal zone; T5 posterior hairband on most of its width absent; T5–T6 with extensive white pubescence on disc; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs different from general body colour; integument of T5 posteriorly and of T6 orange/red.

Flower visitation. *Frankenia*.

Distribution. See map Fig. 31D.

Phenology. September (1 record).

Etymology. The specific epithet is an adjective that refers to the female mandibles that are without teeth.

***Megachile (Austrochile) falcicula* Leijs sp.**

nov.

urn:lsid:zoobank.org:act:EA056055-A79C-4CCC-9796-C35B5382A120

Figure 32A–I

Examined specimens. Holotype, ♂, WAM (E17570), WA, 10 km ESE Meedo HS (25.6991°S: 114.7175°E), 23/08/1980, Howard, C.A. & Houston, T.F. Allotype, ♀, WAM (E22545), WA, 10 km ESE Meedo HS (25.6991°S: 114.7175°E), 23/08/1980, Howard, C.A. & Houston, T.F. **Other specimens.** 1 male, 2 females.

Diagnosis. The female of this species can be recognised by the following combination of characters: terga with wide posterior hairbands present on T2–T5; T6 with white pubescence. The male of this species can be recognised by the following combination of characters: fore leg femur ventrally almost bare posteriorly with fine line of very short white pubescence; all tibia and tarsus orange; S1 median process sickle shaped; T6 medial teeth widely separated, carina multi-dentate and bilobed.

Male. Holotype: Body length 9.1 mm; wing length 6.1 mm; head width 3.3 mm; hind tarsus/tibia ratio 1.15.

Structure. Body size intermediate (9–12 mm); last antennal segment flattened and little wider than previous segment; ventral margin of mandible without projection-not expanded; mandible with three teeth; hypostomal area not modified; fore legs not modified; coxa with anteriorly directed projection, projection shorter than coxa width; tarsus hardly flattened, ventrally with bristles and/or nodules; hind leg tarsus longer than tibia; S1 median subapical process lateral compressed; T6 medial teeth widely separated, more than length of tooth, robust, carina multi-dentate and bilobed.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with long erect white pubescence; fore leg femur ventrally almost bare, some sparse erect hairs; posterior hairbands on terga pre-

sent; general colour of tergal hair bands off-white or straw-coloured; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs orange, red or brown; femur same as body colour; fore tarsus without black dots; T6 integument black.

Female. Allotype: Body length 9.3 mm; wing length 6.2 mm; head width 3.1 mm; metasoma length/width ratio 1.25. Relative head measurements: OOD 16; IOD 15; VW 13; UID 61; LID 55; face upper/lower width ratio 1.11.

Structure. Body size intermediate (9–12 mm); ventral margin of clypeus shallowly emarginate with small medium projection; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands white; T1 with posterior hairband and/or lateral patch; T2–T5 posterior hairbands on terga on most of its width wide, multiple layers of hairs covering most of the marginal zone; T5 pubescence on disc restricted to postero-medial area; T6 pubescence on disc white; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Association of sexes. Based on collecting data and similarities in pubescence patterns.

Flower visitation. *Eremophila crenulata*.

Distribution. See map Fig. 32I.

Phenology. February (1 record), August (4 records).

Etymology. The specific epithet is an adjective that refers to the spine on S1 which is sickle shaped.

***Megachile (Austrochile) fennelli* Leijs sp. nov.**

urn:lsid:zoobank.org:act:57D9FDA3-7B95-4989-A8FE-B4FFC4087E6F

BOLD-BIN (AUSBS): ACD1451

Figure 33A–G

Examined specimens. Holotype, ♂, SAMA (32-46708), SA, Wintinna Station Dead Finish Bank (27.5513°S: 134.0517°E), 13/08/2021, R. Leijs & K. Hogendoorn, *Eremophila freelingii*. Allotype, ♀, SAMA (32-46707), SA, Wintinna Station nr Tierny Hill (27.8026°S: 134.0941°E), 10/08/2021, R. Leijs & K. Hogendoorn, *Eremophila freelingii*. **Other specimens.** 1 female, 5 males.

Diagnosis. The female of this species can be recognised by the following combination of characters: T1 hairband present only laterally; T2–T3 hairband complete; T3 hairband medially orange; pubescence on T4–T6 forming broad orange patch. The male of this species can be recognised by the following combination of characters: T4 apical hairband medially orange, laterally white; T5

with broad orange patch of pubescence; T6 medial teeth short and widely separated, carina almost smooth.

Male. Holotype: Body length 10.3 mm; wing length 6.4 mm; head width 3.2 mm; hind tarsus/tibia ratio 1.00.

Structure. Body size intermediate (9–12 mm); antennae not modified; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area not modified; fore legs not modified; coxa without projection, occasionally with small nodule; projection shorter than coxa width; tarsus not modified; hind leg tarsus longer than tibia; S1 median subapical process absent; T6 medial teeth widely separated, more than length of tooth, robust, carina almost smooth.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with long erect white pubescence; fore leg femur ventrally almost bare, some sparse erect hairs; posterior hairbands on terga present; general colour of tergal hair bands white; T4 hairband medially orange, and laterally white; T5 with broad orange patch of pubescence; T6 pubescence short, dark coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs black or dark brown; femur same as body colour; fore tarsus without black dots; T6 integument black.

Female. Allotype: Body length 8.3 mm; wing length 6 mm; head width 2.9 mm; metasoma length/width ratio 1.23. Relative head measurements: OOD 18; IOD 17; VW 12; UID 65; LID 59; face upper/lower width ratio 1.10.

Structure. Body size small (<9 mm); ventral margin of clypeus shallowly emarginate with small medium projection; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands off-white or straw-coloured; T1 with posterior hairband and/or lateral patch; posterior hairbands on T2–T3 on most of its width narrow, almost single line of branched hairs emerging from apical margin of marginal zone; T5 posterior hairband absent; T5–T6 pubescence on disc entirely orange; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Association of sexes. Confirmed using DNA data.

Flower visitation. *Eremophila freelingii*.

Distribution. See map Fig. 33G.

Phenology. August (4 records), September (3 records), October (3 records).

Etymology. The specific epithet refers to the Fennell family of Wintinna Station, which hosted multiple surveys. Wintinna is the type locality of the species.

Megachile (Austrochile) ferruginea Leijs sp. nov.

urn:lsid:zoobank.org:act:E1B7E304-F125-4CDD-ACCC-1480D65865DE

BOLD-BIN (AUSBS): ACC9517

Figure 34A–D

Examined specimens. Holotype, ♀, WAM (E112645), WA, Cane River CP (22.0142°S: 115.6314°E), 28/06/2011, R. Leijs, *Tephrosia*.

Diagnosis. The female of this species can be recognised by the following combination of characters: mandible with one tooth; scape and all legs orange; whole body pubescence extensively orange. Male unknown.

Female. Holotype: Body length 13.6 mm; wing length 8.7 mm; head width 4.1 mm; metasoma length/width ratio 1.68. Relative head measurements: OOD 14; IOD 14; VW 12; UID 56; LID 52; face upper/lower width ratio 1.08.

Structure. Body size intermediate (9–12 mm); ventral margin of clypeus crenulate; ventral half of clypeus as seen in profile concave; mandible with one tooth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga absent, general colour of hair bands orange; T1 predominantly orange/brown; posterior hairbands on terga on most of its width wide, multiple layers of hairs covering most of the marginal zone; T5 posterior hairband on most of its width absent; T5–T6 pubescence on disc entirely orange or gold; scopa orange.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae orange; legs different from general body colour; T6 integument orange/red.

Flower visitation. *Tephrosia*.

Distribution. See map Fig. 34D.

Phenology. June (1 record).

Etymology. The specific epithet is an adjective that refers to the overall red habitus of the species.

Megachile (Austrochile) flamea Leijs sp. nov.

urn:lsid:zoobank.org:act:A6225EEF-86BD-4B50-88E0-AF5E31042F79

Figure 35A–D

Examined specimens. Holotype, ♀, WAM (E22534), WA, Hamersley Range (22.3738°S: 118.4675°E), 27/08/1971, Houston, T.F., *Corchorus*.

Diagnosis. The female of this species can be recognised by the following combination of characters: integument

colour of head and thorax black, antennae, metasoma and legs orange; all pubescence orange.

Female. Holotype: Body length 8.1 mm; wing length 5.5 mm; head width 3 mm; metasoma length/width ratio 1.13. Relative head measurements: OOD 18; IOD 15; VW 13; UID 65; LID 49; face upper/lower width ratio 1.33.

Structure. Body size small (<9 mm); ventral margin of clypeus crenulate and shallowly emarginate with small medium projection; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands orange; T1 with posterior hairband and/or lateral patch; posterior hairbands on terga on most of its width wide, multiple layers of hairs covering most of the marginal zone; T5 posterior hairband on most of its width absent; T5–T6 pubescence on disc entirely orange or gold; scopa light straw-coloured or orange.

Colouration. Integument of head, mesosoma black, metasoma orange; peduncle of antennae orange; legs same as general body colour; T6 integument orange/red.

Flower visitation. *Corchorus*.

Distribution. See map Fig. 35D.

Phenology. August (1 record).

Etymology. The specific epithet is an adjective that refers to excessively red habitus of the species.

***Megachile (Austrochile) frankeniae* Leijs sp. nov**

rn:lsid:zoobank.org:act:BE41E441-23E8-4244-BA37-5F08F8EED731

BOLD-BIN (AUSBS): AGD4389

Figure 36A–D

Examined specimens. Holotype, ♀, SAMA for BOLD (32-46778), SA, Bon Bon Stn, South Mungillio (30.8751°S: 135.4461°E), 04/01/2023, R. Leijs & K. Hogendoorn, *Frankenia*. **Other specimens.** 1 female.

Diagnosis. The female of this species can be recognised by the following combination of characters: T2–T4 posterior hairbands wide; T5 posterior hairband absent; T5–T6 with white pubescence on discs. Male unknown.

Female. Holotype: Body length 9.5 mm; wing length 5.9 mm; head width 3.4 mm; metasoma length/width ratio 1.29. Relative head measurements: OOD 14; IOD 16; VW 15; UID 60; LID 50; face upper/lower width ratio 1.20.

Structure. Body size intermediate (9–12 mm); ventral margin of clypeus crenulate and shallowly emarginate with small medium projection; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands white; T1 with posterior hairband and/or lateral patch; T2–T4 posterior hairbands on most of its width wide, multiple layers of hairs covering most of the marginal zone; T5 posterior hairband on most of its width absent; T5–T6 pubescence on disc white; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; tibia and tarsus brown; T6 integument black.

Flower visitation. *Frankenia*.

Distribution. See map Fig. 36D.

Phenology. January (2 records).

Etymology. The specific epithet refers to *Frankenia* sp. on which the females of this species were collecting pollen.

***Megachile (Austrochile) fulvopilosa* Leijs & King sp. nov.**

urn:lsid:zoobank.org:act:B5399D1C-A1FA-4D03-A51E-A8693A57CB56

BOLD-BIN (AUSBS): AEC2547

Figure 37A–L

Examined specimens. Holotype, ♂, QM (T260272), QLD, 25 km SW of Laura (15.7783°S: 144.375°E), 07/03/2017, R. Leijs. Allotype, ♀, MV (HYM 70992), QLD, Westwood (23.6161°S: 150.1485°E), 27/01/1924, A.N. Burns. **Other specimens.** 8 males, 1 female.

Diagnosis. The female of this species can be recognised by the following combination of characters: ventral margin of clypeus broadly emarginate; integument colour of head and thorax black, scape, T5–T6, and legs orange; T2–T3 hairbands only present laterally; T3–T6 with extensive orange pubescence. The male of this species can be recognised by the following combination of characters: fore leg femur ventrally with transverse depression medially and basally with round patch of dense white pubescence; T6 medial teeth very close, carina broadly bilobed.

Male. Holotype: Body length 15 mm; wing length 8.7 mm; head width 4.25 mm; hind tarsus/tibia ratio 1.32.

Structure. Body size large (>12 mm); last antennal segment flattened and little wider than previous segment; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area with robust process below base of mandible; fore leg tibia and tarsus modified; coxa with posteriorly or downwardly directed projection, projection shorter than coxa width; tarsus hardly flattened, ventrally with bristles and/or nodules; hind leg tarsus longer than tibia; S1 median subapical process a small protrusion or spine; T6 medial teeth close, less than length of tooth, robust, carina bilobed.

Pubescence. Mandible ventrally with patch of dense pubescence; hypostomal area with patch of dense curved pubescence; posterior hairbands on terga present; T1 with orange pubescence; general colour of tergal hair bands orange; T6 pubescence completely orange.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs orange, red or brown; femur different from body colour; fore tarsus without black dots; T6 integument black.

Female. Allotype: Body length 13.9 mm; wing length 7.9 mm; head width 3.9 mm; metasoma length/width ratio 1.20. Relative head measurements: OOD 17; IOD 17; VW 14; UID 60; LID 50; face upper/lower width ratio 1.20.

Structure. Body size large (>12 mm); ventral margin of clypeus deeply emarginate; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process absent.

Pubescence. T1 predominantly orange/brown; T2–T3 hairbands only present laterally; T3–T6 pubescence on disc entirely orange or gold; scopa light straw-coloured.

Colouration. Integument of head, mesosoma, and metasoma black; peduncle of antennae orange; legs different from general body colour; T6 integument orange/red.

Flower visitation. No records.

Distribution. See map Fig. 37L.

Phenology. December (3 records), January (5 records), March (3 records).

Biology. A cluster of eight resin brood cells has been found attached to the bark of a tree. See: https://www.brisbaneinsects.com/brisbane_bees/Resin-DauberBee.htm. The link contains images of the brood cells and adults reared from them.

Etymology. The specific epithet is an adjective that refers to the red pubescence in both males and females. Rayment labelled some of the specimens as types of *Megachile fulvopilosa* but did not describe them. This name has been retained.

***Megachile (Austrochile) glatzi* Leijs sp. nov.**

urn:lsid:zoobank.org:act:E23DE198-FA0D-4339-9B9A-B92014F01487

Figure 38A–D

Examined specimens. Holotype, ♀, SAMA (32-46782), SA, Flinders Chase NP Kangaroo Island (35.8017°S: 136.8396°E), 07/02/2023, R. Leijs & K. Hogendoorn, *Phyllota pleurandroides*. **Other specimens.** 6 females.

Diagnosis. The female of this species can be recognised by the following combination of characters: ventral margin of clypeus broadly emarginate, with open fringe of orange setae; T2–T4 with narrow, white posterior hair-

bands, T5 posterior hairband absent; T6 and posterior third of T5 with white pubescence. Male unknown.

Female. Holotype: Body length 9.5 mm; wing length 6 mm; head width 3 mm; metasoma length/width ratio 1.44. Relative head measurements: OOD 13; IOD 14; VW 14; UID 58; LID 54; face upper/lower width ratio 1.07.

Structure. Body size intermediate (9–12 mm); ventral margin of clypeus broadly emarginate with ventral margin partly projected; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process absent.

Pubescence. Ventral margin of clypeus with open fringe of orange setae; posterior hairbands on terga present on one or more segments, general colour of hair bands white; T1 with posterior hairband and/or lateral patch; T2–T4 posterior hairbands on terga on most of its width narrow, almost single line of branched hairs emerging from apical margin of marginal zone; T5 posterior hairband on most of its width absent; T5–T6 pubescence on disc white; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Flower visitation. *Phyllota pleurandroides*.

Distribution. See map Fig. 38D.

Phenology. January (1 record), February (5 records), October (1 record).

Etymology. The specific epithet refers to Richard Glatz, resident entomologist on Kangaroo Island, in recognition of his service to entomology. He also collected some specimens of this species.

***Megachile (Austrochile) hamoni* Leijs sp.**

nov.

urn:lsid:zoobank.org:act:4ACE5A9B-D661-446D-B724-8620C453EA39

Figure 39A–D

Examined specimens. Holotype, ♀, WAM (E18036), WA, North Tarin Rock Reserve (32.9908°S: 118.2306°E), 18/12/1987, T.F. Houston, *Daviesia teretifolia*? **Other specimens.** 21 females.

Diagnosis. The female of this species can be recognised by the following combination of characters: ventral margin of clypeus smooth, shallowly emarginate with small median nodule; T2–T4 with narrow posterior hairbands; T5 hairband only present laterally; T6 hairs white. Male unknown.

Female. Holotype (WAM 18036): Body length 9 mm; wing length 5.3 mm; head width 3.4 mm; metasoma length/width ratio 1.19. Relative head measurements: OOD 14; IOD 14.5; VW 10; UID 59; LID 48; face upper/lower width ratio 1.23.

Structure. Body size intermediate (9–12 mm); ventral margin of clypeus smooth; shallowly emarginate with small medium projection with ventral margin partly projected; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands white; T1 with posterior hairband and/or lateral patch; T2–T4 posterior hairbands on terga on most of its width narrow, almost single line of branched hairs emerging from apical margin of marginal zone; T5 posterior hairband on most of its width absent; T5–T6 pubescence on disc white; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Flower visitation. *Phyllota phyllicoides*, *Pultenaea*, *P. acerosa*, *Calytrix tetragona*, *Gompholobium*, *Scaevola ramosissima*, *Daviesia teretifolia*?

Distribution. See map Fig. 39D.

Phenology. October (2 records), November (9 records), December (3 records), January (5 records), February (2 records), March (1 record).

Etymology. The specific epithet refers to Howard Hamon, to acknowledge his valuable editing of the photographic images in this study.

***Megachile (Austrochile) helvicauda* Leijs sp. nov.**

urn:lsid:zoobank.org:act:62A1738B-D435-4E6F-8E03-EB999CBBA420

Figure 40A–D

Examined specimens. Holotype, ♀, WAM (E22544), WA, 70–75 km ENE of Norseman (31.9563°S: 122.4633°E), 10/11/1978, Houston, T.F. *et al.*, *Eremophila caerulea*.

Diagnosis. The female of this species can be recognised by the following combination of characters: T2–T4 posterior hairbands wide laterally, narrower medially; T5 hairband absent, some straw-coloured hairs present on marginal zone; T6 with straw-coloured pubescence. Male unknown.

Female. Holotype: Body length 8.7 mm; wing length 5.6 mm; head width 3.3 mm; metasoma length/width ratio 1.30. Relative head measurements: OOD 15; IOD 15; VW 13; UID 58; LID 51; face upper/lower width ratio 1.14.

Structure. Body size small (<9 mm); ventral margin of clypeus shallowly emarginate with small medium projection; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands white; T1 with posterior hairband and/or lateral patch; posterior hairbands on terga on most of its width narrow, almost single line of hairs emerging from apical margin of marginal zone; T5 posterior hairband on most of its width absent, pubescence on disc almost lacking; T6 pubescence on disc straw-coloured or light brown; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; legs same as general body colour; T6 integument black.

Flower visitation. *Eremophila caerulea*.

Distribution. See map Fig. 40D.

Phenology. November (1 record).

Etymology. The specific epithet is an adjective that refers to the pale-yellow pubescence on T6 of the female.

***Megachile (Austrochile) helvola* Leijs sp. nov.**

urn:lsid:zoobank.org:act:267479BE-8535-43A4-A550-AB53C866E7BB

Figure 41A–G

Examined specimens. Holotype, ♂, WAM (E22373), WA, 10 km ESE Meedo HS (25.6991°S: 114.7175°E), 23/08/1980, Howard, C.A. & Houston, T.F., *Calytrix oldfieldii*. Allotype, ♀, WAM (E22376), WA, 10 km ESE Meedo HS (25.6991°S: 114.7175°E), 23/08/1980, Howard, C.A. & Houston, T.F., *Calytrix oldfieldii*. Other specimens. 2 males, 5 females.

Diagnosis. The female of this species can be recognised by the following combination of characters: mandible with five teeth; clypeus with smooth midline and viewed laterally convex at dorsal part; T2–T5 with wide posterior hairbands; T6 pubescence brown; scopa pale-yellow. The male of this species can be recognised by the following combination of characters: fore legs not modified; T6 medial teeth short and robust, widely separated, carina multi-dentate and bilobed.

Male. Holotype: Body length 10 mm; wing length 5.9 mm; head width 3.3 mm; hind tarsus/tibia ratio 1.35.

Structure. Body size intermediate (9–12 mm); last antennal segment flattened and little wider than previous segment; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area with shallow hypostomal carina, without spine; fore legs not modified; coxa with anteriorly directed projection, projection shorter than coxa width; tarsus not modified; hind leg tarsus longer than tibia; S1 median subapical process a small protrusion or spine; T6 medial teeth widely separated, more than length of tooth, short, carina multi-dentate and bilobed.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with long erect white pubescence; fore leg femur ventrally almost bare, some sparse erect hairs; posterior hairbands on terga pre-

sent; general colour of tergal hair bands white; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs black or dark brown; femur same as body colour; fore tarsus without black dots; T6 integument black.

Female. Allotype: Body length 9.3 mm; wing length 6.5 mm; head width 3.3 mm; metasoma length/width ratio 1.35. Relative head measurements: OOD 15; IOD 11; VW 12; UID 59; LID 55; face upper/lower width ratio 1.07.

Structure. Body size intermediate (9–12 mm); ventral margin of clypeus shallowly emarginate with small medium projection; ventral half of clypeus as seen in profile concave; mandible with five teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands white; T1 with posterior hairband and/or lateral patch; T2–T5 posterior hairbands on terga on most of its width wide, multiple layers of hairs covering most of the marginal zone; T5–T6 pubescence on disc brown; scopa light straw-coloured or pale yellow.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Association of sexes. Based on collecting data and similarities in pubescence patterns and integument colour.

Flower visitation. *Calytrix oldfieldii*, *Schoenia cassiniana*.

Distribution. See map Fig. 41G.

Phenology. August (9 records).

Etymology. The specific epithet is an adjective that refers to the pale yellow scopa in this species.

***Megachile (Austrochile) houstoni* Leijs & King sp. nov.**

urn:lsid:zoobank.org:act:9A4D6974-7B00-43DE-BCC2-85F9382FABE4

Figure 42A–E

Examined specimens. Holotype, ♂, WAM (E22538), WA, 70 mi E of Onslow (21.6391°S: 116.2019°E), 24/08/1971, Houston, T.F., *Ptilotus*.

Diagnosis. The male of this species can be recognised by the following combination of characters: fore legs tarsus hardly modified, but with one black dots and grey patches; T3–T5 discs with adpressed pubescence and same straw-coloured colour as posterior hairbands, T2 disc almost without pubescence appearing as black band; T6 medial teeth large; carina multi-dentate. Female unknown.

Male. Holotype: Body length 10.9 mm; wing length 6.8 mm; head width 3.5 mm; hind tarsus/tibia ratio 1.50.

Structure. Body size intermediate (9–12 mm); last antennal segment flattened and little wider than previous segment; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area not modified; fore legs not modified; coxa with anteriorly directed projection, projection shorter than coxa width; tarsus hardly modified, but with one or more black dots; hind leg tarsus longer than tibia; S1 median subapical process a small protrusion or spine; T6 medial teeth distance similar to length of tooth, teeth slender, carina multi-dentate.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with long erect white pubescence; fore leg femur ventrally almost bare, some sparse erect hairs; posterior hairbands on terga present; general colour of tergal hair bands off-white or straw-coloured; T2 disc almost without pubescence appearing as black band; T3–T5 discs with adpressed straw-coloured pubescence; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs black or dark brown; femur same as body colour; fore tarsus with one black dot; T6 integument black.

Flower visitation. *Ptilotus*.

Distribution. See map Fig. 42E.

Phenology. August (1 record).

Etymology. The specific epithet refers to Terry Houston, to acknowledge his contributions to bee research in Australia. He also collected the type of this species.

***Megachile (Austrochile) hudsoni* Leijs sp. nov.**

urn:lsid:zoobank.org:act:2439683B-CF00-48AD-8E45-946BDA28DEA9

Figure 43A–G

Examined specimens. Holotype, ♂, WAM (E22405), WA, 4.5 km SSW of Peak Charles National Park (32.9208°S: 121.1425°E), 19/10/1985, Houston, T.F., *Gompholobium*. Allotype, ♀, SAMA (32-035149), SA, Mobella Stn, edge Mobing Lake (30.0837°S: 133.0955°E), 01/11/2016, P. Hudson & H. Atkin, *Gunniopsis* & *Frankenia*. **Other specimens.** 17 males, 1 female.

Diagnosis. The female of this species can be recognised by the following combination of characters: T2–T4 posterior hairbands wide, straw-coloured; T5 posterior hairband absent; integument T5 posterior half and most of T6 red, pubescence white. The male of this species can be recognised by the following combination of characters: fore legs not modified; T6 integument orange, medial teeth robust and close, carina very wide, 3/5 of tergal width, with large spines on each side and two smaller inner spines.

Male. Holotype: Body length 9.6 mm; wing length 5.6 mm; head width 3.2 mm; hind tarsus/tibia ratio 1.24.

Structure. Body size intermediate (9–12 mm); antennae not modified; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area not modified; fore legs not modified; coxa with posteriorly or downwardly directed projection, projection shorter than coxa width; tarsus not modified; hind leg tarsus longer than tibia; S1 median subapical process absent; T6 medial teeth close, less than length of tooth, robust, carina multi-dentate.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with long erect white pubescence; fore leg femur ventrally almost bare, some sparse erect hairs; posterior hairbands on terga present; general colour of tergal hair bands white; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen apart from T6 black; middle and hind legs orange, red or brown; femur different from body colour; fore tarsus without black dots; T6 integument red or orange.

Female. Allotype: Body length 8.1 mm; wing length 5.5 mm; head width 3.1 mm; metasoma length/width ratio 1.43. Relative head measurements: OOD 15; IOD 17; VW 14; UID 60; LID 53; face upper/lower width ratio 1.13.

Structure. Body size small (<9 mm); ventral margin of clypeus shallowly emarginate with small medium projection; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands off-white or straw-coloured; T1 with posterior hairband and/or lateral patch; T2–T4 posterior hairbands on terga straw-coloured, on most of their width wide, multiple layers of hairs covering most of the marginal zone; T5 posterior hairband on most of its width absent; T5–T6 pubescence on disc white; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, apart from T5 posteriorly and T6, black; peduncle of antennae black; legs different from general body colour; integument T5 posterior half and most of T6 orange/red.

Association of sexes. Confirmed using DNA data.

Flower visitation. small pea flowers, *Scaevola depauperata*, *Gastrolobium*, *G. spinosum*, *G. oxylobioides*, *Pultenaea affinis*, *neurocalyx*, *P. boormanii*, *Calytrix longiflora*, *Olearia subspicata*, *Phyllota phyllicoides*, *Daviesia leptophylla*.

Distribution. See map Fig. 43G.

Phenology. April (1 record), May (1 record), August (1 record), September (1 record), October (9 records), November (6 records), December (1 record).

Etymology. The specific epithet is named after Peter Hudson who collected males and females of this species and provided DNA data that associated the sexes.

Megachile (Austrochile) kirbyana Cockerell, 1906

Figure 44A–G

Megachile kirbyana Cockerell, 1906, p.537.

Chalicodoma (Austrochile) subferox Meade-Waldo, 1915, p.333 syn. nov.

The holotypes of *kirbyana* (♂, BMNH Hym. 17.a.2372) and *subferox* (♀, BMNH Hym. 17.a.2349) were examined and are in good condition. They share the same type localities. The sexes were associated using collecting data and similarities in integument colours.

Examined specimens. Redescription, ♂, WAM (E18327), WA, Watheroo National Park, NW corner (30.1833°S: 115.7333°E), 15/11/1997, Houston, T. F., *Jacksonia*, Redescription, ♀, WAM (E22512), WA, 14 km SE of Perth, Kenwick (32.0294°S: 115.9803°E), 19/11/1981, Houston, T. F., *Gompholobium aristatum*. **Other specimens.** 19 males, 11 females.

Diagnosis. The female of this species can be recognised by the following combination of characters: T2–T3 posterior hairband interrupted medially; T5 posterior hairband absent; posterior third of T5 and the entirety of T6 and with orange pubescence; S1 with spine on posterior margin. The male of this species can be recognised by the following combination of characters: fore legs not modified; T5 with triangular shaped patch of white pubescence; T6 integument red with extensive white pubescence; T6 medial teeth robust, carina multi-dentate.

Male. Redescription. Body length 11.6 mm; wing length 6.8 mm; head width 3.8 mm; hind tarsus/tibia ratio 1.26.

Structure. Body size intermediate (9–12 mm); antennae not modified; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area not modified; fore legs not modified; coxa with anteriorly directed projection, projection shorter than coxa width; tarsus not modified; hind leg tarsus longer than tibia; S1 median subapical process a small spine; T6 medial teeth close, less than length of tooth, robust, carina multi-dentate.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with long erect white pubescence; fore leg femur ventrally almost bare, some sparse erect hairs; posterior hairbands on terga present; general colour of tergal hair bands white; T5 with triangular shaped patch of white pubescence; T6 pubescence extensive, short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs orange, red or brown; fore tarsus without black dots; T6 integument red or orange.

Female. Redescription. Body length 10.2 mm; wing length 6.8 mm; head width 3.8 mm; metasoma length/width ratio 1.26. Relative head measurements: OOD 12; IOD 14; VW 13; UID 56; LID 50; face upper/lower width ratio 1.12.

Structure. Body size intermediate (9–12 mm); ventral margin of clypeus crenulate; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process present.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands white; T1 with posterior hairband and/or lateral patch; T2–4 posterior hairbands on terga on most of its width narrow, almost single line of branched hairs emerging from apical margin of marginal zone; T5 posterior hairband on most of its width absent, pubescence on disc restricted to posterior third, similar in colour to T6; T6 pubescence on disc entirely orange or gold; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Association of sexes. Based on collecting data and similarities in integument colours.

Flower visitation. *Gompholobium shuttleworthii*, *G. aristatum*, *Calytrix formosa*, *C. strigosa*, *Jacksonia*, *J. racemosa*, *J. horrida*, *Beaufortia elegans*?, *Pityrodia oldfieldii*, *Gastrolobium*, *Verreauxia reinwardtii*.

Distribution. See map Fig. 44G.

Phenology. October (9 records), November (17 records), January (5 records), February (1 record).

***Megachile (Austrochile) lobata* Leijs sp. nov.**

urn:lsid:zoobank.org:act:A7822DC9-EBBE-41FF-8CB4-20602DFCF35C

Figure 45A–F

Examined specimens. Holotype, ♂, MAGNT (I011699), NT, Henbury Stn McMinn Ck (24.3682°S: 132.7727°E), 20/10/2022, R. Leijs, *Dicrastylis lewellinii*. **Other specimens.** 1 male.

Diagnosis. The male of this species can be recognised by the following combination of characters: ventral margin of mandible with median projection; fore leg femur ventrally entirely covered in long dense white pubescence, tibia and tarsus modified; T6 with robust widely separated medial teeth, carina robust and bilobed. Female unknown.

Male. Holotype: Body length 9.5 mm; wing length 6 mm; head width 3.2 mm; hind tarsus/tibia ratio 0.80.

Structure. Body size intermediate (9–12 mm); last antennal segment flattened and little wider than previous segment; ventral margin of mandible with median projection; mandible with three teeth; hypostomal area with shallow hypostomal carina, without spine; fore leg tibia and tarsus modified; coxa with anteriorly directed projection, projection as long as, or longer than, coxa width; tarsus slightly flattened, ventrally with bristles and/or nodules; hind leg tarsus as long as, or shorter than, tibia; S1 median subapical process laterally compressed and projected downwards; T6 medial teeth widely separated, more than length of tooth, robust or short, carina bilobed.

Pubescence. Mandible ventrally with patch of dense pubescence; hypostomal area with patch of dense curved pubescence; fore leg femur ventrally entirely covered with white pubescence; posterior hairbands on terga present; general colour of tergal hair bands white; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs femur black or dark brown, tibia and tarsus orange red or brown; femur same as body colour; fore tarsus without black dots; T6 integument black.

Flower visitation. *Dicrastylis lewellinii*.

Distribution. See map Fig. 45F.

Phenology. October (2 records).

Etymology. The specific epithet is an adjective that refers to the downward projection on S1.

***Megachile (Austrochile) lucidacincta* Leijs sp. nov.**

urn:lsid:zoobank.org:act:7D2EA306-9B5B-429C-9322-BB351F3D54E6

Figure 46A–E

Examined specimens. Holotype, ♂, AM (K.273322), QLD, 24 km SW Charleville (26.5319°S: 146.0356°E), 28/08/2009, M. Batley, *Eremopila gilesii*. **Other specimens.** 2 males.

Diagnosis. The male of this species can be recognised by the following combination of characters: T2–T5 marginal zone translucent; T6 medial teeth short, widely separated, carina multi-dentate or bilobed, pubescence on disc sparse, short, and white. Female unknown.

Male. Holotype: Body length 8.5 mm; wing length 6 mm; head width 3.1 mm; hind tarsus/tibia ratio 1.12.

Structure. Body size small (< 9 mm); last antennal segment flattened and little wider than previous segment; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area not modified; fore legs not modified; coxa with anteriorly directed projection, projection shorter than coxa width; tarsus not modified; hind leg tarsus longer than tibia; S1 median subapical process a small protrusion

or spine; T6 medial teeth widely separated, more than length of tooth, short, carina multi-dentate or bilobed.

Pubescence. Mandible ventrally with patch of dense pubescence; hypostomal area with long erect white pubescence; posterior hairbands on terga present; general colour of tergal hair bands off-white or straw-coloured; T6 pubescence sparse, short, white coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs black or dark brown; femur same as body colour; fore tarsus without black dots; T2–T5 marginal zone translucent; T6 integument black.

Flower visitation. *Eremophila gilesii*.

Distribution. See map Fig. 46E.

Phenology. August (3 records).

Etymology. The specific epithet is an adjective that refers to the translucent posterior margins of the terga.

***Megachile (Austrochile) mandibularis* Leijs sp. nov.**

urn:lsid:zoobank.org:act:73515D87-B003-4AE9-887F-0266BE895E25

Figure 47A–D

Examined specimens. Holotype, ♀, WAM (E18098), WA, 12 km NE Giles, Rawlinson Range (24.8513°S: 127.9108°E), 13/01/1990, Houston, T.F. & Harvey, M.S.

Diagnosis. The female of this species can be recognised by the following combination of characters: mandible with three teeth, basal tooth (Te3) large, clypeus ventral margin concave, T4–T5 without posterior hairbands but entirely cover in short straw-coloured pubescence, pubescence T6 white. Male unknown.

Female. Holotype: Body length 8.9 mm; wing length 6.4 mm; head width 3.2 mm; metasoma length/width ratio 1.30. Relative head measurements: OOD 15; IOD 16; VW 19; UID 56; LID 55; face upper/lower width ratio 1.02.

Structure. Body size small (<9 mm); ventral margin of clypeus smooth; ventral half of clypeus as seen in profile flat; mandible with three teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga absent, general colour of hair bands white; T1 with posterior hairband and/or lateral patch; posterior hairbands on terga on most of its width narrow, almost single line of branched hairs emerging from apical margin of marginal zone; T4–T5 posterior hairband on most of its width absent, pubescence on disc different in colour to T6, short, straw-coloured; T6 pubescence on disc white; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Flower visitation. No records.

Distribution. See map Fig. 47D.

Phenology. January (1 record).

Etymology. The specific epithet is an adjective that refers to the extraordinary shape of the mandibles in the female of this species.

***Megachile (Austrochile) maxillaris* Leijs sp. nov.**

urn:lsid:zoobank.org:act:C24F864F-DD1F-4820-8CEE-849C2ED3C38E

BOLD-BIN (AUSBS): AEC4675

Figure 48A–I

Examined specimens. Holotype, ♂, SAMA (32-37540), SA, Great Victoria Desert (29.0067°S: 130.026°E), 20/09/2017, R. Leijs. Allotype, ♀, SAMA (32-40806), SA, Clifton Hills Stn (27.2117°S: 139.7460°E), 02/09/2018, R. Leijs. **Other specimens.** 16 males, 18 females.

Diagnosis. The female of this species can be recognised by the following combination of characters: T2–T4 posterior hairbands wide, pubescence white; T5–T6 covered with short adpressed branched white pubescence, T5 also with long widely spaced stiff orange setae. The male of this species can be recognised by the following combination of characters: ventral margin of mandible with triangular median projection; fore tarsus modified, ventrally with dense short black pubescence. T6 medial teeth robust, carina multi-dentate.

Male. Holotype: Body length 11 mm; wing length 6.2 mm; head width 3.5 mm; hind tarsus/tibia ratio 1.00.

Structure. Body size intermediate (9–12 mm); last antennal segment flattened and little wider than previous segment; ventral margin of mandible with median projection; mandible with three teeth; hypostomal area with shallow hypostomal carina, without spine; fore leg tibia and tarsus modified; coxa with anteriorly directed projection, projection shorter than coxa width; tarsus hardly flattened, ventrally with bristles and/or nodules; hind leg tarsus about as long as tibia; S1 median subapical process lateral compressed; T6 medial teeth intermediate, similar to length of tooth, robust, carina multi-dentate.

Pubescence. Mandible ventrally with patch of dense pubescence; hypostomal area with long erect white pubescence; fore leg femur ventrally almost bare, some sparse erect hairs; fore tarsus ventrally with dense short black pubescence; posterior hairbands on terga present; general colour of tergal hair bands white; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs femur black or dark brown, tibia and tarsus orange red or brown; femur same as body colour; fore tarsus without black dots; T6 integument black.

Female. Allotype: Body length 11.3 mm; wing length 6.9 mm; head width 3.6 mm; metasoma length/width ratio 1.32. Relative head measurements: OOD 16; IOD 14; VW 14; UID 59; LID 54; face upper/lower width ratio 1.09.

Structure. Body size intermediate (9–12 mm); ventral margin of clypeus shallowly emarginate with small medium projection; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands white; T1 with posterior hairband and/or lateral patch; T2–T4 posterior hairbands on terga on most of its width wide, multiple layers of hairs covering most of the marginal zone; T5 posterior hairband on most of its width absent; T5–T6 covered with short adpressed branched white pubescence; T5 also with long widely spaced stiff orange setae.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Association of sexes. Confirmed using DNA data.

Flower visitation. *Daviesia*, *Swainsona burkitii*, *S. phacoides*, *Cullen patens*, *Dicrastylis exsuccosa*, *Eremophila sturtii*, *Eremophila* sp.

Distribution. See map Fig. 48I.

Phenology. April (1 record), August (4 records), September (25 records), October (5 records), November (1 record).

Etymology. The specific epithet is an adjective that refers to the median projection on the ventral margin of the mandibles of males.

***Megachile (Austrochile) modesta* Smith, 1862**

Figure 49A–I

Megachile recisa Cockerell, 1913, p. 534. syn. nov.

Megachile simpliciformis Cockerell, 1918, p. 119. syn. nov.

Megachile kirbiella Rayment, 1953, p. 35. syn. nov.

Holotype ♀ of *modesta* in BMNH. The specimen is in reasonable condition, the left antenna is broken, apical and preapical tarsomeres of right and left hind tarsus are missing.

Holotype ♂ of *recisa* in QM. The specimen is in reasonable condition, missing are left antenna and preapical and apical tarsomeres from right fore tarsus.

Holotype of *simpliciformis* in QM. The specimen is in good condition but dirty, left antenna is missing.

Holotype ♀ of *kirbiella* in ANIC. The specimen is in very poor condition, right antenna, hind leg and hind wing

missing; right fore wing glued to locality label; metasoma, right mid leg glued to pin (the latter were remounted on card).

Examined specimens. Redescription, ♂, QM (T258687), QLD, Moreton Island, Mount Tempest (27.1407°S: 153.4034°E), 20/09/1997, J. Skevington. Redescription, ♀, ANIC (32-163448), NSW, National Park (34.0610°S: 151.0381°E), 14/02/1926, Mackerras. **Other specimens.** 18 males, 17 females.

Diagnosis. The female of this species can be recognised by the following combination of characters: T2–T4 posterior hairbands narrow; T5 pubescence orange-brown; T6 pubescence with a slightly paler, straw-coloured patch. The male of this species can be recognised by the following combination of characters: fore legs modified, femur ventrally with two narrow lines of short white pubescence, tarsus flattened with one black dot; T6 medial teeth slender and widely separated, carina bilobed.

Male. Redescription. Body length 12.1 mm; wing length 7 mm; head width 3.85 mm; hind tarsus/tibia ratio 1.14.

Structure. Body size large (>12 mm); antennae not modified; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area not modified; fore legs only tarsus modified; coxa with posteriorly or downwardly directed projection, projection shorter than coxa width; tarsus flattened; hind leg tarsus as long or shorter than tibia; S1 median subapical process a small protrusion or spine; T6 medial teeth widely separated, more than length of tooth, slender, carina bilobed.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with long erect white pubescence; fore leg femur ventrally with two longitudinal lines of white dense pubescence; posterior hairbands on terga present; general colour of tergal hair bands white; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs black or dark brown; femur same as body colour; fore tarsus with one black dot; T6 integument black.

Female. Redescription. Body length 11.1 mm; wing length 6.7 mm; head width 3.7 mm; metasoma length/width ratio 1.43. Relative head measurements: OOD 15; IOD 14; VW 13; UID 56; LID 53; face upper/lower width ratio 1.06.

Structure. Body size small (<9 mm) to intermediate (9–12 mm); ventral margin of clypeus crenulate; ventral half of clypeus as seen in profile flat or convex; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands white; T1 with posterior hairband and/or lateral patch; T1–T4 posterior hairbands on terga on most of its width

narrow, almost single line of branched hairs emerging from apical margin of marginal zone; T5 posterior hair-band on most of its width absent; T5–T6 pubescence on disc consisting of orange or golden patch, slightly paler on T6; scopa white or light straw-coloured.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Association of sexes. Based on collection data and similarities in pubescence patterns and integument colour.

Flower visitation. *Daviesia*, *Pultenaea tuberculata*, *P. elliptica*, *Phyllota phyllicoides*, *Gompholobium*, *Dillwynia*, *Kunzea ambigua*.

Distribution. See map Fig. 49I.

Phenology. August (2 records), September (10 records), October (2 records), November (9 records), December (6 records), January (6 records), February (1 record).

***Megachile (Austrochile) monteithi* Leijs & King sp. nov.**

urn:lsid:zoobank.org:act:83327CCE-43A2-4544-A09C-9F2FB72819A4

BOLD-BIN (AUSBS): ACD1393

Figure 50A–L

Examined specimens. Holotype, ♂, SAMA (32-46689), SA, Bon Bon Station (30.2934°S: 135.4180°E), 26/10/2010, R. Leijs, *Swainsona* sp. West5513. Allotype, ♀, SAMA (32-46660), SA, Everard Park Station (Mimili) (26.985°S: 132.705°E), 04/11/1970, T.F. Houston, *Crotalaria dissitiflora*. **Other specimens.** 1 female, 7 males.

Diagnosis. The female of this species can be recognised by the following combination of characters: ventral margin of clypeus crenulate; T2–4 posterior hairbands wide, light straw-coloured, T5 posterior hairband only present laterally; T6 pubescence white. The male of this species can be recognised by the following combination of characters: fore leg modified, metatarsus dorsally with large extended lobe, tarsus with three black dots; T6 medial teeth robust, carina crenulate or multi-dentate.

Male. Body length 11.1 mm; wing length 6.7 mm; head width 3.8 mm; hind tarsus/tibia ratio 1.05.

Structure. Body size intermediate (9–12 mm); last antennal segment flattened and little wider than previous segment; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area with large hypostomal carina, including spine; fore leg tibia and tarsus modified; coxa with anteriorly directed projection, projection as long as or longer than coxa width; metatarsus with dorsally extended lobe; hind leg tarsus as long or shorter than tibia; S1 median subapical process lateral compressed; T6 medial teeth widely separated, more than length of tooth, robust, carina crenulate or multi-dentate.

Pubescence. Mandible ventrally with patch of dense pubescence; hypostomal area with patch of dense curved pubescence; fore leg femur ventrally with two longitudinal lines of white dense pubescence; posterior hairbands on terga present; general colour of tergal hair bands white; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs orange, red or brown; fore tarsus with three black dots; T6 integument black.

Female. Body length 10.4 mm; wing length 7.3 mm; head width 3.6 mm; metasoma length/width ratio 1.29. Relative head measurements: OOD 15; IOD 16; VW 14; UID 59; LID 54; face upper/lower width ratio 1.09.

Structure. Body size intermediate (9–12 mm); ventral margin of clypeus crenulate; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands off-white or straw-coloured; T1 with posterior hairband and/or lateral patch; T2–T5 posterior hairbands on terga on most of its width wide, multiple layers of hairs covering most of the marginal zone; T5–T6 pubescence on disc white; scopa white or light straw-coloured.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae brown; legs different from general body colour; T6 integument black.

Association of sexes. Confirmed using DNA data.

Flower visitation. *Eremophila*, *Helipterum floribundum*, *Velleia glabrata*, *Crotalaria dissitiflora*, *Swainsona* sp. West5513.

Distribution. See map Fig. 50L.

Phenology. September (3 records), October (4 records), November (3 records).

Etymology. The specific epithet is in memory and honour of Geoff Monteith, a distinguished and internationally recognised entomologist.

***Megachile (Austrochile) multispina* Leijs sp. nov.**

urn:lsid:zoobank.org:act:2BC8DB78-D55F-4A54-A03A-AD549BA68921

BOLD-BIN (AUSBS): AEC5850

Figure 51A–I

Examined specimens. Holotype, ♂, SAMA (32-37545), SA, Great Victoria Desert (29.0067°S: 130.2600°E), 20/09/2017, R. Leijs. Allotype, ♀, SAMA (32-37512), SA, Great Victoria Desert (29.0067°S: 130.2600°E), 20/09/2017, R. Leijs. **Other specimens.** 2 males, 9 females.

Diagnosis. The female of this species can be recognised by the following combination of characters: mandible

with one tooth; ventral margin of clypeus smooth and slightly crenulate; T1–T5 posterior hairbands wide, white; T6 pubescence white. The male of this species can be recognised by the following combination of characters: fore legs not modified; T6 medial teeth robust, carina with long spines.

Male. Holotype: Body length 8 mm; wing length 5.1 mm; head width 2.8 mm; hind tarsus/tibia ratio 1.21.

Structure. Body size small (<9 mm); antennae not modified; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area not modified; fore legs not modified; coxa without projection, occasionally with small nodule; projection shorter than coxa width; tarsus not modified; hind leg tarsus longer than tibia; S1 median subapical process absent; T6 medial teeth intermediate, similar to length of tooth, robust, carina multi-dentate.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with long erect white pubescence; fore leg femur ventrally almost bare, some sparse erect hairs; posterior hairbands on terga present; general colour of tergal hair bands white; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs black or dark brown; femur same as body colour; fore tarsus without black dots; T6 integument red or orange.

Female. Allotype: Body length 8.4 mm; wing length 5.3 mm; head width 3 mm; metasoma length/width ratio 1.33. Relative head measurements: OOD 15; IOD 16; VW 11; UID 58; LID 48; face upper/lower width ratio 1.21.

Structure. Body size small (<9 mm); ventral margin of clypeus smooth and crenulate; ventral half of clypeus as seen in profile flat or concave; mandible with one tooth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands white; T1 with posterior hairband and/or lateral patch; T2–T5 posterior hairbands on terga on most of its width wide, multiple layers of hairs covering most of the marginal zone; T5 pubescence on disc restricted to medial triangular white patch; T6 pubescence on disc white; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Association of sexes. Confirmed using DNA data.

Flower visitation. No records.

Distribution. See map Fig. 51l.

Phenology. April (7 records), September (3 records), November (3 records).

Etymology. The specific epithet refers to the transverse carina on T6 of males, bearing multiple spines.

***Megachile (Austrochile) nigricauda* Leijs sp. nov.**

urn:lsid:zoobank.org:act:811768A8-F367-4452-9589-5991DAE083AA

Figure 52A–D

Examined specimens. Holotype, ♀, WAM (E18040), WA, North Tarin Rock Reserve (32.9908°S: 118.2306°E), 18/12/1987, Houston, T.F., *Daviesia teretifolia*?

Diagnosis. The female of this species can be recognised by the following combination of characters: T2–T4 posterior hairbands narrow, T1–T5 discs closely covered in black setae; T6 pubescence on disc dark brown/black. Male unknown.

Female. Holotype: Body length 8.1 mm; wing length 5.4 mm; head width 3.3 mm; metasoma length/width ratio 1.09. Relative head measurements: OOD 16; IOD 15; VW 13; UID 60; LID 45; face upper/lower width ratio 1.33.

Structure. Body size small (<9 mm); ventral margin of clypeus shallowly emarginate with small medium projection; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands white; T1 with posterior hairband and/or lateral patch; T2–T4 posterior hairbands on terga on most of its width narrow, almost single line of branched hairs emerging from apical margin of marginal zone; T5 posterior hairband absent; T1–T5 discs closely covered in black setae; T6 pubescence on disc dark brown/black; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Flower visitation. *Daviesia teretifolia*?

Distribution. See map Fig. 52D.

Phenology. December (1 record).

Etymology. The specific epithet is an adjective that refers to the black hairs on the female T6 of the species.

***Megachile (Austrochile) nigriscopa* Leijs sp. nov.**

urn:lsid:zoobank.org:act:42A76408-049F-4974-B5DC-F53D40E7C9D1

BOLD-BIN (AUSBS): AEC2364

Figure 53A–I

Examined specimens. Holotype, ♂, SAMA (32-45522), SA, Great Victoria Desert (29.0067°S: 130.2604°E), 01/09/2015, R. Leijs & J. Forrest, *Daviesia*. Allotype, ♀, SAMA (32-45537), SA, Great Victoria Desert (29.0067°S:

130.2604°E), 01/09/2015, R. Leijs & J. Forrest, *Daviesia*. *Other specimens*. 2 males, 1 female.

Diagnosis. Both sexes: T1 with long white pubescence, pubescence on remaining terga black, hairbands absent. The female of this species can be recognised by the black or dark brown scopa. The male of this species can be recognised by the following combination of characters: fore legs not modified; T6 medial teeth robust, carina multi-dentate.

Male. Holotype: Body length 12.1 mm; wing length 7.3 mm; head width 3.8 mm; hind tarsus/tibia ratio 1.30.

Structure. Body size intermediate (9–12 mm) to large (>12 mm); last antennal segment flattened and little wider than previous segment; ventral margin of mandible with basal projection, mandible with three teeth; hypostomal area with shallow hypostomal carina, without spine; fore legs not modified; projection shorter than coxa width; tarsus not modified; hind leg tarsus longer than tibia; S1 median subapical process robust; T6 medial teeth intermediate, similar to length of tooth, robust, carina multi-dentate.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with patch of dense curved pubescence; fore leg femur ventrally almost bare, some sparse erect hairs; posterior hairbands on terga absent, T1 with white pubescence; T2–T6 pubescence short, black.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs black or dark brown; femur same as body colour; fore tarsus without black dots; T6 integument black.

Female. Allotype: Body length 11.4 mm; wing length 7.3 mm; head width 3.6 mm; metasoma length/width ratio 1.40. Relative head measurements: OOD 15; IOD 16; VW 12; UID 58; LID 50; face upper/lower width ratio 1.16.

Structure. Body size intermediate (9–12 mm); ventral margin of clypeus crenulate; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga absent; T1 entirely white; T2–T6 pubescence on disc black; scopa black or brown.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Association of sexes. Based on collecting data and similarities in pubescence patterns and integument colour.

Flower visitation. *Daviesia*, also caught in vehicle net.

Distribution. See map Fig. 53I.

Phenology. August (2 records), September (3 records).

Etymology. The specific epithet is an adjective that refers to the black scopa in females of this species.

***Megachile (Austrochile) paula* Leijs sp. nov.**

urn:lsid:zoobank.org:act:491E50F4-FEC2-44D2-A238-79F66CBB0E20

Figure 54A–E

Examined specimens. Holotype, ♂, SAMA (32-46665), SA, Mt Remarkable nr Melrose (32.8021°S: 138.1618°E), 07/10/1977, T.F. Houston, *Goodenia*. *Other specimens*. 3 males.

Diagnosis. The male of this species can be recognised by the following combination of characters: fore legs not modified; T1–T5 marginal zones transparent; T5–T6 integument colour red; S5 ventral margin broadly concave. Female unknown.

Male. Holotype: Body length 7.2 mm; wing length 4.9 mm; head width 2.7 mm; hind tarsus/tibia ratio 1.07.

Structure. Body size small (<9 mm); antennae not modified; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area not modified; fore legs not modified; coxa without projection, occasionally with small nodule; projection shorter than coxa width; tarsus not modified; hind leg tarsus longer than tibia; S1 median subapical process absent; S5 ventral margin broadly concave; T6 medial teeth widely separated, more than length of tooth, short, carina bilobed.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with long erect white pubescence; fore leg femur ventrally almost bare, some sparse erect hairs; posterior hairbands on terga present; general colour of tergal hair bands off-white or straw-coloured; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs black or dark brown; femur same as body colour; fore tarsus without black dots; T1–T5 marginal zones transparent; T5–T6 integument red or orange.

Flower visitation. *Goodenia*.

Distribution. See map Fig. 54E.

Phenology. October (3 records), November (1 record).

Etymology. The specific epithet is an adjective that refers to the size of the species, 'paula' meaning 'little one'.

***Megachile (Austrochile) planimala* Leijs sp. nov.**

urn:lsid:zoobank.org:act:38EEF318-5887-4C73-8737-6E396D2EDE01

BOLD-BIN (AUSBS): AGD4392

Figure 55A–D

Examined specimens. Holotype, ♀, ANIC (32-072199), NT, Todd River 9 km NE of Alice Springs (23.6333°S:

133.8833°E), 10/10/1978, J.C. Cardale. *Other specimens*. 5 females.

Diagnosis. The female of this species can be recognised by the following combination of characters: mandible flat and broad; ventral margin of clypeus partly projected, crenulate and shallowly emarginate; T2–T5 posterior hairbands very wide, straw-coloured; T6 pubescence light straw-coloured. Male unknown.

Female. Holotype: Body length 8.5 mm; wing length 5.8 mm; head width 3.2 mm; metasoma length/width ratio 1.50. Relative head measurements: OOD 16; IOD 17; VW 13; UID 63; LID 55; face upper/lower width ratio 1.15.

Structure. Body size intermediate (9–12 mm); ventral margin of clypeus crenulate and shallowly emarginate with ventral margin partly projected; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands off-white or straw-coloured; T1 with posterior hairband and/or lateral patch; posterior hairbands on terga on most of its width wide, multiple layers of hairs covering most of the marginal zone; T5 posterior hairband on most of its width present, pubescence on disc different in colour to T6, openly spaced, orange; T6 pubescence on disc light straw-coloured; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Flower visitation. *Swainsona purpurea*, *Crotalaria*.

Distribution. See map Fig. 55D.

Phenology. October (2 records).

Etymology. The specific epithet is an adjective that refers to the flat broad mandible of the female of this species.

***Megachile (Austrochile) plebeia* Leijs sp. nov.**

urn:lsid:zoobank.org:act:03DC91CD-358B-4971-AB8C-D5B5FA020ABA

BOLD-BIN (AUSBS): AEC3927

Figure 56A–G

Examined specimens. Holotype, ♂, SAMA (32-37531), SA, Rodinia Rd Great Victoria Desert -29.0504°S: 129.543°E), 18/09/2017, R. Leijs. Allotype, ♀, SAMA (32-37522), SA, Rodinia Rd nr airstrip Great Victoria Desert (29.1153°S: 129.5410°E), 21/09/2017, R. Leijs. *Other specimens*. 3 females.

Diagnosis. The female of this species can be recognised by the following combination of characters: ventral margin of clypeus widely crenulate, with few long orange setae; supraclypeal area shiny, openly punctate; T2–T4 with white posterior hairband which are narrower in the middle; T5 posterior hairband absent; T6 pubescence

brown. The male of this species can be recognised by the following combination of characters: mandible ventrally with dense white pubescence; hypostomal area with two longitudinal rows of adpressed white pubescence most ventral row wide, upper row narrow; T6 medial teeth short, widely separated, carina shallowly bilobed.

Male. Holotype: Body length 8.6 mm; wing length 5.1 mm; head width 2.55 mm; hind tarsus/tibia ratio 1.07.

Structure. Body size small (<9 mm); antennae not modified; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area not modified; fore legs not modified; coxa with anteriorly directed projection, projection shorter than coxa width; tarsus hardly flattened, ventrally with bristles and/or nodules; hind leg tarsus longer than tibia; S1 median subapical process a small protrusion or spine; T6 medial teeth widely separated, more than length of tooth, short, carina bilobed.

Pubescence. Mandible ventrally with patch of dense white pubescence; hypostomal area with two longitudinal rows of adpressed white pubescence most ventral row wide, upper row narrow; fore leg femur ventrally almost bare, some sparse erect hairs; posterior hairbands on terga present; general colour of tergal hair bands white; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs femur black or dark brown, tibia and tarsus orange red or brown; femur same as body colour; fore tarsus without black dots; T6 integument black.

Female. Allotype: Body length 8.5 mm; wing length 5.6 mm; head width 2.6 mm; metasoma length/width ratio 1.46. Relative head measurements: OOD 20; IOD 19; VW 16; UID 70; LID 60; face upper/lower width ratio 1.17.

Structure. Body size small (<9 mm); ventral margin of clypeus crenulate; ventral half of clypeus as seen in profile convex; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands white; T1 with posterior hairband and/or lateral patch; T2–T4 posterior hairbands on terga on most of its width narrow, almost single line of branched hairs emerging from apical margin of marginal zone; T5 posterior hairband on most of its width absent, pubescence on disc almost lacking; T6 pubescence on disc brown; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Association of sexes. Confirmed using DNA data.

Flower visitation. *Eremophila scoparia*.

Distribution. See map Fig. 56G.

Phenology. September (2 records), October (2 records), November (1 records).

Etymology. The specific epithet is an adjective meaning 'common', and refers to the habitus, which is typical for the species in this group.

***Megachile (Austrochile) preissi* Cockerell, 1910**

Figure 57A–L

Megachile preissi Cockerell, 1910, p.110.

Chalicodoma (Hackeriapis) preissi (Cockerell), Michener, 1965, p.198.

Examined specimens. Holotype, ♀, New Holland, Orient, Preiss, in Museum der Humboldt Universität, Berlin. The type is in good condition. Redescription, ♀, WAM (E18143), WA, Eneabba (29.8213°S: 115.2692°E), 18/12/1989, Mc Millan, R. P., *Verreauxia*. Allotype, ♂, WAM (E109871), WA, Star Swamp (31.8575°S: 115.7602°E), 05/01/2018, Prendergast, K. S. *Other specimens.* 18 males, 13 females.

Diagnosis. The female of this species can be recognised by the following combination of characters: ventral margin of clypeus deeply emarginate with large lateral projections and baso-medial projection; T2–T4 posterior hairbands narrow, white; T5 posterior hairband absent; T5–T6 with orange pubescence. The male of this species can be recognised by the following combination of characters: mandibles expanded basally, ventrally with dense pubescence; hypostomal area with two longitudinal rows of adpressed dense white pubescence; fore leg femur ventrally with two patches of short openly placed white pubescence, coxa covered with robust posterior directed setae; T6 medial teeth short, widely separated, carina bilobed.

Male. Holotype: Body length 9.2 mm; wing length 4.8 mm; head width 2.95 mm; hind tarsus/tibia ratio 1.00.

Structure. Body size intermediate (9–12 mm); last antennal segment flattened and little wider than previous segment; ventral margin of mandible with basal projection or with median projection; mandible with three teeth; hypostomal area with shallow hypostomal carina, without spine; fore leg tibia and tarsus modified; coxa with anteriorly directed projection, projection shorter than coxa width; tarsus hardly flattened, ventrally with bristles and with several black patches; hind leg tarsus longer than tibia; S1 median subapical process a small protrusion or spine; T6 medial teeth widely separated, more than length of tooth, short, carina bilobed.

Pubescence. Mandible ventrally with patch of dense pubescence; hypostomal area with patch of dense curved pubescence; fore leg femur ventrally with two patches of short openly placed white dense pubes-

cence; posterior hairbands on terga present; general colour of tergal hair bands off-white or straw-coloured; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs femur black or dark brown, tibia and tarsus orange red or brown; femur different from body colour; fore tarsus with two black dots; T6 integument red or orange.

Female. Allotype: Body length 8.5 mm; wing length 5.1 mm; head width 2.9 mm; metasoma length/width ratio 1.21. Relative head measurements: OOD 15; IOD 15; VW 16; UID 59; LID 52; face upper/lower width ratio 1.13.

Structure. Body size small (<9 mm); ventral margin of clypeus deeply emarginate with large lateral projections and baso-medial projection; ventral half of clypeus as seen in profile convex; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands white; T1 with posterior hairband and/or lateral patch; posterior hairbands on terga on most of its width narrow, almost single line of branched hairs emerging from apical margin of marginal zone; T5 posterior hairband on most of its width absent, pubescence on disc similar in colour to T6, orange; T6 pubescence on disc consisting of orange or golden patch; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae brown; legs same as general body colour; T6 integument black.

Association of sexes. Based on collection data.

Flower visitation. *Jacksonia*, *Eucalyptus*, pea flowers.

Distribution. See map Fig. 57L.

Phenology. October (1 record), November (2 records), December (4 records), January (25 records).

***Megachile (Austrochile) prendergastae* Leijs sp. nov.**

urn:lsid:zoobank.org:act:A2047D3C-31AC-4520-8AAD-7B046FB6CC05

BOLD-BIN (AUSBS): AEC6285

Figure 58A–G

Examined specimens. Holotype, ♂, WAM (E109832), WA, Wireless Hill (32.0311°S: 115.8264°E), 21/01/2017, Prendergast, K.S. Allotype, ♀, WAM (E114121), WA, Kings Park (31.96231°S: 115.83151°E), 12/12/2017, Prendergast, K.S. *Other specimens.* 7 males.

Diagnosis. The female of this species can be recognised by the following combination of characters: ventral margin of clypeus smooth and crenulate; T2–T5 posterior hairbands wide, straw-coloured T6 pubescence white, with sparse straw-coloured-coloured setae. The male of this species can be recognised by the following combination of characters: fore legs not modified; T5 with

narrow line of straw-coloured pubescence medially; T6 medial teeth robust, carina with 6–8 sharp spines.

Male. Holotype: Body length 8.1 mm; wing length 5.2 mm; head width 3.15 mm; hind tarsus/tibia ratio 1.27.

Structure. Body size small (<9 mm); antennae not modified; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area not modified; fore legs not modified; coxa without projection, occasionally with small nodule; projection shorter than coxa width; tarsus not modified; hind leg tarsus longer than tibia; S1 median subapical process absent; T6 medial teeth intermediate, similar to length of tooth, robust, carina multi-dentate.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with long erect white pubescence; fore leg femur ventrally almost bare, some sparse erect hairs; posterior hairbands on terga present; general colour of tergal hair bands white, off-white or straw-coloured; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs femur black or dark brown, tibia and tarsus orange red or brown; fore tarsus without black dots; T6 integument red or orange.

Female. Allotype: Body length 7.9 mm; wing length 5.1 mm; head width 3.1 mm; metasoma length/width ratio 1.18. Relative head measurements: OOD 15; IOD 15; VW 10; UID 59; LID 50; face upper/lower width ratio 1.18.

Structure. Body size small (<9 mm); ventral margin of clypeus smooth and crenulate; ventral half of clypeus as seen in profile concave; mandible with one tooth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands off-white or straw-coloured; T1 with posterior hairband and/or lateral patch; T2–T5 posterior hairbands on terga on most of its width wide, multiple layers of hairs covering most of the marginal zone; T5 pubescence on disc almost lacking, some small sparsely placed short brown setae; T6 pubescence on disc white; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Association of sexes. Confirmed using DNA data.

Flower visitation. No records.

Distribution. See map Fig. 58G.

Phenology. September (1 record), November (2 records), December (1 record), January (5 records).

Etymology. The specific epithet refers to Kit Prendergast, in recognition of her work on native bees, and the collector of the holotype of the species.

Megachile (Austrochile) quadricincta Leijs sp. nov.

urn:lsid:zoobank.org:act:83431A6E-E68F-47A9-A725-5CD1CA595F93

BOLD-BIN (AUSBS): AEC1816

Figure 59A–D

Examined specimens. Holotype, ♀, SAMA (32-37521), SA, Rodinia Rd Great Victoria Desert (29.0041°S: 129.5440°E), 22/09/2017, R. Leijs.

Diagnosis. The female of this species can be recognised by the following combination of characters: T1–T4 with white posterior hairband, narrow medially and wider laterally; T5 posterior hairband absent; T6 with short openly spaced brown pubescence. Male unknown.

Female. Holotype: Body length 7.8 mm; wing length 5.4 mm; head width 2.6 mm; metasoma length/width ratio 1.44. Relative head measurements: OOD 19; IOD 19; VW 15; UID 67; LID 58; face upper/lower width ratio 1.16.

Structure. Body size small (<9 mm); ventral margin of clypeus crenulate; ventral half of clypeus as seen in profile flat or convex; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands white; T1 with posterior hairband and/or lateral patch; posterior hairbands on terga on most of its width narrow, almost single line of branched hairs emerging from apical margin of marginal zone; T5 posterior hairband on most of its width absent, pubescence on disc brown; T6 pubescence on disc open, brown; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Flower visitation. No records.

Distribution. See map Fig. 59D.

Phenology. September (1 record).

Etymology. The specific epithet is an adjective that refers to the four narrow tergal hairbands on the posterior margins in females of this species.

Megachile (Austrochile) quinquecincta Leijs sp. nov.

urn:lsid:zoobank.org:act:B2582352-EC12-4E1B-ABAE-99522142084B

BOLD-BIN (AUSBS): AEC5617

Figure 60A–D

Examined specimens. Holotype, ♂, MAGNT (I011700), NT, Wongalara Stn, Australian Wildlife Conservancy (14.1821°S: 134.281°E), 28/05/2012, R. Leijs. *Other specimens.* 1 male.

Diagnosis. The male of this species can be recognised by the following combination of characters: fore legs not modified; T6 lateral and medial teeth robust, carina wide almost on complete width of segment, smooth and slightly crenulated. Female unknown.

Male. Holotype: Body length 11.8 mm; wing length 7.1 mm; head width 3.9 mm; hind tarsus/tibia ratio 1.10.

Structure. Body size intermediate (9–12 mm); antennae not modified; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area not modified; fore legs not modified; coxa without projection, occasionally with small nodule; projection shorter than coxa width; tarsus not modified; hind leg tarsus longer than tibia; S1 median subapical process a small protrusion or spine; T6 medial teeth intermediate, similar to length of tooth, carina wide, almost smooth and slightly crenulated.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with long erect white pubescence; fore leg femur ventrally almost bare, some sparse erect hairs; posterior hairbands on terga present; general colour of tergal hair bands off-white or straw-coloured; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs black or dark brown; femur same as body colour; fore tarsus without black dots; T6 integument black.

Flower visitation. No records.

Distribution. See map Fig. 60D.

Phenology. May (2 records).

Etymology. The specific epithet is an adjective that refers to the five tergal hairbands on the posterior margins in males of this species.

***Megachile (Austrochile) quinquedentata* Leijs sp. nov.**

urn:lsid:zoobank.org:act:52B3510C-FAFE-4D0F-B20B-8463224A4C86

Figure 61A–D

Examined specimens. Holotype, ♀, ANIC (32-163455), WA, Badgingarra NP (30.4484°S: 115.4850°E), 04/11/2021, J. & F. Hort, 14711, *Gastrolobium*.

Diagnosis. The female of this species can be recognised by the following combination of characters: mandible with five teeth, deeply emarginate between Te3 and Te4, mandible relative long and curved with condylar ridge, outer ridge, and acetabular carina about 3/4 mandibular length. T2–T5 with white posterior hairband, the one on T5 narrow in the centre, discs covered in relative long black setae; T6 with short white pubescence and sparse orange setae. Male unknown.

Female. Holotype: Body length 10.4 mm; wing length 6.5 mm; head width 3.6 mm; metasoma length/width ratio 1.31. Relative head measurements: OOD 14; IOD 14.5; VW 15; UID 59; LID 56; face upper/lower width ratio 1.05.

Structure. Body size intermediate (9–12 mm); ventral margin of clypeus shallowly emarginate with small medium projection; ventral half of clypeus as seen in profile flat or convex; mandible with five teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands white; T1 with posterior hairband and/or lateral patch; T2–T5 posterior hairbands on terga on most of their width narrow, almost single line of branched hairs emerging from apical margin of marginal zone, discs covered with long black setae; T5 posterior hairband narrow in the centre; T6 pubescence on disc short, white with sparse orange setae; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Flower visitation. *Gastrolobium*.

Distribution. See map Fig. 61D.

Phenology. November (1 record).

Etymology. The specific epithet is an adjective that refers to the five teeth on the mandibles of females.

***Megachile (Austrochile) recava* Leijs sp. nov.**

urn:lsid:zoobank.org:act:759853A1-805D-4560-A4CE-40DE8A747215

Figure 62A–D

Examined specimens. Holotype, ♀, AM (K.273359), QLD, 12 km South of Charleville (26.5039°S: 146.2156°E), 29/08/2009, M. Batley, *Calytrix longiflora*.

Diagnosis. The female of this species can be recognised by the following combination of characters: ventral margin clypeus with small medial emargination, lateral halves protruding, T3–T4 posterior hairbands obscured by same orange short, branched pubescence on discs; T5 posterior hairband absent; T6 with open simple orange-brown hairs, appearing black in contrast with previous terga. Male unknown.

Female. Holotype: Body length 10.7 mm; wing length 6.8 mm; head width 3.2 mm; metasoma length/width ratio 1.29. Relative head measurements: OOD 15; IOD 16; VW 17; UID 61; LID 58; face upper/lower width ratio 1.05.

Structure. Body size intermediate (9–12 mm); ventral margin of clypeus shallowly emarginate with ventral margin partly projected; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands off-white laterally and orange-straw-coloured medially; T1 with posterior hairband and/or lateral patch; posterior hairbands on terga on most of its width wide, multiple layers of hairs covering most of the marginal zone; T5 posterior hairband on most of its width absent, pubescence on disc different in colour to T6, orange; T6 pubescence on disc openly spaced orange-brown; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Flower visitation. *Calytrix longiflora*.

Distribution. See map Fig. 62D.

Phenology. August (1 record).

Etymology. The specific epithet is an adjective that refers to the broad emarginated ventral margin of the female clypeus.

***Megachile (Austrochile) remotula* Cockerell, 1910**

BOLD-BIN (AUSBS): ACU3781

Figure 63A–L

Megachile remotula Cockerell, 1910, p.112.

Chalicodoma (Austrochile) remotula (Cockerell) Michener, 1965, p.203.

Holotype ♀ of *remotula* in HU. The type specimen is in good condition, the preapical and apical tarsomeres are missing from the left hind tarsus.

Examined specimens. Redescription, ♂, WAM (E22494), WA, 10–13 km NE of Wanneroo (31.6844°S: 115.8764°E), 09/01/1982, Howard, C.A. & Houston, T.F., Redescription, ♀, WAM (E22493), WA, 22 km S. of Perth, Thomsons Lake (32.1505°S: 115.8258°E), 17/01/1981, Houston, T. F., *Astartea fascicularis*. **Other specimens.** 17 males, 35 females.

Diagnosis. The female of this species can be recognised by the following combination of characters: T2–T4 posterior hairbands narrow, white; T5 posterior hairband absent, with large central patch of golden hairs; T6 pubescence entirely orange or gold. The male of this species can be recognised by the following combination of characters: fore legs modified, tarsus with one black dot; T2–T5 integument of postero-lateral corners brown; T6 medial teeth intermediate and robust, carina bilobed.

Male. Redescription. Body length 10.9 mm; wing length 7.2 mm; head width 4.1 mm; hind tarsus/tibia ratio 1.25.

Structure. Body size intermediate (9–12 mm); antennae not modified; ventral margin of mandible without pro-

jection– not expanded; mandible with three teeth; hypostomal area not modified; fore legs only tarsus modified; coxa with posteriorly or downwardly directed projection, projection shorter than coxa width; tarsus flattened; hind leg tarsus longer than tibia; S1 median subapical process a large backwardly directed spine; T6 medial teeth intermediate, similar to length of tooth, robust, carina bilobed.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with long erect white pubescence; fore leg femur ventrally with two longitudinal lines of white dense pubescence; posterior hairbands on terga present; general colour of tergal hair bands white; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs femur brown at basal half, remaining half, tibia and tarsus orange red or brown; fore tarsus with one black dot; T2–T5 integument of postero-lateral corners brown; T6 integument black or red or orange.

Female. Redescription. Body length 10.7 mm; wing length 7.8 mm; head width 4.2 mm; metasoma length/width ratio 1.22. Relative head measurements: OOD 16; IOD 13; VW 13; UID 53; LID 57; face upper/lower width ratio 0.93.

Structure. Body size intermediate (9–12 mm); ventral margin of clypeus crenulate; ventral half of clypeus as seen in profile convex; mandible with four teeth; S1 median subapical process present.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands white; T1 with posterior hairband and/or lateral patch; T2–T4 posterior hairbands on terga on most of its width narrow, almost single line of branched hairs emerging from apical margin of marginal zone; T5 posterior hairband on most of its width absent, disc with large central patch of golden pubescence; T6 pubescence on disc entirely orange or gold; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Flower visitation. *Daviesia*, *Jacksonia furcellata*, *Gompholobium tomentosum*, *Gastrolobium*.

Distribution. See map Fig. 63L.

Phenology. October (8 records), November (12 records), December (7 records), January (14 records), February (5 records).

***Megachile (Austrochile) resinicuna* Leijs & King sp. nov.**

urn:lsid:zoobank.org:act:138ADB8B-75F7-4BDC-9B65-4232B4F06BDC

Figure 64A–F

Examined specimens. Holotype, ♂, WAM (E112661), WA, Wyndham (15.4852°S: 128.1148°E), no date, L.J. Newman.

Diagnosis. The male of this species can be recognised by the following combination of characters: ventral margin of clypeus with three small medial spines, separated by emarginations; fore legs modified, tarsus with two black dots; medial teeth slender and close, carina multi-dentate. Female unknown.

Male. Holotype: Body length 9.6 mm; wing length 6.5 mm; head width 3.6 mm; hind tarsus/tibia ratio 0.80.

Structure. Body size intermediate (9–12 mm); ventral margin of mandible with basal projection or with median projection; mandible with three teeth; ventral margin of clypeus with three small medial spines, separated by emarginations; hypostomal area with large transverse hypostomal carina, including spine; fore leg tibia and tarsus modified; coxa with anteriorly directed projection, projection as long as or longer than coxa width; tarsus flattened; hind leg tarsus as long or shorter than tibia; S1 median subapical process a small protrusion or spine; T6 medial teeth close, less than length of tooth, slender, carina multi-dentate.

Pubescence. Mandible ventrally with patch of dense pubescence; hypostomal area with patch of dense curved pubescence; fore leg femur ventrally almost bare, some sparse erect hairs; posterior hairbands on terga present; general colour of tergal hair bands off-white or straw-coloured; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs black or dark brown; femur different from body colour, brown; fore tarsus with two black dots; T6 integument black.

Flower visitation. No records.

Distribution. see map Fig. 64F.

Phenology. No collection date on label.

Biology. The holotype specimen was reared from a resin pot attached to a twig.

Etymology. The specific epithet is a combination of resin and 'cuna' meaning cradle, referring the resin pot the specimen was reared from.

***Megachile (Austrochile) resinifera* Meade-Waldo, 1915**

BOLD-BIN (AUSBS): AEC5483

Figure 65A–K

Megachile resinifera Meade-Waldo, 1915, p.329.

Chalicodoma (Austrochile) resinifera (Meade-Waldo) Michener, 1965, p.202, 203.

Holotype ♀ of *resinifera* in BMNH. The type specimen is in perfect condition. *Examined specimens.* Redescription, ♂, WAM (E22454), WA, Cowaramup Bay Nat. Park (33.8833°S: 114.9833°E), 28/10/1982, Howard, C.A. & Houston, T.F., *Leptospermum*, Redescription, ♀, WAM (E22466), WA, Boorabbin Rock (31.2036°S: 120.2856°E), 04/10/1981, Houston, T. F. *Other specimens.* 16 males, 15 females.

Diagnosis. The female of this species can be recognised by the following combination of characters: T1–T3 posterior hairbands white; T4–T5 posterior hairbands absent; T6 with large central patch of orange-gold pubescence. The male of this species can be recognised by the following combination of characters: fore legs modified, metatarsus dorsally with posteriorly extended lobe, tarsus with one black dot; T6 medial teeth robust, carina bilobed with laterally directed blunt spines.

Male. Redescription. Body length 12.9 mm; wing length 8.1 mm; head width 4.1 mm; hind tarsus/tibia ratio 1.25.

Structure. Body size large (>12 mm); last antennal segment flattened and little wider than previous segment; ventral margin of mandible without projection-not expanded; mandible with three teeth; hypostomal area not modified; fore legs only tarsus modified; coxa with posteriorly or downwardly directed projection, projection shorter than coxal width; metatarsus dorsally with posteriorly extended lobe; tarsus with one black dot; hind leg tarsus longer than tibia; S1 median subapical process a large backwardly directed spine; T6 medial teeth widely separated, more than length of tooth, robust, carina bilobed with laterally directed blunt spines.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with long erect white pubescence; fore leg femur ventrally almost bare, some sparse erect hairs; posterior hairbands on terga present; general colour of tergal hair bands white; T6 pubescence long, white.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs black or dark brown; femur same as body colour; fore tarsus one black dot; T6 integument black.

Female. Redescription. Body length 13.3 mm; wing length 8.6 mm; head width 4.1 mm; metasoma length/width ratio 1.43. Relative head measurements: OOD 14; IOD 14; VW 13; UID 58; LID 55; face upper/lower width ratio 1.05.

Structure. Body size large (>12 mm); ventral margin of clypeus crenulate; ventral half of clypeus as seen in profile flat or concave; mandible with four teeth; S1 median subapical process present.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands white; T1–T3 with posterior hairbands on terga on most

of its width wide, multiple layers of hairs covering most of the marginal zone; T4–T5 posterior hairbands absent; T5 pubescence on disc different in colour to T6, black; T6 pubescence on disc consisting of large, central orange or golden patch; scopa black or brown.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Association of sexes and biology. Based on their size, and on observations of a collector, R. J. Turner. Meade-Waldo (1915) notes that Turner had observed males and females at a sandy bank, the females burrowing and the males flying around.

Flower visitation. *Jacksonia furcellata*, *Verreauxia reinwardtii*, *Leptospermum*.

Distribution. See map Fig. 65K.

Phenology. October (8 records), November (8 records), December (2 records), January (1 record), February (1 record), March (1 record), April (4 records).

Biology. Based on observations of a collector, R. J. Turner, Meade-Waldo (1915) notes that Turner observed that some of the females carried gum between their mandibles. This behaviour gave rise to the species name. The brood cells are constructed from thick mix of sand grains and resin.

***Megachile (Austrochile) rotnestensis* Rayment, 1934**

Figure 66A–H

Megachile rotnestensis Rayment, 1934, p.209

Megachile subremotula Rayment, 1934, p.210. syn. nov.

Megachile portlandia Rayment, 1953, p.36. syn. nov.

Examined specimens. Redescription, ♂, WAM (E22416), WA, Twin Bays (34.0633°S: 119.7083°E), 27/11/1979, Houston, T. F. & Chapman, A., *Scaevola crassifolia*. Redescription, ♀, WAM (E22415), WA, S side of Dempster Inlet (34.0666°S: 119.6436°E), 01/12/1979, Houston, T. F. & Chapman, A., *Jacksonia lehmannii*. **Other specimens.** 26 males, 32 females.

Diagnosis. The female of this species can be recognised by the following combination of characters: T2–T4 posterior hairbands narrow, white; T5 posterior hairband absent; T5–T6 pubescence entirely orange. The male of this species can be recognised by the following combination of characters: fore legs not modified; lateral corners of terga with integument red; T6 medial teeth robust and close, carina with 8–10 blunt spines.

Male. Redescription. Body length 10.3 mm; wing length 6.7 mm; head width 3.7 mm; hind tarsus/tibia ratio 1.32.

Structure. Body size intermediate (9–12 mm); last antennal segment flattened and little wider than previous seg-

ment; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area not modified; fore legs not modified; coxa with anteriorly directed projection, projection shorter than coxa width; tarsus not modified; hind leg tarsus longer than tibia; S1 median subapical process a small protrusion or spine; T6 medial teeth close, less than length of tooth, robust, carina multi-dentate.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with long erect white pubescence; fore leg femur ventrally almost bare, some sparse erect hairs; posterior hairbands on terga present; tergal hair bands white laterally, orange medially; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs femur black or dark brown, tibia and tarsus orange red or brown; femur different from body colour; fore tarsus without black dots; T6 integument black.

Female. Redescription. Body length 8.9 mm; wing length 6.1 mm; head width 3.4 mm; metasoma length/width ratio 1.25. Relative head measurements: OOD 16; IOD 15; VW 11; UID 62; LID 52; face upper/lower width ratio 1.19.

Structure. Body size intermediate (9–12 mm); ventral margin of clypeus crenulate and shallowly emarginate with small medium projection; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on T2–T4, general colour of hair bands white; T1 with posterior hairband and/or lateral patch; posterior hairbands on terga on most of its width narrow, almost single line of branched hairs emerging from apical margin of marginal zone; T5 posterior hairband on most of its width absent; T5–T6 pubescence on disc entirely orange or gold; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Association of sexes. Based on collection data.

Flower visitation. *Acacia*, *Scaevola crassifolia*, *S. crassifolia*, *Gompholobium*, *Jacksonia lehmannii*, *Westringia dampieri*.

Distribution. See map Fig. 66H.

Phenology. September (9 records), October (6 records), November (10 records), December (8 records).

***Megachile (Austrochile) rufipes* Leijs sp. nov.**

urn:lsid:zoobank.org:act:F2A63563-B074-454B-8BC5-7E788E8C1B83

Figure 67A–G

Examined specimens. Holotype, ♂, WAM (E22509), WA, 2 km WNW of Woolbernup Hill (34.0269°S: 119.6806°E), 29/11/1979, Houston, T.F. Allotype, ♀, WAM (E11628),

WA, Neerabup National Park (31.6644°S: 115.7339°E), 29/01/1979, Houston, T.F., *Jacksonia horrida?*, *Other specimens*. 5 males, 2 females.

Diagnosis. The female of this species can be recognised by the following combination of characters: ventral margin of clypeus with 5 nodules; flagellum brown; T2–T5 posterior hairbands wide, straw-coloured or off-white; T6 pubescence straw-coloured. The male of this species can be recognised by the following combination of characters: fore legs not modified; all tibia and tarsus orange-brown; T6 medial teeth short, rounded and widely separated, carina relatively narrow, multi-lobed.

Male. Holotype. Body length 10.3 mm; wing length 5.6 mm; head width 3.3 mm; hind tarsus/tibia ratio 1.18.

Structure. Body size intermediate (9–12 mm); antennae not modified; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area not modified; fore legs not modified; coxa with anteriorly directed projection, projection shorter than coxa width; tarsus not modified; hind leg tarsus longer than tibia; S1 median subapical process a small protrusion or spine; T6 medial teeth widely separated, more than length of tooth, short, carina multi-dentate or bilobed.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with long erect white pubescence; fore leg femur ventrally almost bare, some sparse erect hairs; posterior hairbands on terga present; general colour of tergal hair bands white; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs orange, red or brown; all tibia and tarsus orange-brown; fore tarsus without black dots; T6 integument black or red or orange.

Female. Allotype. Body length 8.1 mm; wing length 4.5 mm; head width 2.85 mm; metasoma length/width ratio 1.30. Relative head measurements: OOD 16; IOD 15; VW 14; UID 60; LID 55; face upper/lower width ratio 1.09.

Structure. Body size small (<9 mm); ventral margin of clypeus crenulated; ventral half of clypeus as seen in profile convex; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on T2–T5, general colour of hair bands off-white or straw-coloured; T1 with posterior hairband and/or lateral patch; T2–T5 posterior hairbands on terga on most of its width wide, multiple layers of hairs covering most of the marginal zone; T5 pubescence on disc almost absent, some orange branched hairs; T6 pubescence on disc straw-coloured or light brown; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black, flagellum brown; legs different from general body colour; T6 integument black.

Association of sexes. Based on collecting data, and similarities in pubescence and integument colour.

Flower visitation. *Jacksonia horrida?*, *Eremophila ionantha*, *E. scoparia*.

Distribution. See map Fig. 67G.

Phenology. October (2 records), November (5 records), January (1 record).

Etymology. The specific epithet is an adjective that refers to the reddish integument of the tibia and tarsi of the male.

Megachile (Austrochile) rufomaculata **Rayment, 1935**

Figure 68A–H

Examined specimens. Redescription, ♂, AM (K.540068), NSW, Westleigh (33.7150°S: 151.0517°E), 08/11/2000, M. Batley, *Pultenaea elliptica*. Allotype, ♀, AM (K.540061), NSW, Marramarra NP (33.5639°S: 151.0700°E), 15/02/1998, M. Batley, *Pultenaea tuberculata*. *Other specimens*. 11 males, 15 females.

Diagnosis. The female of this species can be recognised by the following combination of characters: clypeus with large anteriorly directed projections; T2–T5 posterior hairbands narrow, white; T6 pubescence white, with intermixed setae. The male of this species can be recognised by the following combination of characters: fore legs only tarsus slightly modified; terga laterally with red integument; T6 medial teeth small and widely separated, carina almost smooth.

Male. Redescription: Body length 9.1 mm; wing length 6.2 mm; head width 3.3 mm; hind tarsus/tibia ratio 1.00.

Structure. Body size small (<9 mm) to intermediate (9–12 mm); antennae not modified; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area not modified; fore legs only tarsus modified; coxa with anteriorly directed projection, projection shorter than coxa width; tarsus flattened; hind leg tarsus longer than tibia; S1 median subapical process a small protrusion or spine; T6 medial teeth widely separated, more than length of tooth, short, carina almost smooth.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with long erect white pubescence; fore leg femur ventrally almost bare, some sparse erect hairs; posterior hairbands on terga present; general colour of tergal hair bands off-white or straw-coloured; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs orange, red or brown; femur different from body colour; fore tarsus without black dots; terga laterally with red integument; T6 integument red or orange.

Female. Allotype: Body length 10.9 mm; wing length 6.3 mm; head width 3.4 mm; metasoma length/width ratio 1.35. Relative head measurements: OOD 16; IOD 14; VW 15; UID 59; LID 61; face upper/lower width ratio 0.97.

Structure. Body size intermediate (9–12 mm); ventral margin of clypeus deeply emarginate with large lateral projections and baso-medial projection; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on T2–T5, general colour of hair bands white; T1 with posterior hairband and/or lateral patch; posterior hairbands on terga on most of its width narrow, almost single line of branched hairs emerging from apical margin of marginal zone; T5 pubescence on disc almost absent, some sparsely spaced short setae; T6 pubescence on disc white; scopa light straw-coloured.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs different from general body colour; T6 integument black or orange/red.

Association of sexes. Based on locality data and similarities of pubescence and integument colour.

Flower visitation. *Pultenaea tuberculata*, *P. ferruginea*, *P. elliptica*.

Distribution. See map Fig. 68H.

Phenology. September (5 records), October (8 records), November (7 records), December (4 records), January (3 records), February (2 records).

***Megachile (Austrochile) silaceacincta* Leijs sp. nov.**

urn:lsid:zoobank.org:act:05ED5CCA-E8CA-4044-A072-3B741DD5362F

BOLD-BIN (AUSBS): AEC4514

Figure 69A–D

Examined specimens. Holotype, ♀, SAMA (32-37554), SA, NW of homestead Andamooka St (30.7086°S: 137.175°E), 04/09/2016, R. Leijs. **Other specimens.** 1 female.

Diagnosis. The female of this species can be recognised by the following combination of characters: T2–T5 posterior hairbands very wide, straw-coloured; T6 with straw-coloured pubescence. Male unknown.

Female. Holotype: Body length 9.5 mm; wing length 6.2 mm; head width 3.2 mm; metasoma length/width ratio 1.18. Relative head measurements: OOD 18; IOD 18; VW 9; UID 67; LID 53; face upper/lower width ratio 1.26.

Structure. Body size intermediate (9–12 mm); ventral margin of clypeus crenulate; ventral half of clypeus as seen in profile convex; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands straw-coloured; T1 with posterior hairband and/or lateral patch; T2–T5 posterior hairbands on terga on most of its width wide, multiple layers of hairs covering most of the marginal zone; T5 pubescence on disc densely covered in short branched orange pubescence; T6 pubescence on disc simple, straw-coloured or light brown; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Flower visitation. No records.

Distribution. See map Fig. 69D.

Phenology. September (2 records).

Etymology. The specific epithet is an adjective that refers to the yellow-ochre coloured hairbands on the terga.

***Megachile (Austrochile) spinalta* Leijs & King sp. nov.**

urn:lsid:zoobank.org:act:24572F14-91B2-41FD-94E7-BE1FA9DDBC63

BOLD-BIN (AUSBS): AEC3869

Figure 70A–L

Examined specimens. Holotype, ♂, SAMA (32-39552), SA, Mamungari (28.9400° S: 129.5400°E), 19/09/2017, B.A. Parslow. Allotype, ♀, SAMA (32-37517), SA, Rodinia Rd Great Victoria Desert (28.9259°S: 129.5380°E), 22/09/2017, R. Leijs. **Other specimens.** 11 males, 21 females.

Diagnosis. The female of this species can be recognised by the following combination of characters: mandible without teeth; posterior hairbands wide, white; T6 pubescence white. The male of this species can be recognised by the following combination of characters: fore leg femur ventrally smooth with two longitudinal lines of dense white pubescence, tibia and tarsus modified, tarsus flattened with 3–4 black dots ventrally; all legs short and robust.

Male. Body length 11.9 mm; wing length 7.3 mm; head width 3.6 mm; hind tarsus/tibia ratio 0.86.

Structure. Body size intermediate (9–12 mm); last antennal segment flattened >1.5 times as wide as previous segment; ventral margin of mandible with basal projection, mandible with three teeth; hypostomal area with large hypostomal carina, including spine; fore leg tibia and tarsus modified; coxa with anteriorly directed projection, projection as long as or longer than coxa width; tarsus flattened; hind leg tarsus as long or shorter than tibia; S1 median subapical process lateral compressed; T6 medial teeth widely separated, more than length of tooth, robust, carina multi-dentate.

Pubescence. Mandible ventrally with patch of dense pubescence; hypostomal area with patch of dense

curved pubescence; fore leg femur ventrally with two longitudinal lines of white dense pubescence; posterior hairbands on terga present; general colour of tergal hair bands white; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs black or dark brown; femur same as body colour; fore tarsus with three or more black dots; T6 integument black.

Female. Body length 11.2 mm; wing length 7.1 mm; head width 3.6 mm; metasoma length/width ratio 1.04. Relative head measurements: OOD 14; IO D 15; VW 13; UID 61; LID 56; face upper/lower width ratio 1.09.

Structure. Body size intermediate (9–12 mm); ventral margin of clypeus crenulate; ventral half of clypeus as seen in profile convex; mandible without teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands white; T1 with posterior hairband and/or lateral patch; posterior hairbands on terga on most of its width wide, multiple layers of hairs covering most of the marginal zone; T5 posterior hairband on most of its width present, pubescence on disc absent; T6 pubescence on disc white; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Association of sexes. Confirmed using DNA data.

Flower visitation. *Calytrix longiflora*, *Dianella longifolia*, *Keraudrenia nephrosperma*, *Goodenia maideniana*, *Velleia discophora*, *Swainsona*, *Dicrastylis exsuccosa*, *Ptilotus*, *Scaevola parviflora*, *Stemodia floribunda*, also yellow pan trap, and blue vane trap.

Distribution. See map Fig. 70L.

Phenology.

July (2 records), August (3 records), September (20 records), October (6 records), November (3 records).

Etymology. The specific epithet refers to Wiebe Hogen-doorn, who assisted with the naming of many bee species. The epithet refers to his surname, which is equivalent to the English 'Highborn', and to the long spine on the fore leg coxa of the males of this species.

***Megachile (Austrochile) tarltoni* Leijs & King sp. nov.**

urn:lsid:zoobank.org:act:CDB17B04-4642-4ACC-94FC-1257DEA55639

BOLD-BIN (AUSBS): AEC1404

Figure 71A–L

Examined specimens. Holotype, ♂, SAMA (32-46695), SA, Port Augusta Arid Land Bot. Garden (32.4618°S: 137.7445°E), 06/04/2022, R. Leijs & K. Hogendoorn, *Cro-*

talaria. Allotype, ♀, SAMA (32-46696), SA, Witchelina Station, Teatree swamp (30.4227°S: 138.0768°E), 21/10/2010, R. Leijs, *Crotalaria*. *Other specimens.* 17 males, 39 females.

Diagnosis. The female of this species can be recognised by the following combination of characters: mandible with tufts of golden hairs at base of Te1 on both sides of outer ridge; T3–T6 with orange pubescence on posterior margins and discs flanked with lighter pubescence laterally. The male of this species can be recognised by the following combination of characters: hypostomal area smooth and shiny with transverse ridge bearing long off-white pubescence; fore leg femur ventrally covered in adpressed white pubescence, tibia ventrally broadened, smooth and without pubescence. S5 posterior margin medially with two little hooks.

Male. Holotype: Body length 9.4 mm; wing length 5.5 mm; head width 3.2 mm; hind tarsus/tibia ratio 1.06.

Structure. Body size intermediate (9–12 mm); last antennal segment flattened and little wider than previous segment; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area with transverse carina; fore leg tibia and tarsus modified; coxa with anteriorly directed projection, projection shorter than coxa width; metatarsus with dorsally extended lobe, tarsus hardly flattened, ventrally with bristles and/or nodules; hind leg tarsus longer than tibia; S1 median subapical process a small protrusion or spine; S5 posterior margin medially with two little hooks; T6 medial teeth intermediate, similar to length of tooth, slender, carina bilobed.

Pubescence. Mandible ventrally with patch of dense pubescence; hypostomal area with long erect white pubescence; fore leg femur ventrally entirely covered with white pubescence, femur ventrally covered in adpressed white pubescence, tibia ventrally broadened, smooth and without pubescence; posterior hairbands on terga present; general colour of tergal hair bands white, off-white or straw-coloured; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs black or dark brown; femur same as body colour; fore tarsus without black dots; T6 integument black.

Female. Allotype: Body length 9 mm; wing length 5.7 mm; head width 3.2 mm; metasoma length/width ratio 1.22. Relative head measurements: OOD 17; IOD 11; VW 13; UID 62; LID 48; face upper/lower width ratio 1.29.

Structure. Body size small (< 9 mm) to intermediate (9–12 mm); ventral margin of clypeus crenulate and shallowly emarginate with small medium projection; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process absent.

Pubescence. Mandible with tufts of golden hairs at base of Te1 on both sides of outer ridge; T1 with posterior hairband and/or lateral patch; T3–T6 with orange pubescence on posterior margins and discs flanked with lighter pubescence laterally; T5 posterior hairband on most of its width absent, pubescence on disc different in colour to T6, straw-coloured; T6 pubescence on disc white, straw-coloured and light brown; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Association of sexes. Confirmed using DNA data.

Flower visitation. *Crotalaria*, *C. dissitiflora*, *Swainsona* sp. West5513, *Jacksonia furcellata*, *J. sternbergiana*, *Grevillea*, *Sida dordifolia*.

Distribution. See map Fig. 71L.

Phenology. January (9 records), February (1 record), March (7 records), April (10 records), May (4 records), June (2 records), July (1 record), August (2 records), September (1 record), October (7 records), November (23 records).

Biology. There are several observations of resin brood pots that are individually attached to twigs in small groups.

Etymology. The specific epithet refers to Tarlton Rayment in recognition of his contributions to the study of Australian bees.

***Megachile (Austrochile) tarsata* Leijs sp. nov.**

urn:lsid:zoobank.org:act:E382355F-BDBB-4E41-B115-DE615F92D1D4

BOLD-BIN (AUSBS): AEC2785

Figure 72A–I

Examined specimens. Holotype, ♂, SAMA (32-39547), SA, Thornby (34.755°S: 139.259°E), 22/09/2018, B. A. Parslow. Allotype, ♀, SAMA (32-37501), SA, Rodinia Rd Great Victoria Desert (29.0445°S: 129.543°E), 21/09/2017, R. Leijs. **Other specimens.** 1 female.

Diagnosis. The female of this species can be recognised by the following combination of characters: ventral margin of clypeus smooth; T2–T5 posterior hairbands wide, white; T6 pubescence white. The male of this species can be recognised by the following combination of characters: mandible ventral margin with basal projection and dense patch of orange-brown pubescence; fore legs modified, tibia broadened apically with wide semi transverse groove; spine on front coxa curved; middle coxa with sharp spine; hind leg apex of tibia ventrally drawn out into a smooth plate covering the tibial spurs; S1 process drawn out in long spine.

Male. Body length 11.8 mm; wing length 7.3 mm; head width 3.7 mm; hind tarsus/tibia ratio 0.84.

Structure. Body size intermediate (9–12 mm); last antennal segment flattened >1.5 times as wide as previous segment; ventral margin of mandible with basal projection, mandible with three teeth; hypostomal area with shallow hypostomal carina, without spine; fore leg tibia and tarsus modified, tibia broadened apically with wide semi transverse groove; spine on front coxa curved anteriorly directed, projection as long as or longer than coxa width; tarsus flattened; middle coxa with sharp spine; hind leg apex of tibia ventrally drawn out in smooth plate covering the tibial spurs; hind leg tarsus as long or shorter than tibia; S1 median subapical process a large backwardly directed spine; T6 medial teeth widely separated, more than length of tooth, robust, carina almost smooth.

Pubescence. Mandible ventrally with patch of dense pubescence; hypostomal area with patch of dense curved pubescence; fore leg femur ventrally entirely covered with white pubescence; posterior hairbands on terga present; general colour of tergal hair bands white; T6 pubescence short, pale coloured or long, white.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs black or dark brown; femur different from body colour; fore tarsus with two black dots; T6 integument black.

Female. Body length 10.1 mm; wing length 7.5 mm; head width 3.9 mm; metasoma length/width ratio 1.15. Relative head measurements: OOD 15; IOD 15; VW 11; UID 59; LID 52; face upper/lower width ratio 1.13.

Structure. Body size intermediate (9–12 mm); ventral margin of clypeus smooth; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on T2–T5, general colour of hair bands white; T1 with posterior hairband and/or lateral patch; T2–T5 posterior hairbands on terga on most of its width wide, multiple layers of hairs covering most of the marginal zone; T5 pubescence on disc almost lacking; T6 pubescence on disc white; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Association of sexes. Confirmed using DNA data.

Flower visitation. No records.

Distribution. See map Fig. 72I.

Phenology. September (2 records).

Etymology. The specific epithet is an adjective that refers to the highly modified fore tarsi of the males.

***Megachile (Austrochile) tridentata* Leijs sp. nov.**

urn:lsid:zoobank.org:act:8FA05988-40D4-425B-9862-855E7CD25E2C

Figure 73A–D

Examined specimens. Holotype, ♀, WAM (E22551), WA, 50 km E of Leonora (28.8863°S: 121.8433°E), 10/09/1982, Houston, T.F. & Hanich, B., *Goodenia pinnatifida*.

Diagnosis. The female of this species can be recognised by the following combination of characters: ventral margin of clypeus smooth; T2–T4 posterior hairbands wide, white; T5 posterior hairband absent; T6 pubescence brown. Male unknown.

Female. Holotype: Body length 10.8 mm; wing length 7.4 mm; head width 3.6 mm; metasoma length/width ratio 1.28. Relative head measurements: OOD 14.5; IOD 15; VW 15; UID 59; LID 57; face upper/lower width ratio 1.04.

Structure. Body size intermediate (9–12 mm); ventral margin of clypeus smooth; ventral half of clypeus as seen in profile concave; mandible with three teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on T2–T4, general colour of hair bands white; T1 with posterior hairband and/or lateral patch; posterior hairbands on terga on most of its width wide, multiple layers of hairs covering most of the marginal zone; T5 posterior hairband on most of its width absent; T5–T6 pubescence on disc short brown; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Flower visitation. *Goodenia pinnatifida*.

Distribution. See map Fig. 73D.

Phenology. September (1 record).

Etymology. The specific epithet is an adjective that refers to the three teeth on the mandibles of females of this species.

Megachile (Austrochile) trinotata Leijs sp. nov.

urn:lsid:zoobank.org:act:F20081BD-5B6D-47D7-A56A-DD6A13ADAB4B

Figure 74A–I

Examined specimens. Holotype, ♂, MAGNT (I011701), NT, Palm Valley, Ranger Stn (24.0646°S: 132.7438°E), 18/10/2022, R. Leijs, B.A. Parslow & G. Brown, on *Swainsona*. Allotype, ♀, WAM (E22532), WA, 70 – 75 km ENE of Norseman (31.9391°S: 122.5122°E), 10/11/1978, Houston, T. F. et al. *Other specimens.* 1 female, 1 male.

Diagnosis. The female of this species can be recognised by the following combination of characters: legs orange apart from femur basally; posterior hairbands wide and orange, orange pubescence on discs of T4 medially and entire on T5–T6. The male of this species can be recognised by the following combination of characters:

mandible ventrally with patch of long dense white pubescence; fore leg tarsus not modified, but with 3–4 black dots ventrally; T6 medial teeth robust and close, carina bilobed.

Male. Holotype: Body length 7.3 mm; wing length 5.5 mm; head width 3.1 mm; hind tarsus/tibia ratio 1.00.

Structure. Body size small (<9 mm); antennae not modified; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area with shallow hypostomal carina, without spine; fore leg tibia and tarsus modified; coxa with anteriorly directed projection, projection shorter than coxa width; tarsus hardly flattened, ventrally with bristles and/or nodules, and 3–4 black dots; hind leg tarsus as long or shorter than tibia; S1 median subapical process a small protrusion or spine; T6 medial teeth close, less than length of tooth, robust, carina bilobed.

Pubescence. Mandible ventrally with patch of long dense white pubescence; hypostomal area with long erect white pubescence; fore leg femur ventrally with two longitudinal lines of white dense pubescence; posterior hairbands on terga present; general colour of tergal hair bands white, off-white or straw-coloured; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs black or dark brown; femur same as body colour; fore tarsus with three or more black dots; T6 integument black.

Female. Allotype: Body length 8.2 mm; wing length 5.6 mm; head width 3 mm; metasoma length/width ratio 1.33. Relative head measurements: OOD 18; IOD 15; VW 12; UID 63; LID 49; face upper/lower width ratio 1.29.

Structure. Body size small (<9 mm); ventral margin of clypeus crenulate and shallowly emarginate with small medium projection; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on one or more segments, general colour of hair bands orange; T1 with posterior hairband and/or lateral patch; posterior hairbands on terga on most of its width wide, multiple layers of hairs covering most of the marginal zone; T5 posterior hairband on most of its width absent, pubescence on disc similar in colour to T6; T6 pubescence on disc entirely orange or gold; scopa light straw-coloured.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae brown; legs different from general body colour; T6 integument black or orange/red.

Association of sexes. Confirmed using DNA data.

Flower visitation. *Swainsona*.

Distribution. See map Fig. 74F.

Phenology. September (2 records), October (1 record), November (3 records).

Etymology. The specific epithet is an adjective that refers to the three black dots ventrally on the fore tarsi of the male.

***Megachile (Austrochile) uninotata* Leijs sp.**

nov.

urn:lsid:zoobank.org:act:D2EEB98F-E6C8-4C0D-979C-15145D0367EA

Figure 75A–E

Examined specimens. Holotype, ♂, AM (K.359743), WA, Narrogin (32.9406°S: 117.1572°E), 12/10/2009, M. Batley, *Hemigenia*. **Other specimens.** 1 male.

Diagnosis. The male of this species can be recognised by the following combination of characters: fore legs hardly modified; tarsus with one black dot; T5–T6 integument orange; T6 medial teeth short, widely separated, carina multi-dentate. Female unknown.

Male. Holotype: Body length 7.4 mm; wing length 5.1 mm; head width 2.95 mm; hind tarsus/tibia ratio 1.14.

Structure. Body size small (<9 mm); antennae not modified; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area not modified; fore legs not modified; coxa without projection, occasionally with small nodule; projection shorter than coxa width; tarsus hardly modified, but with one or more black dots; hind leg tarsus longer than tibia; S1 median subapical process absent; T6 medial teeth widely separated, more than length of tooth, short, carina multi-dentate.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with long erect white pubescence; fore leg femur ventrally almost bare, some sparse erect hairs; posterior hairbands on terga present; general colour of tergal hair bands white; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs black or dark brown; femur same as body colour; fore tarsus with one black dot; T6 integument red or orange.

Flower visitation. *Hemigenia*, yellow pan trap.

Distribution. See map Fig. 75E.

Phenology. August (1 record), October (1 record).

Etymology. The specific epithet is an adjective that refers to the single black dot ventrally on the male fore tarsi.

***Megachile (Austrochile) wintinnaensis* Leijs sp. nov.**

urn:lsid:zoobank.org:act:50FD6221-2541-495F-A9D1-4D6D6A7B8DA4

Figure 76A–H

Examined specimens. Holotype, ♂, SAMA (32-46703), SA, Wintinna Station Panorama tank (27.6044°S: 133.8106°E), 11/08/2021, R. Leijs & K. Hogendoorn, *Eremophila freelingii*. Allotype, ♀, SAMA (32-46705), SA, Wintinna Station nr Butcher Hill (27.5798°S: 133.9266°E), 13/08/2021, R. Leijs & K. Hogendoorn, *Eremophila freelingii*. **Other specimens.** 11 males, 2 females.

Diagnosis. The female of this species can be recognised by the following combination of characters: ventral margin of clypeus smooth, emarginate with small medium projection; T2–T3 posterior hairbands wide, white; T4–T5 posterior hairbands absent; T5–T6 with sparse brown pubescence. The male of this species can be recognised by the following combination of characters: flagellum segments F2–F11 longer than wide; fore legs not modified; T1–T2 with long erect white pubescence, T3–T6 with long erect black pubescence; T6 medial teeth short widely separated, carina bilobed.

Male. Holotype: Body length 10.5 mm; wing length 6.4 mm; head width 3.3 mm; hind tarsus/tibia ratio 0.95.

Structure. Body size intermediate (9–12 mm); antennae not modified; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area not modified; fore legs not modified; coxa without projection, occasionally with small nodule; projection shorter than coxa width; tarsus not modified; hind leg tarsus as long or shorter than tibia; S1 median subapical process a small protrusion or spine; T6 medial teeth widely separated, more than length of tooth, short, carina smooth and bilobed.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with long erect white pubescence; fore leg femur ventrally almost bare, some sparse erect hairs; posterior hairbands on terga present; general colour of tergal hair bands white; T1–T2 with long erect white pubescence, T3–T6 with long erect black pubescence.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs black or dark brown; femur same as body colour; fore tarsus without black dots; T6 integument black.

Female. Allotype: Body length 9.4 mm; wing length 6.8 mm; head width 3.3 mm; metasoma length/width ratio 1.27. Relative head measurements: OOD 17; IOD 17; VW 14; UID 63; LI D 60; face upper/lower width ratio 1.05.

Structure. Body size intermediate (9–12 mm); ventral margin of clypeus shallowly emarginate with small medium projection; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on T2–T3, general colour of hair bands white; T1 with posterior hairband and/or lateral patch; T2–T3 posterior hairbands on terga on most of its width wide, multiple layers

of hairs covering most of the marginal zone; T4–T5 posterior hairband on most of its width absent; T5–T6 pubescence on disc sparse brown; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument black.

Association of sexes. Based on collecting data, and similarities on pubescence and integument colour.

Flower visitation. *Eremophila freelingii*, *E. gibsonii*, *E. lin-smithii*, *E. sturtii*, *E. goodwinii*.

Distribution. See map Fig. 76H.

Phenology. August (8 records), September (7 records).

Etymology. The specific epithet refers to Wintinna Station that contains the type locality of the species.

***Megachile (Austrochile) witchelinaensis* Leijs sp. nov.**

urn:lsid:zoobank.org:act:350274B3-DC8C-4185-9542-F3B142173BFD

BOLD-BIN (AUSBS): AEC5722

Figure 77A–D

Examined specimens. Holotype, ♀, SAMA (32-37690), SA, Witchelina, The Bend (30.0792°S: 137.9930°E), 29/09/2014, R. Leijs.

Diagnosis. The female of this species can be recognised by the following combination of characters: clypeus smooth with medial process and pronounced lateral projections on ventral margin; distance between vertex and OOD equal to OOC, appears longer than in other species; T2–T4 posterior hairbands wide, straw-coloured; T5 apical hairband weakly defined. T6 integument brown-red, pubescence white. Male unknown.

Female. Holotype: Body length 9.5 mm; wing length 6.4 mm; head width 3.2 mm; metasoma length/width ratio 1.27. Relative head measurements: OOD 18; IOD 16; VW 20; UID 65; LID 62; face upper/lower width ratio 1.05.

Structure. Body size intermediate (9–12 mm); ventral margin of clypeus with median process, also large lateral projections; ventral half of clypeus as seen in profile concave; mandible with four teeth; S1 median subapical process absent.

Pubescence. Posterior hairbands on terga present on T2–T4, general colour of hair bands off-white or straw-coloured; T1 with posterior hairband and/or lateral patch; T2–T4 posterior hairbands on terga on most of its width wide, multiple layers of hairs covering most of the marginal zone; T5 posterior hairband on most of its width absent, pubescence on disc almost lacking; T6 pubescence on disc white; scopa white.

Colouration. Integument of head, mesosoma, and metasoma, black; peduncle of antennae black; legs same as general body colour; T6 integument orange/red.

Flower visitation. No records.

Distribution. See map Fig. 77D.

Phenology. September (1 record).

Etymology. The specific epithet refers to Witchelina Nature Reserve which is the type locality of the species.

***Megachile (Austrochile) yeatesi* Leijs & King sp. nov.**

urn:lsid:zoobank.org:act:C43C94EE-BC0B-4E1B-BE09-68D68C5270CD

Figure 78A–E

Examined specimens. Holotype, ♂, QM (T258696), QLD, Mt Moffatt NP, base of Kenniffs Lookout (24.9094°S: 148.0081°E), 24/11/1995, C.J. Burwell. **Other specimens.** 2 males.

Diagnosis. The male of this species can be recognised by the following combination of characters: antennae brown; hypostomal area with blunt spine, fore legs hardly modified but tarsus with one black dot ventrally; T5 on disc with extensive orange pubescence; T6 medial teeth short and widely separated, carina bilobed. Female unknown.

Male. Holotype: Body length 10.3 mm; wing length 6.9 mm; head width 3.1 mm; hind tarsus/tibia ratio 1.18.

Structure. Body size intermediate (9–12 mm); antennae not modified; ventral margin of mandible without projection—not expanded; mandible with three teeth; hypostomal area with large hypostomal carina, including blunt spine; fore legs hardly modified; coxa without projection, occasionally with small nodule; projection shorter than coxa width; tarsus hardly modified, but with one black dot; hind leg tarsus longer than tibia; S1 median subapical process a small protrusion or spine; T6 medial teeth widely separated, more than length of tooth, short, carina bilobed.

Pubescence. Mandible ventrally without patch of dense pubescence; hypostomal area with long erect white pubescence; fore leg femur ventrally almost bare, some sparse erect hairs; posterior hairbands on terga present; general colour of tergal hair bands off-white or straw-coloured; T5 with extensive orange pubescence on disc; T6 pubescence short, pale coloured.

Colouration. Integument of head, thorax and abdomen black; middle and hind legs femur black or dark brown, tibia and tarsus orange red or brown; femur same as body colour; fore tarsus with one black dot; T6 integument red or orange.

Flower visitation. No records.

Distribution. See map Fig. 78E.

Phenology. September (1 record), November (2 records).

Etymology. The specific epithet refers to Dr. David Yeates, who collected the first specimen of this species.

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Supplementary Data

S1: Examined Specimens: <https://doi.org/10.5061/dryad.xwdbv1nj>

S2: Neighbour joining tree of uncorrected sequence divergences based on AUSBS-barcode data: <https://doi.org/10.5281/zenodo.13382006>

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A: ♀, WAM 17621, dorsolateral



B: ♀, WAM 17621, head



C: ♀, WAM 17621, terga

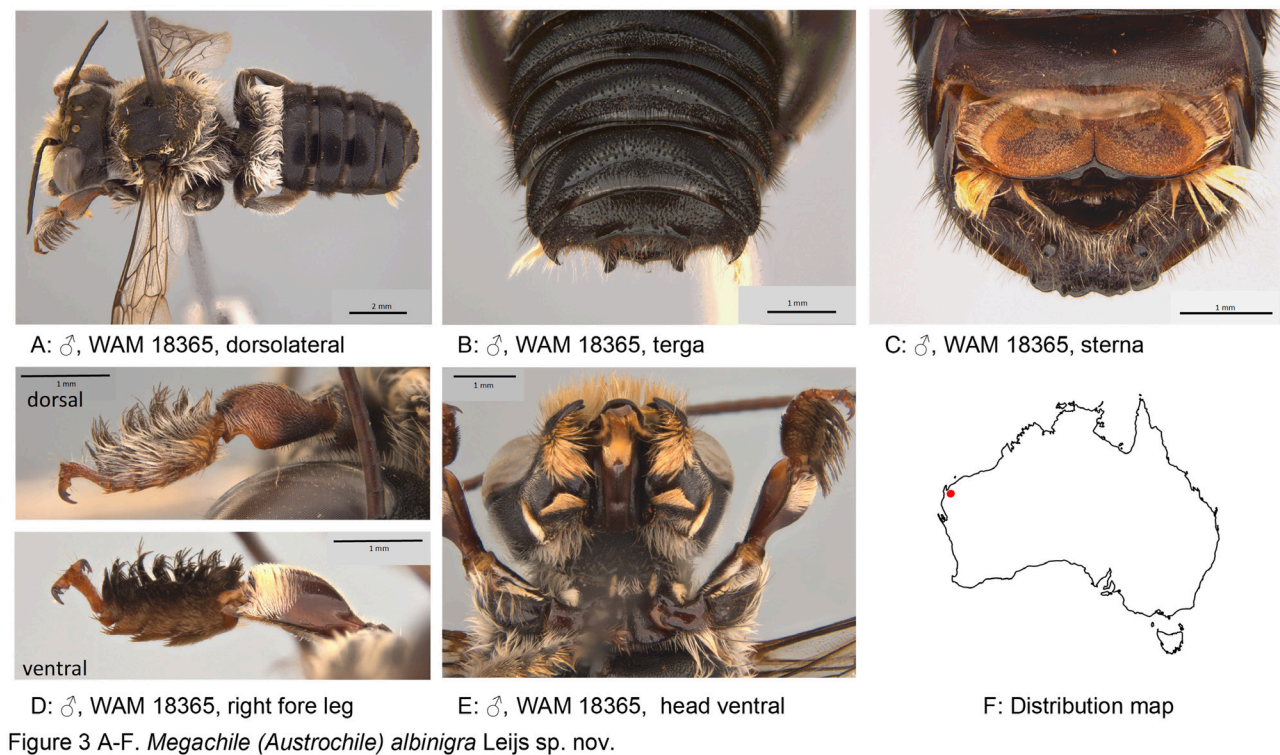
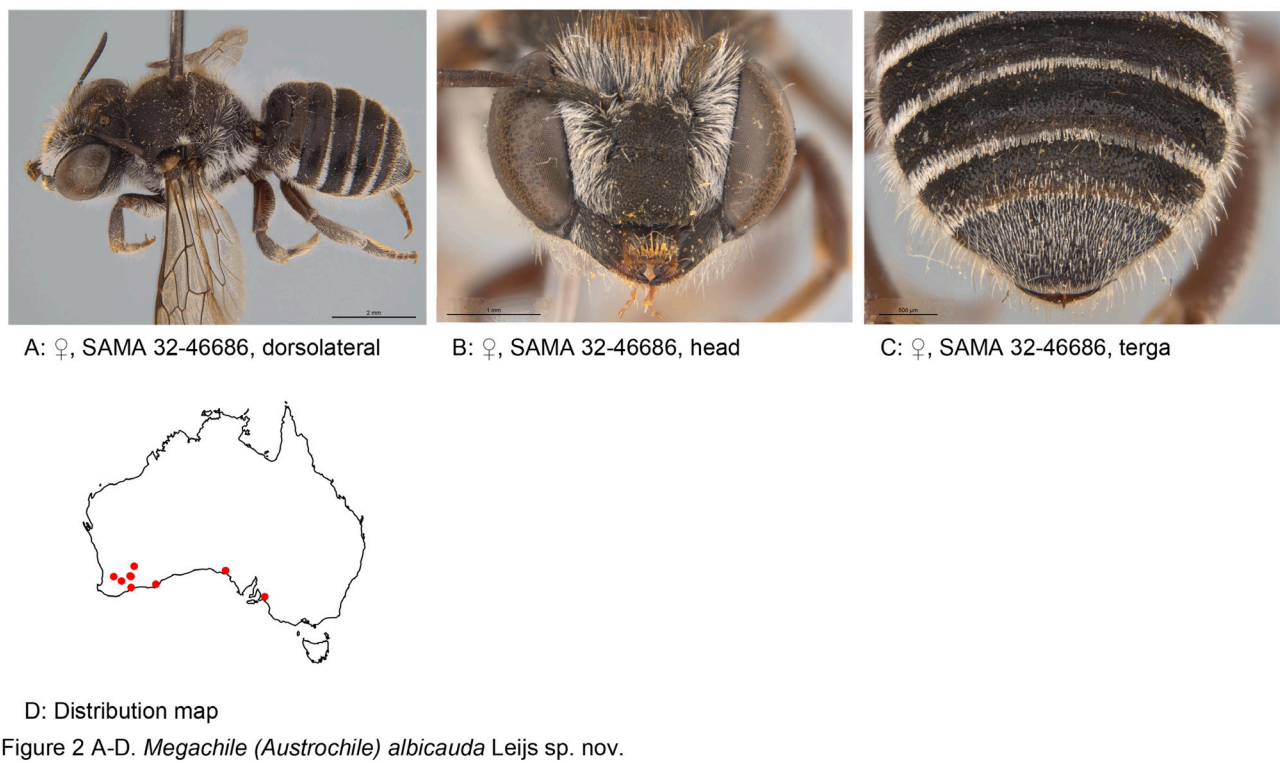


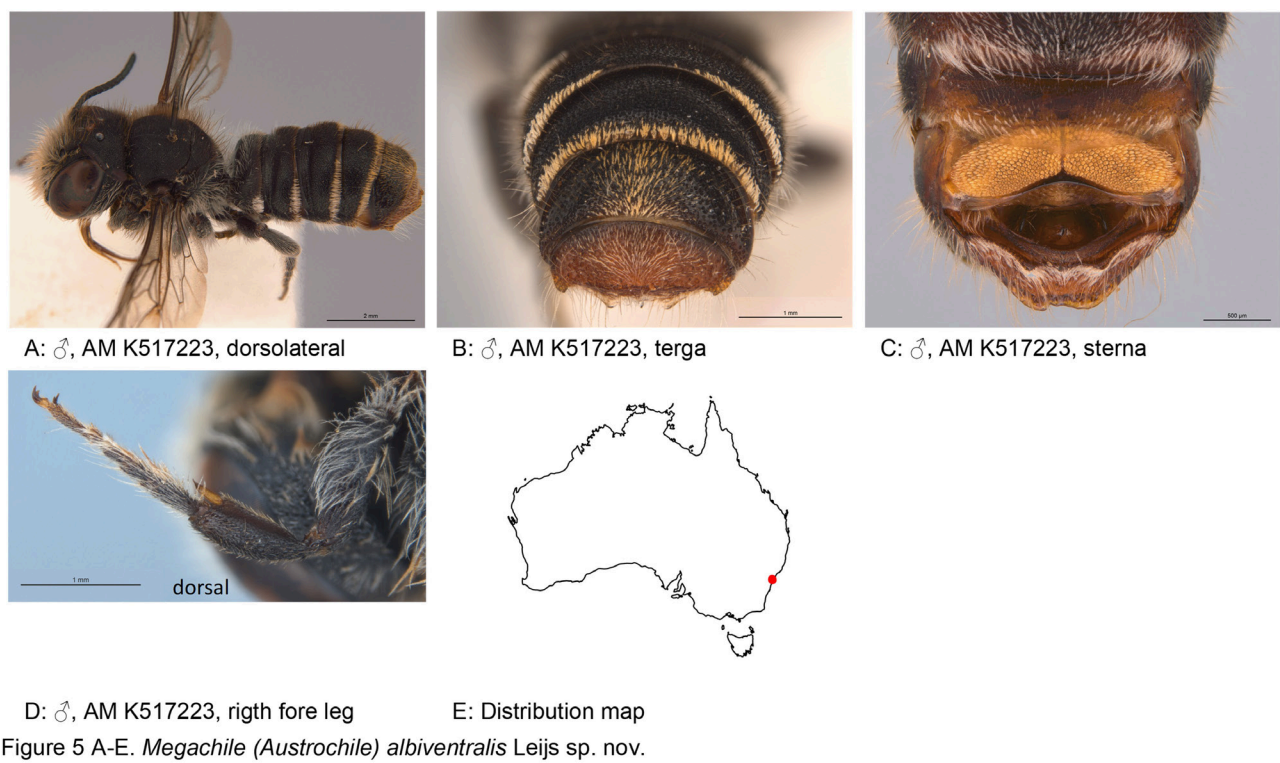
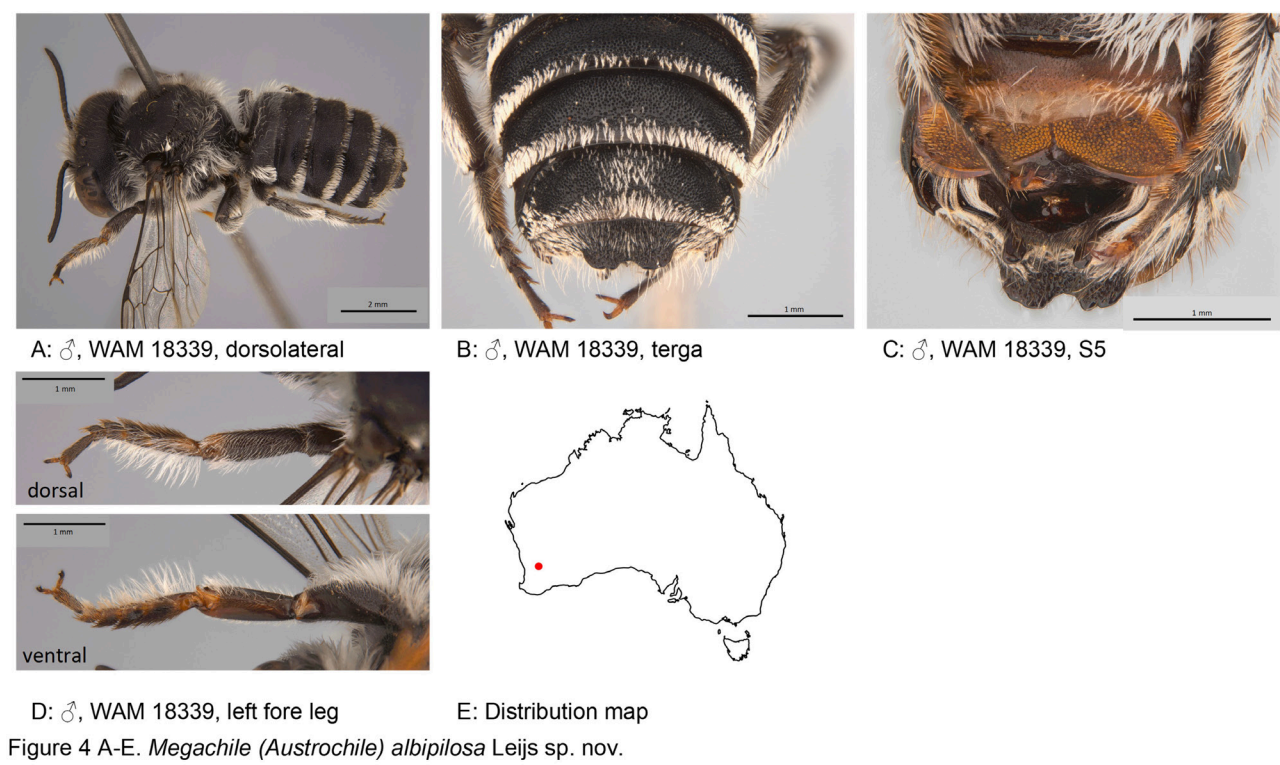
D: WAM 17621, resin pot



E: Distribution map

Figure 1 A-E. *Megachile (Austrochile) adusta* Leijs sp. nov.



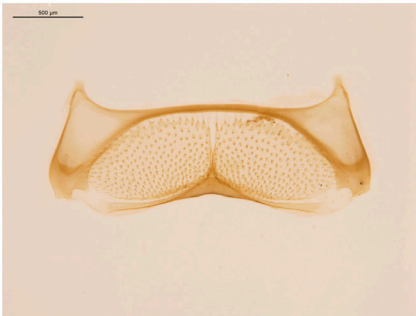




A: ♂, WAM 22536, dorsolateral



B: ♂, WAM 22536, terga



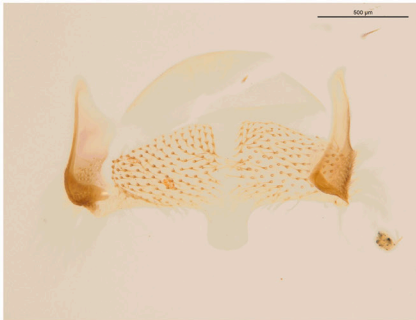
C: ♂, S5



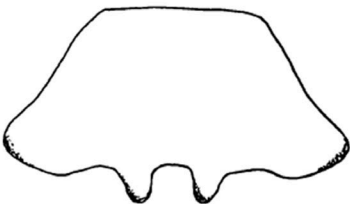
D: ♂, WAM 22536, right fore leg



E: ♂, T6



F: ♂, S6



G: ♂, clypeus

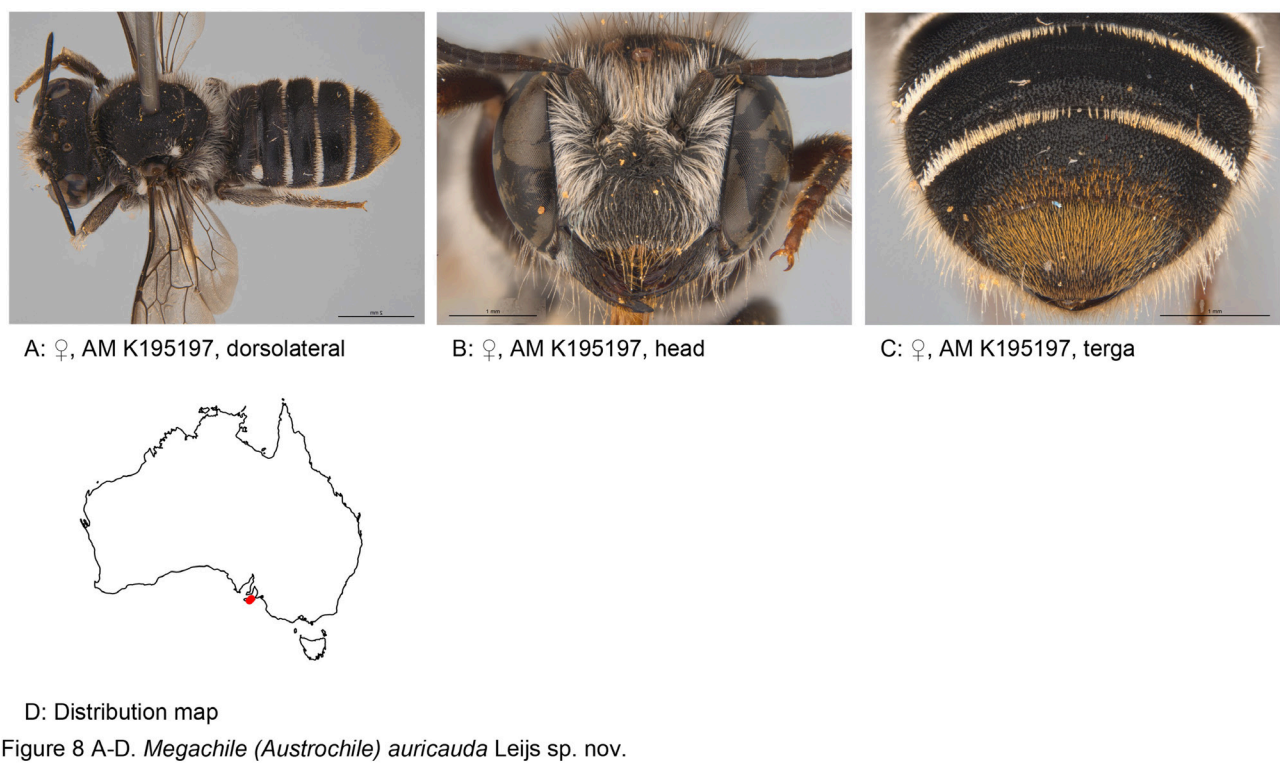
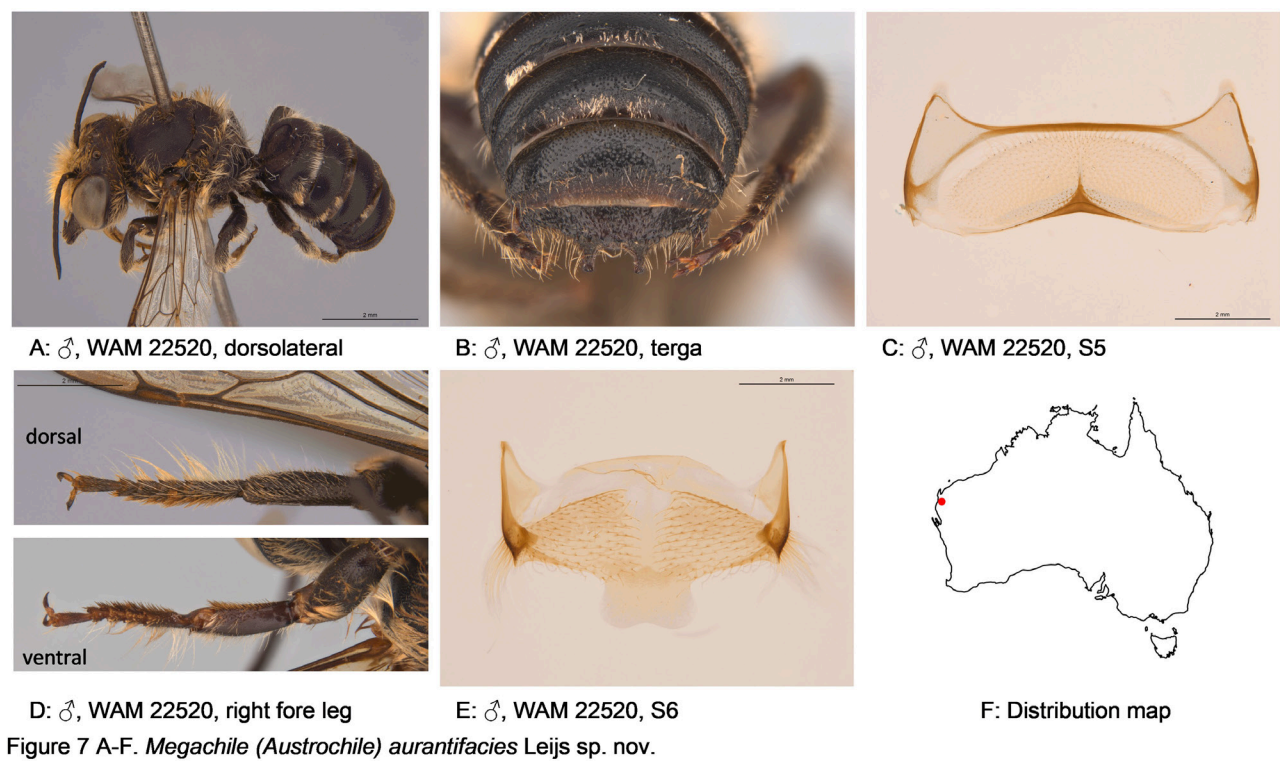


H: ♂, left mandible



I: Distribution map

Figure 6 A-I. *Megachile (Austrochile) amnicola* Leijs & King sp. nov.



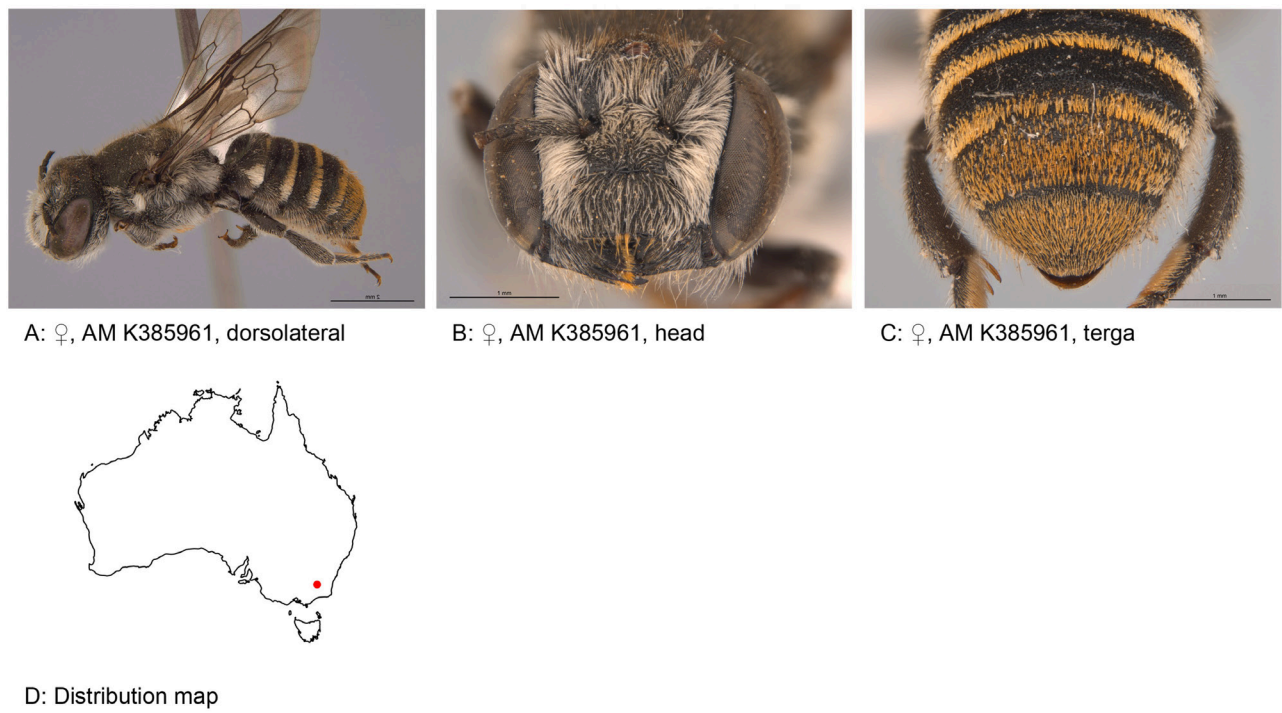


Figure 9 A-D. *Megachile (Austrochile) aurifimbriata* Leijs sp. nov.

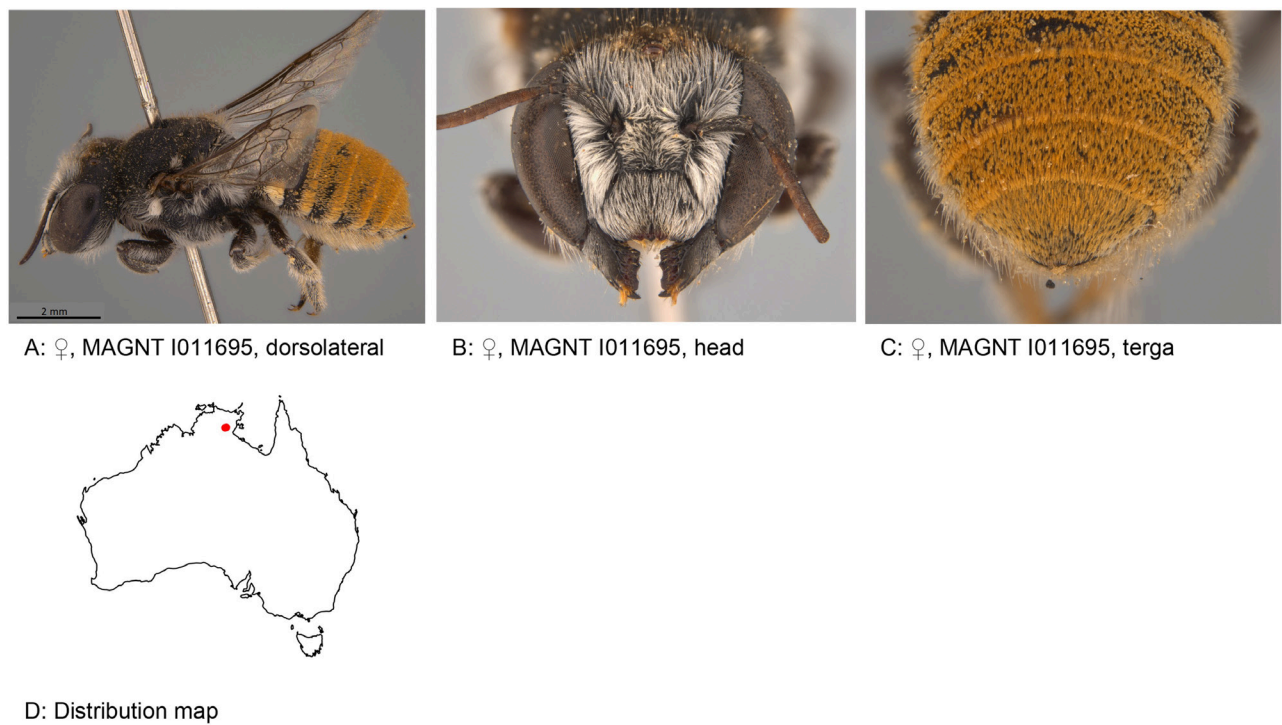
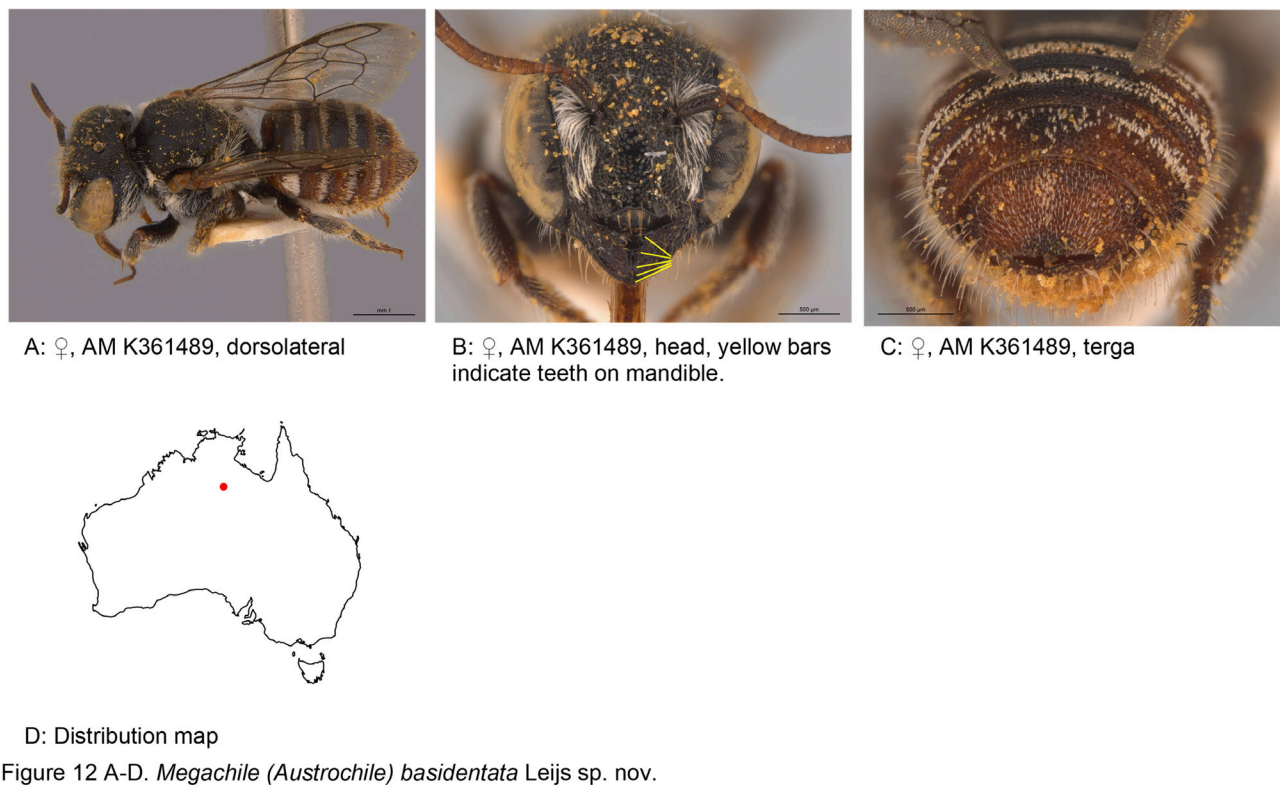
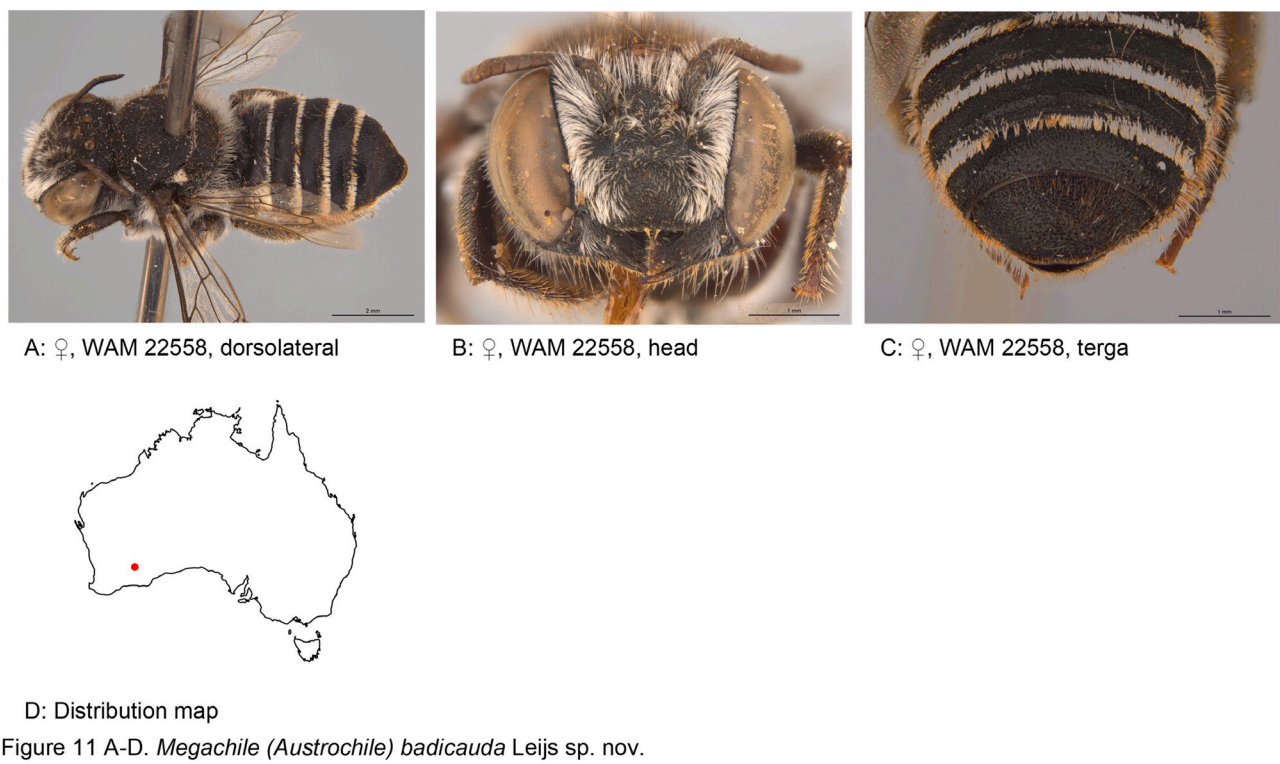
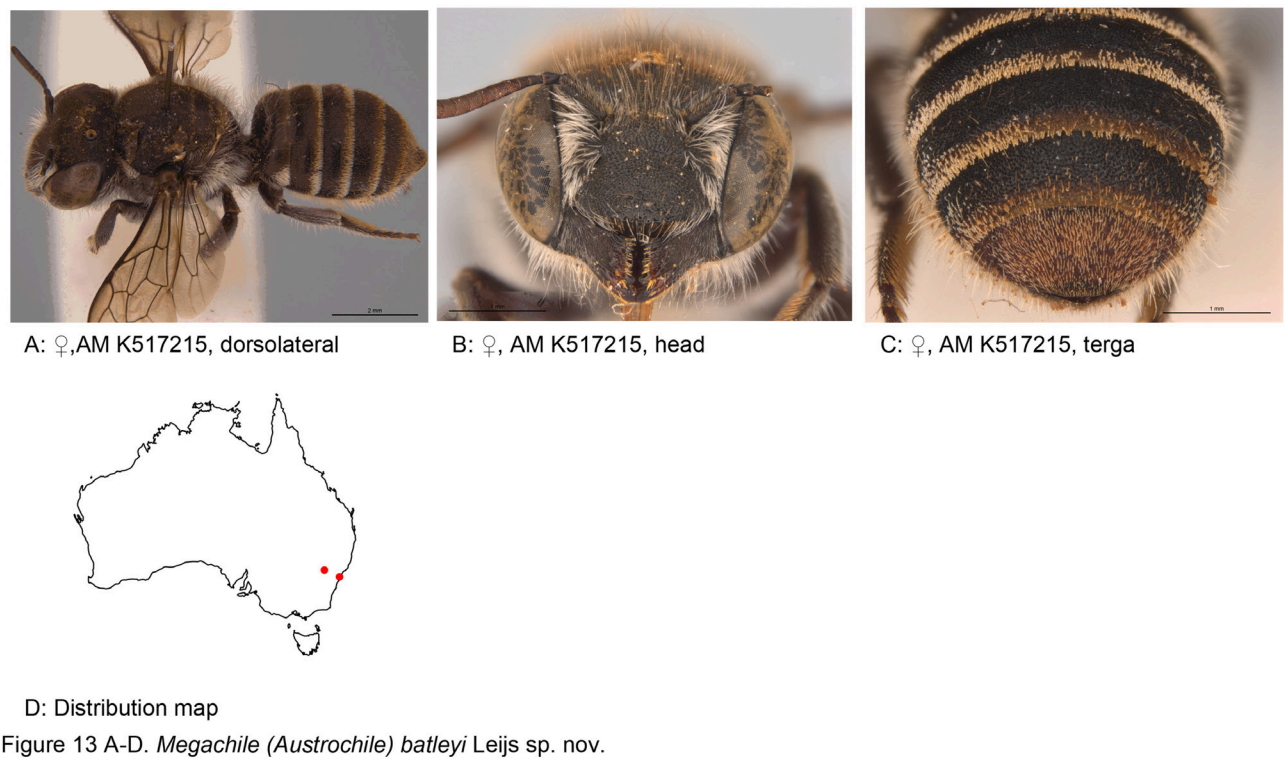


Figure 10 A-D. *Megachile (Austrochile) auriterga* Leijs sp. nov.





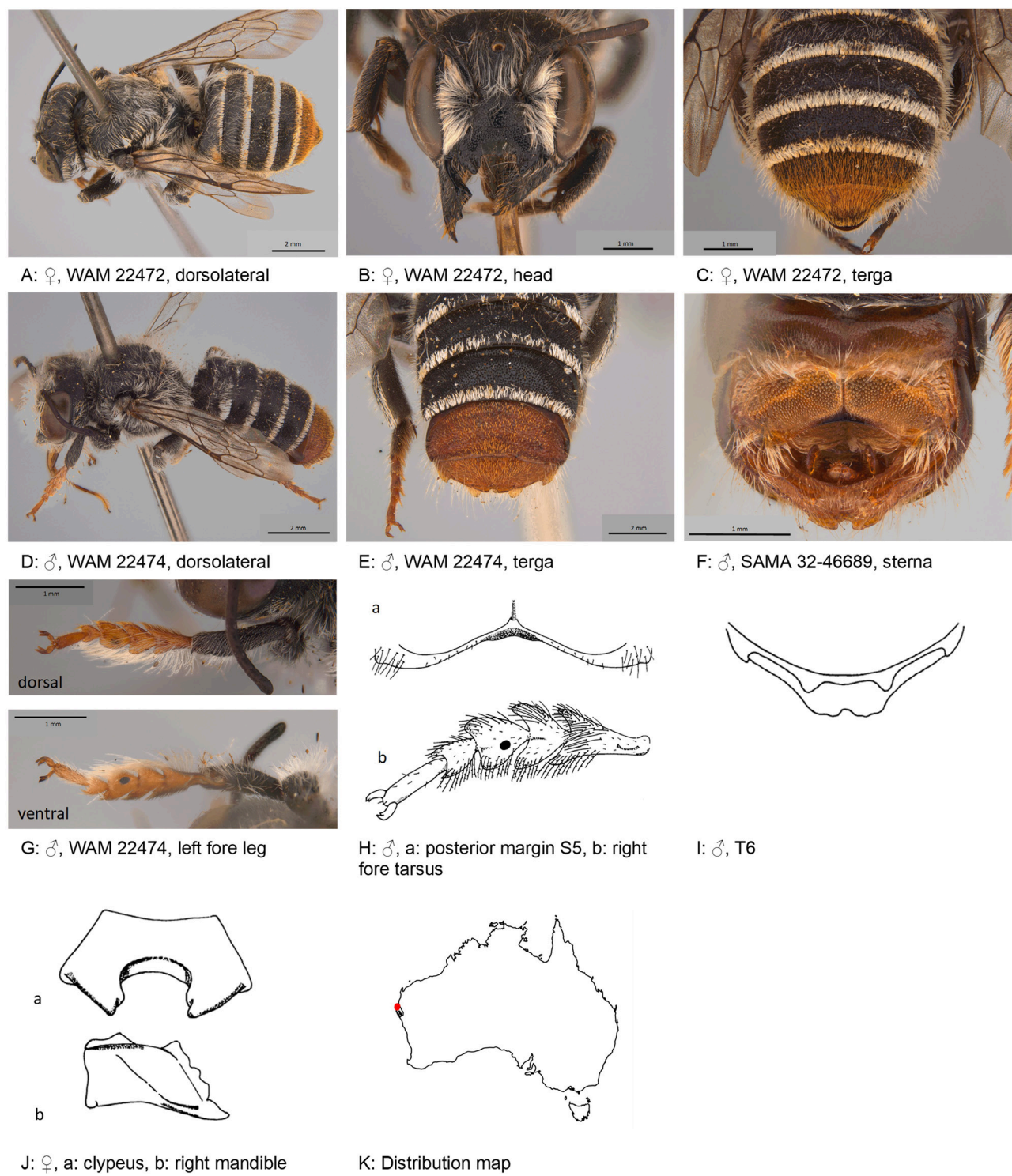


Figure 14 A-K. *Megachile (Austrochile) bernierensis* Leijs & King sp. nov.

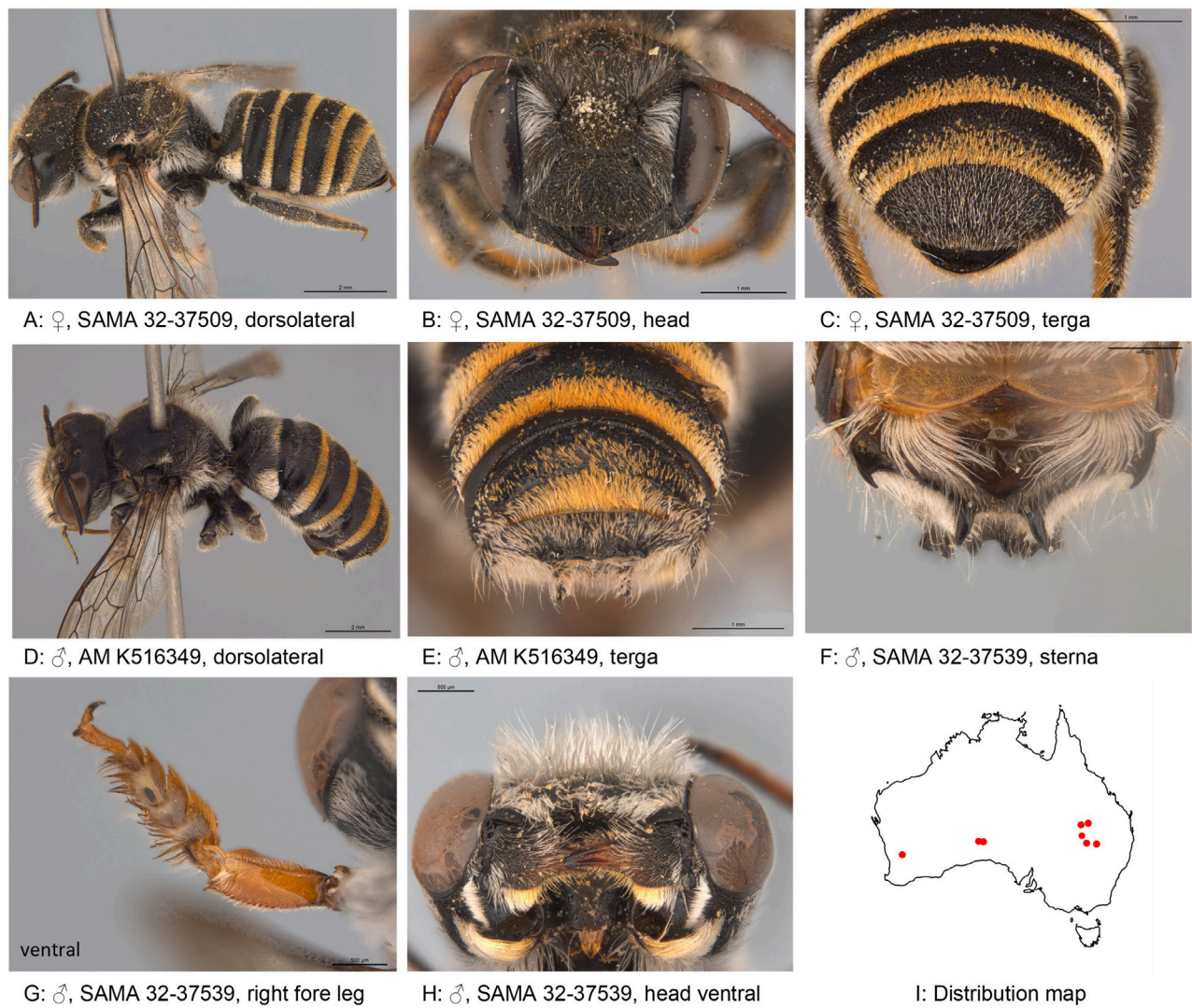
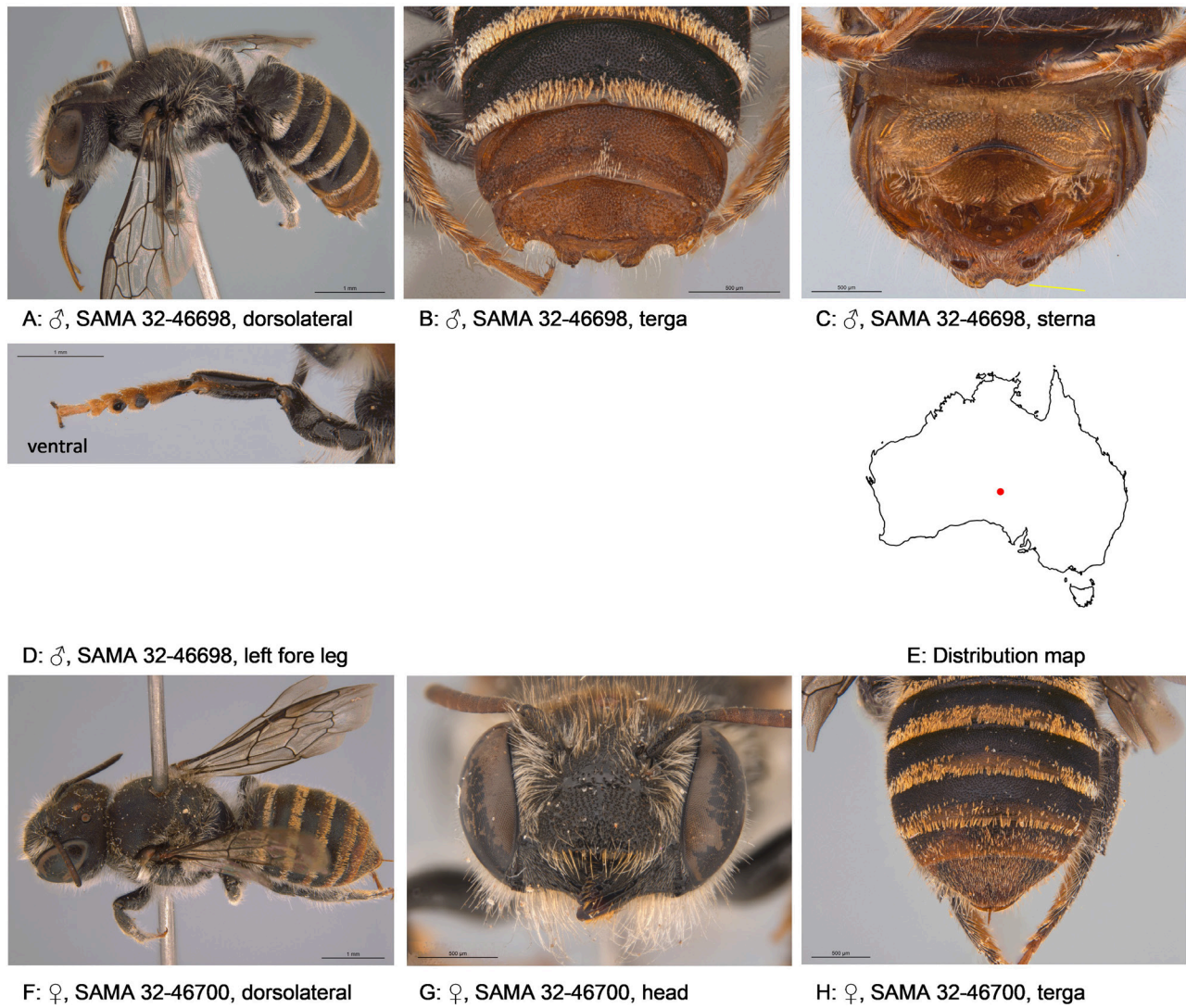


Figure 15 A-I. *Megachile (Austrochile) bilineata* Leijs sp. nov.



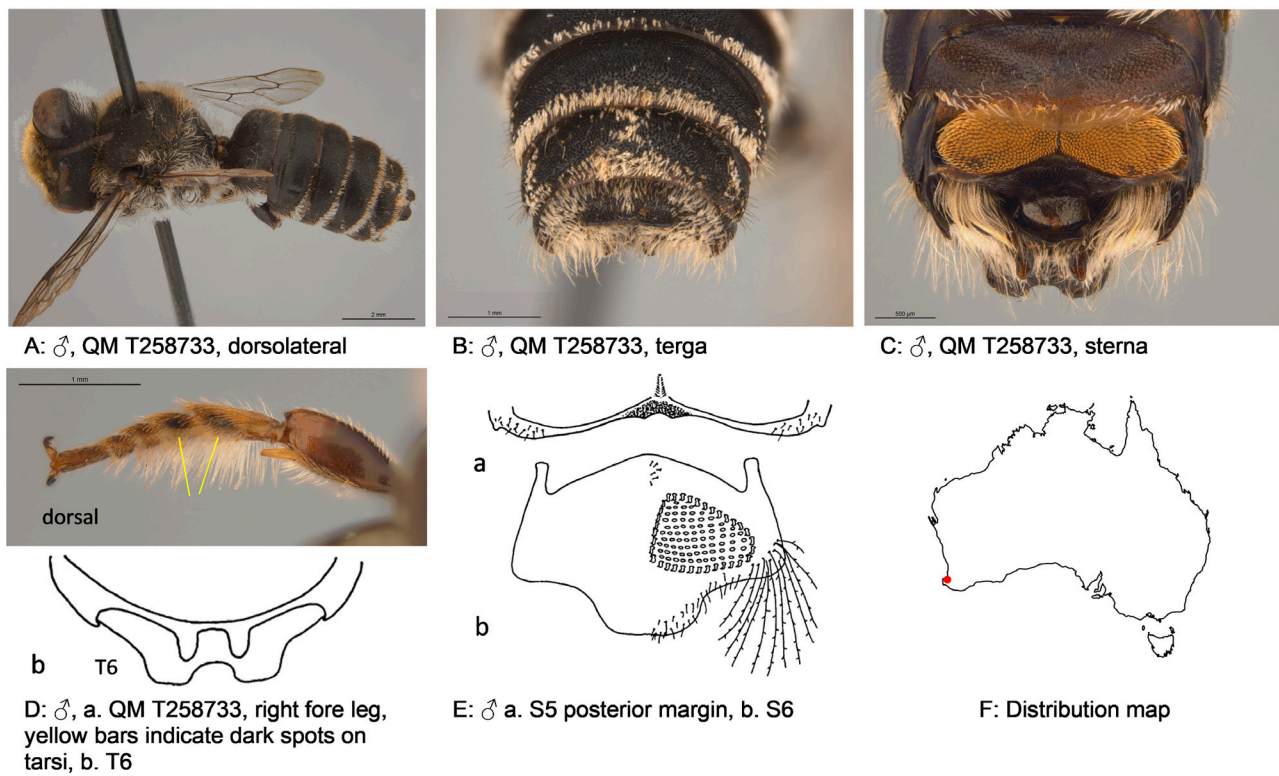


Figure 17 A-F. *Megachile (Austrochile) boharti* Leijs & King sp. nov.

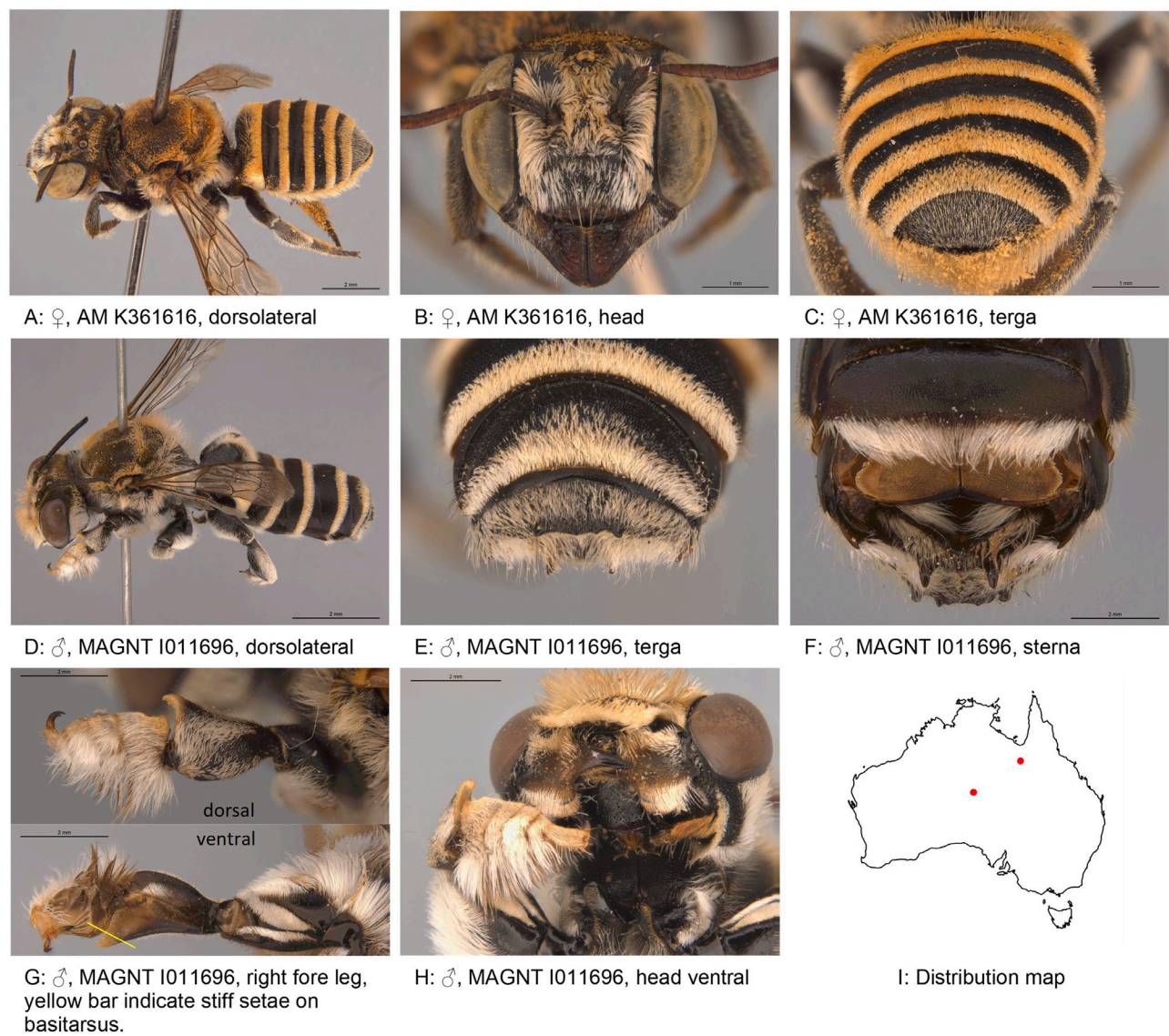


Figure 18 A-I. *Megachile (Austrochile) buspina* Leijs sp. nov.



A: ♀, QM T258702, dorsolateral



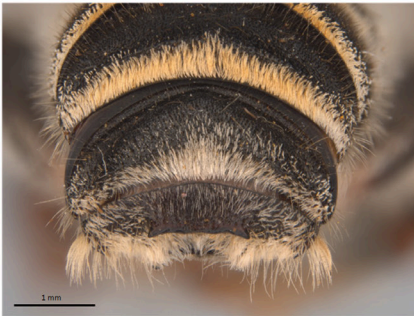
B: ♀, QM T258702, head



C: ♀, QM T258702, terga



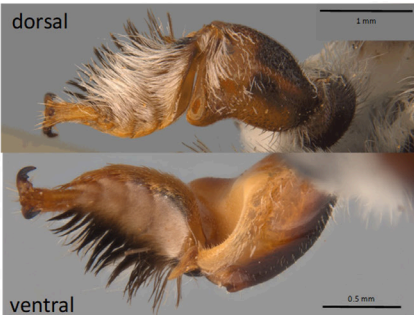
D: ♂, QM T258680, dorsolateral



E: ♂, QM T258680, terga



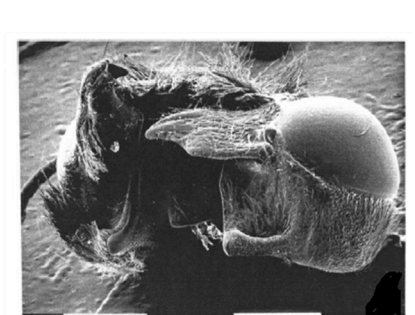
F: ♂, QM T258680, sterna



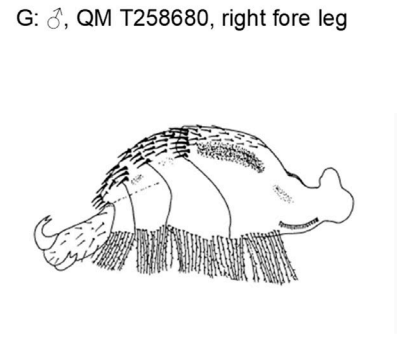
G: ♂, QM T258680, right fore leg



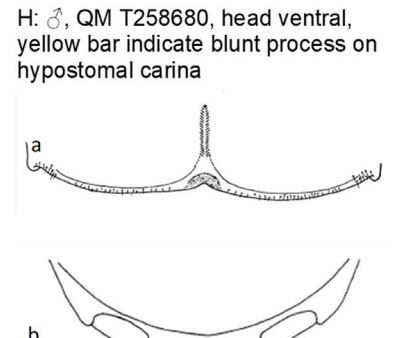
H: ♂, QM T258680, head ventral, yellow bar indicate blunt process on hypostomal carina



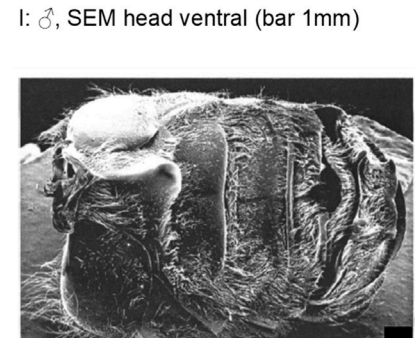
I: ♂, SEM head ventral (bar 1mm)



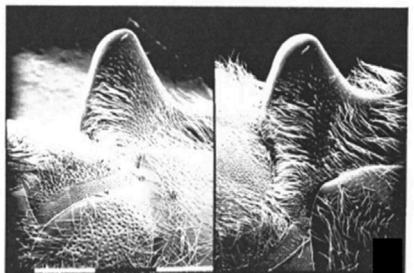
J: ♂, right tarsi ventral



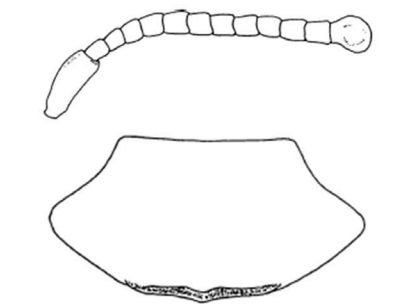
K: ♂, a: posterior margin S5, b: T6 mandible



L: ♂, SEM metasomal sterna (bar = 1mm)



M: ♂, SEM S1 lateral view (bar = 0.5 mm)



N: ♂ antenna , ♀ clypeus



O: Distribution map

Figure 19 A-O. *Megachile (Austrochile) cafrae* Leijs & King sp. nov.
VERSION OF RECORD



A: ♀, WAM E112643, dorsolateral



B: ♀, WAM E112643, head, yellow bars indicate pubescence on mandible.



C: ♀, WAM E112643, terga



D: ♂, WAM 22539, dorsolateral



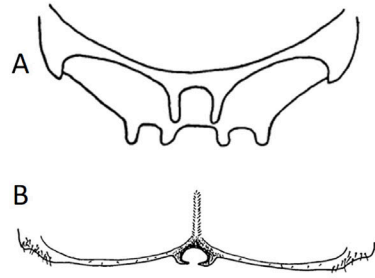
E: ♂, WAM 22539, terga



F: ♂, WAM 22539, sterna



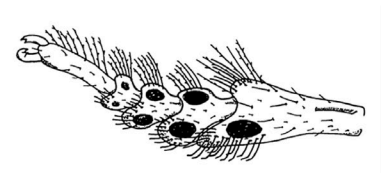
G: ♂, WAM 22539, fore leg, head ventral



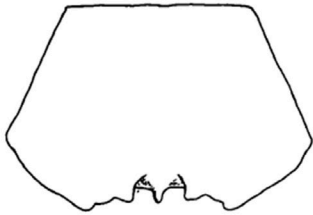
H: ♂, A: T6, B: posterior margin S6



I: Distribution map



J: ♂, fore tarsus



K: ♀, clypeus

Figure 20 A-K. *Megachile (Austrochile) calcarata* Leijs & King sp. nov.

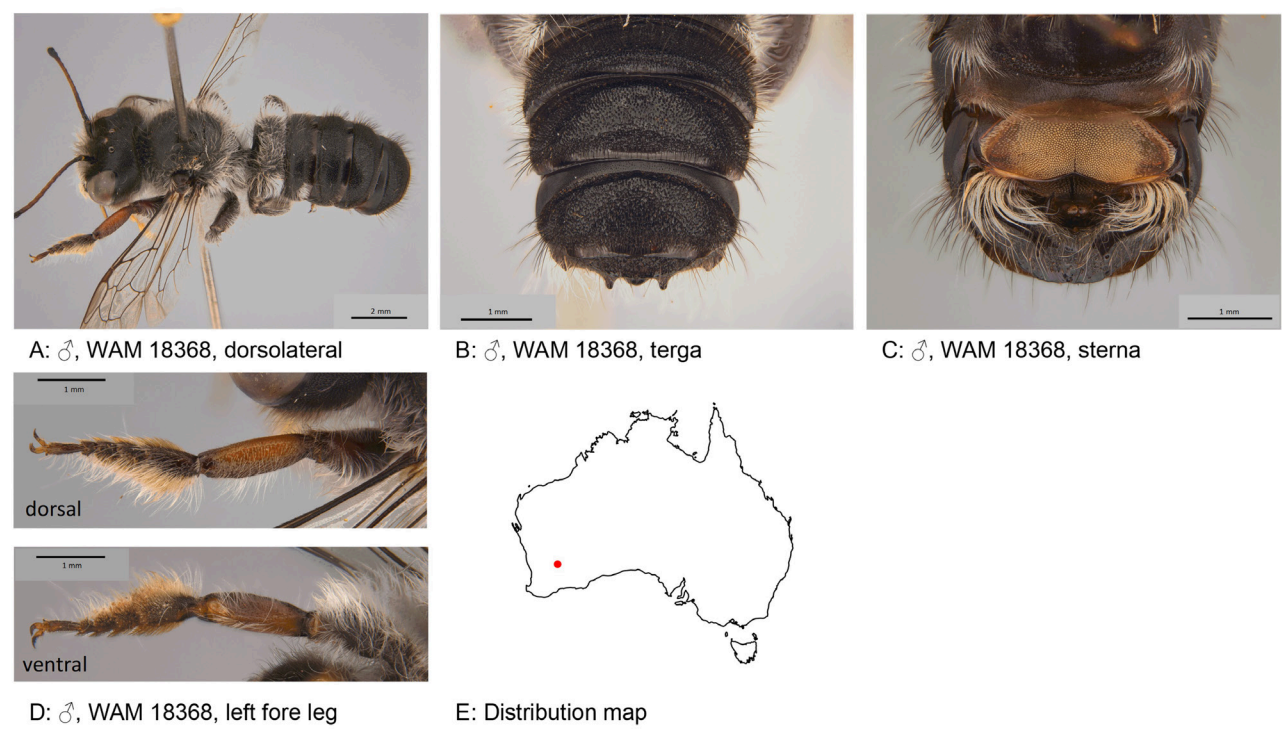


Figure 21 A-E. *Megachile (Austrochile) calva* Leijs sp. nov.

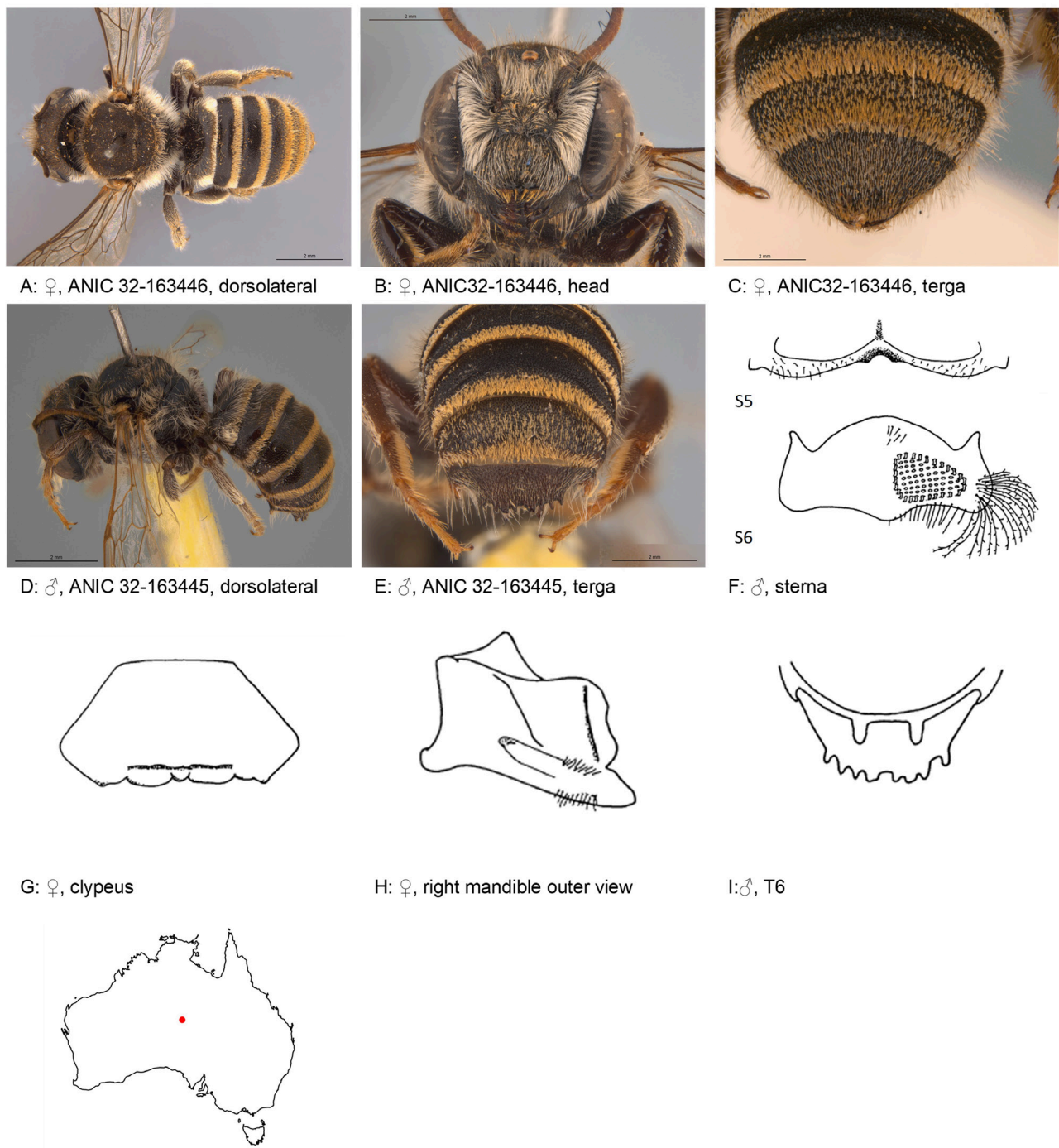


Figure 22 A-J. *Megachile (Austrochile) cardaleae* Leijs & King sp. nov.

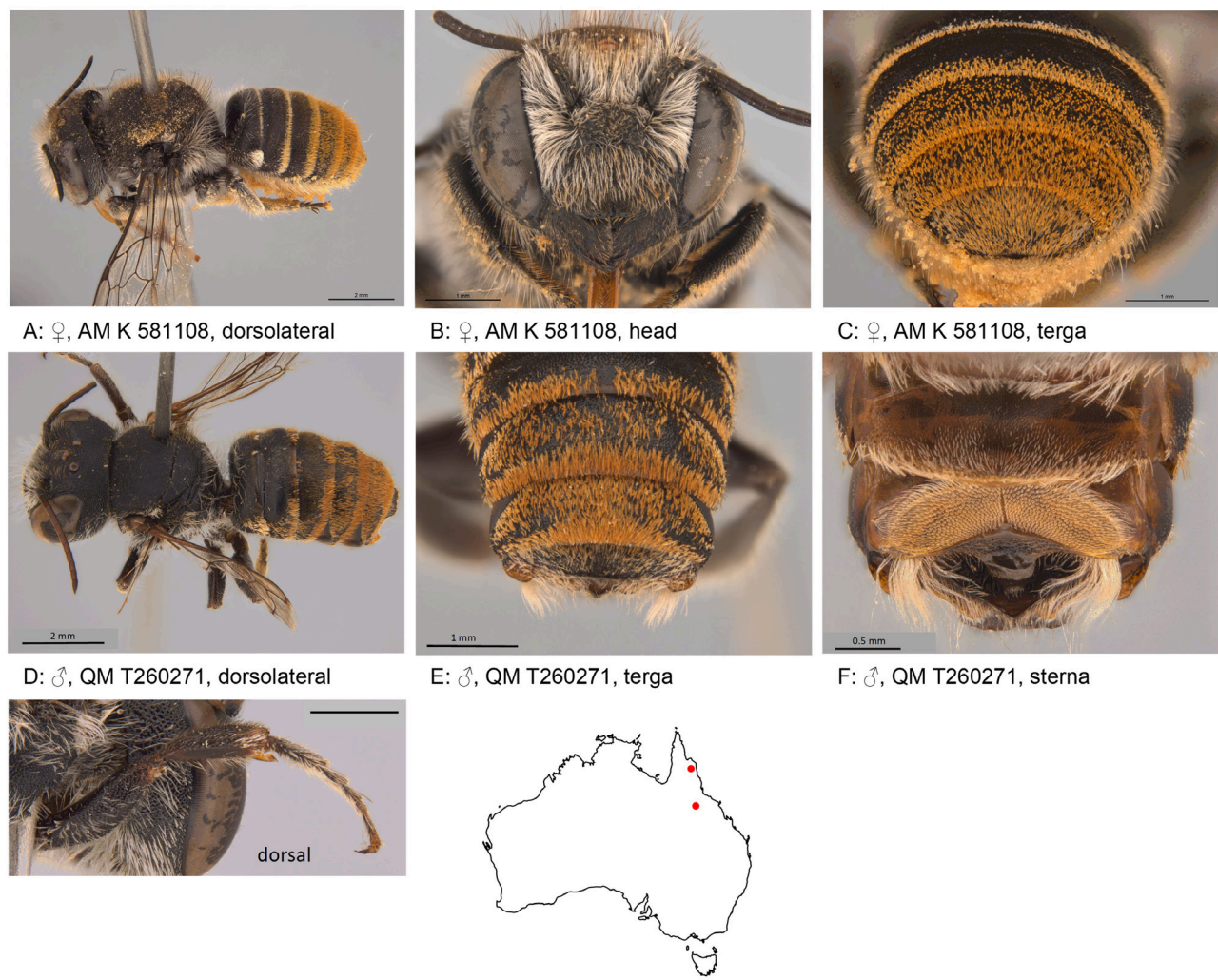
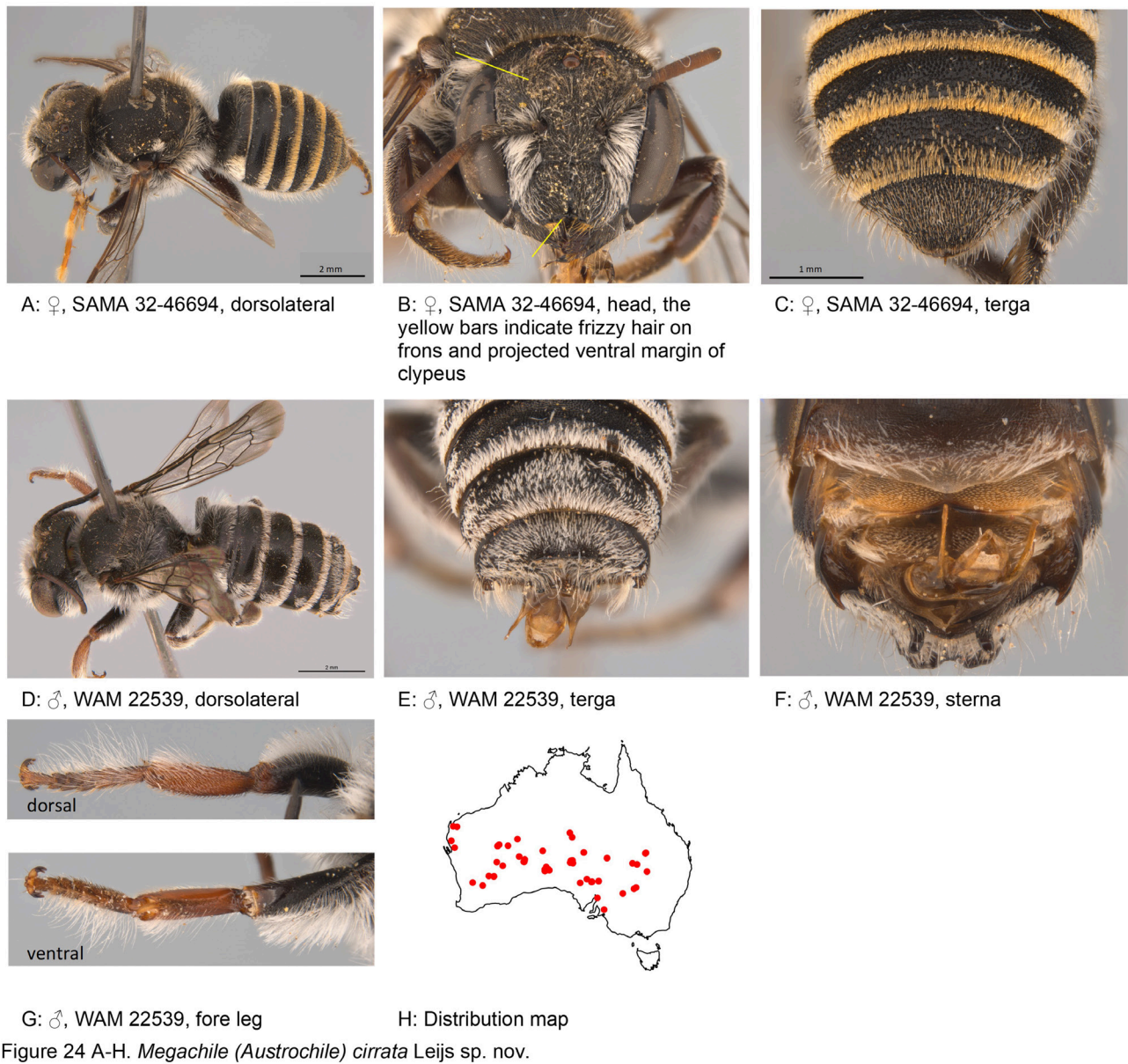


Figure 23 A-H. *Megachile (Austrochile) carinata* Leijs sp. nov.



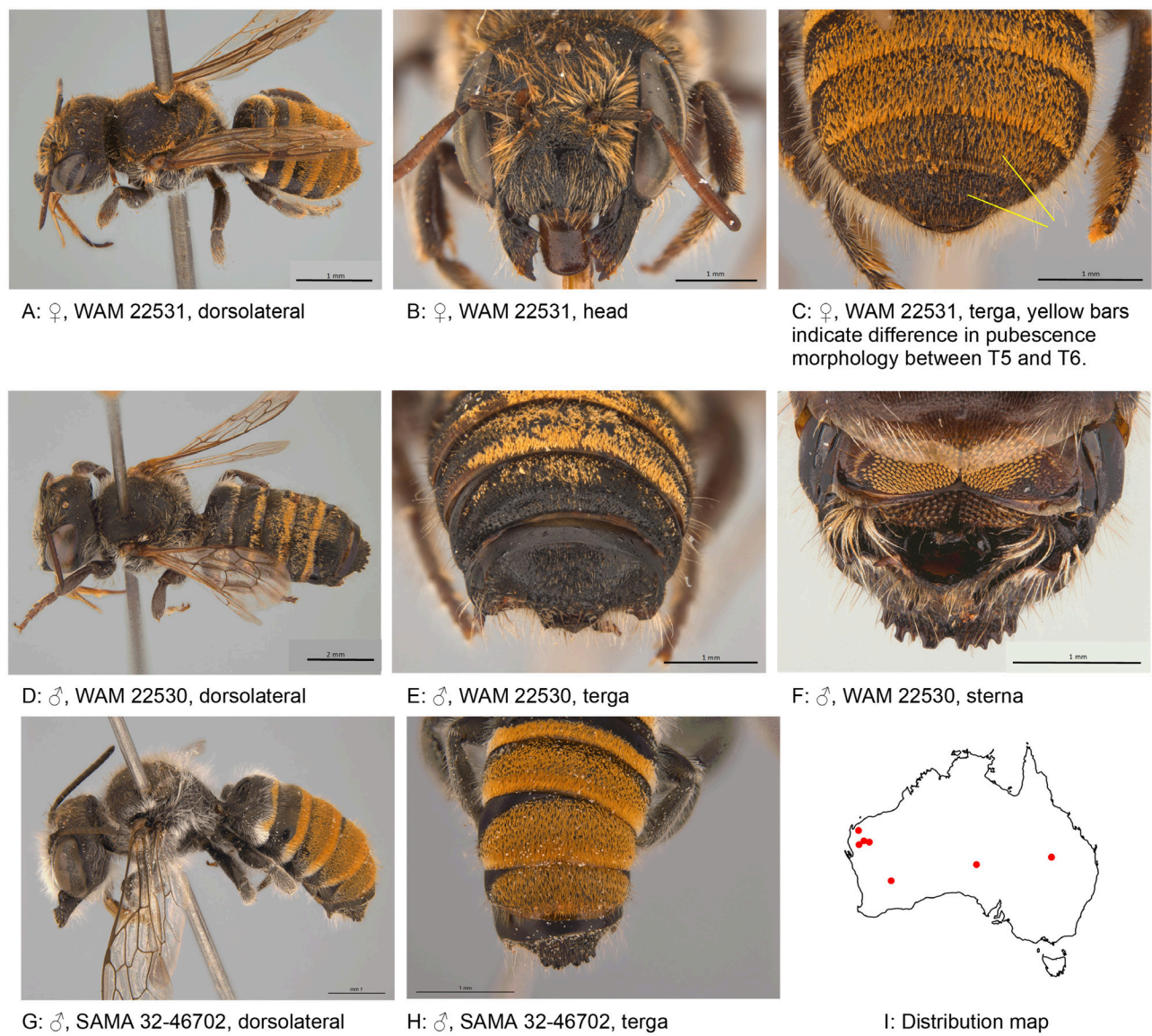
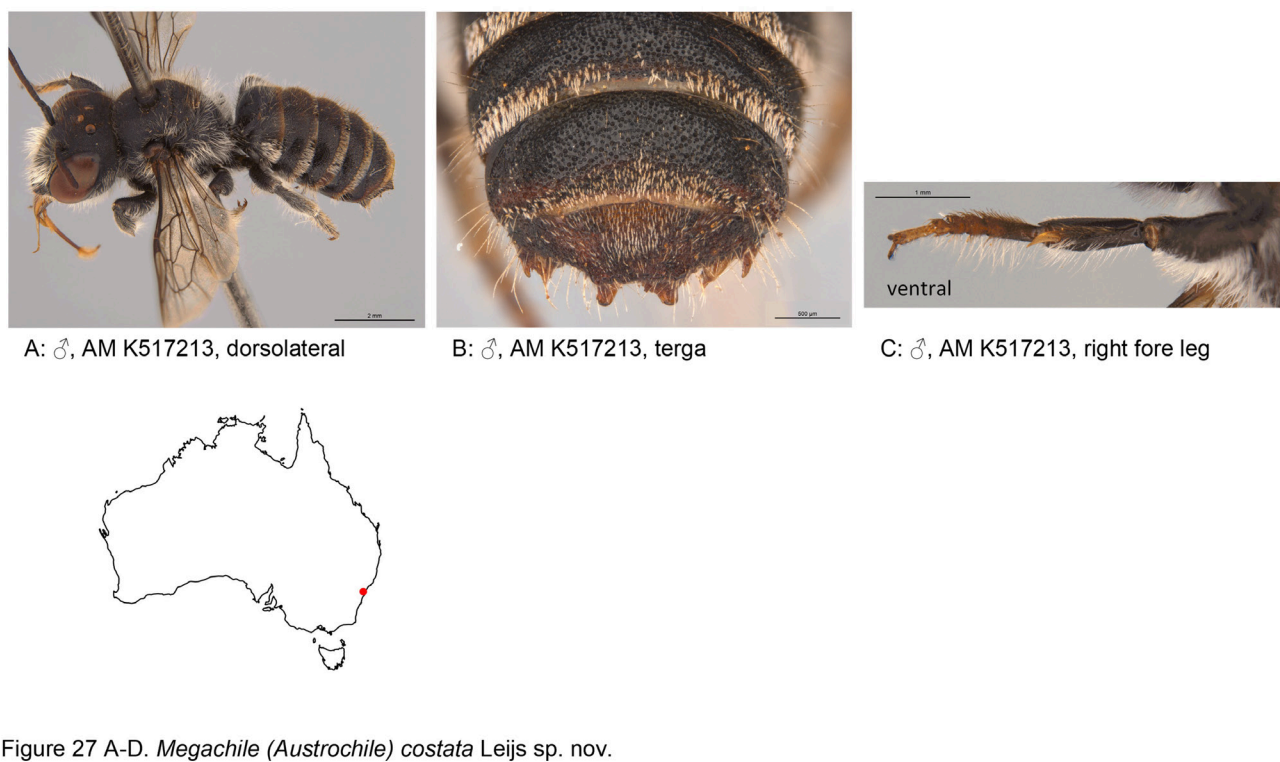
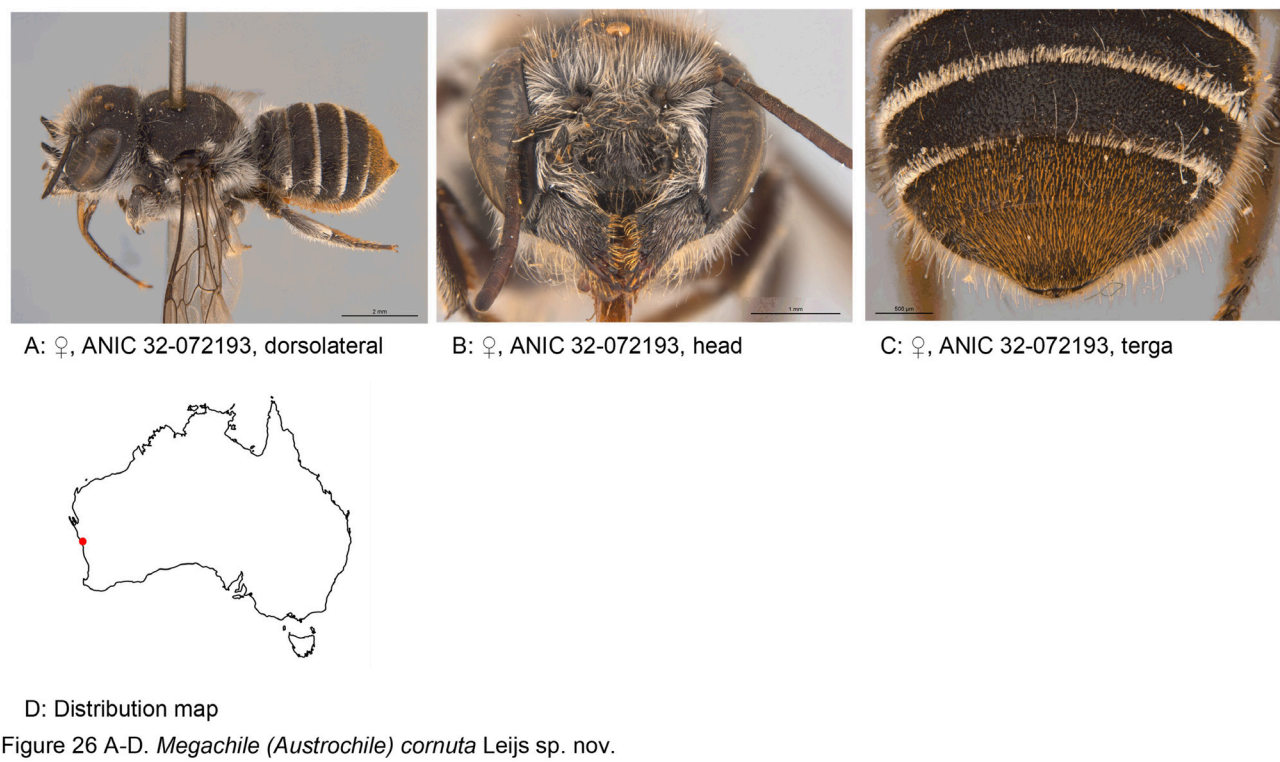


Figure 25 A-I. *Megachile (Austrochile) concava* Leijs sp. nov.





A: ♀, MAGNT I011698, dorsolateral



B: ♀, MAGNT I011698, head, the yellow bars indicate teeth on the mandible.



C: ♀, MAGNT I011698, terga



D: ♂, MAGNT I011697, dorsolateral



E: ♂, MAGNT I011697, terga



F: ♂, MAGNT I011697, sterna

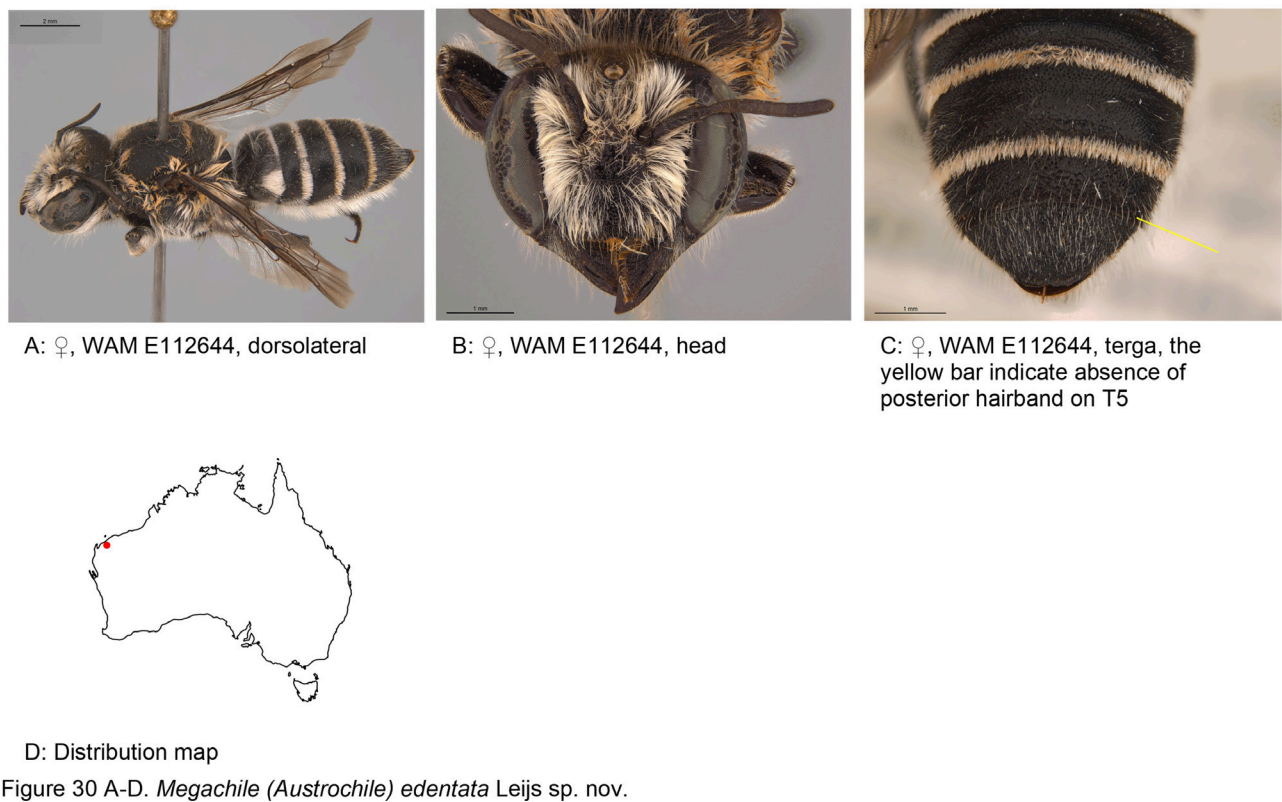
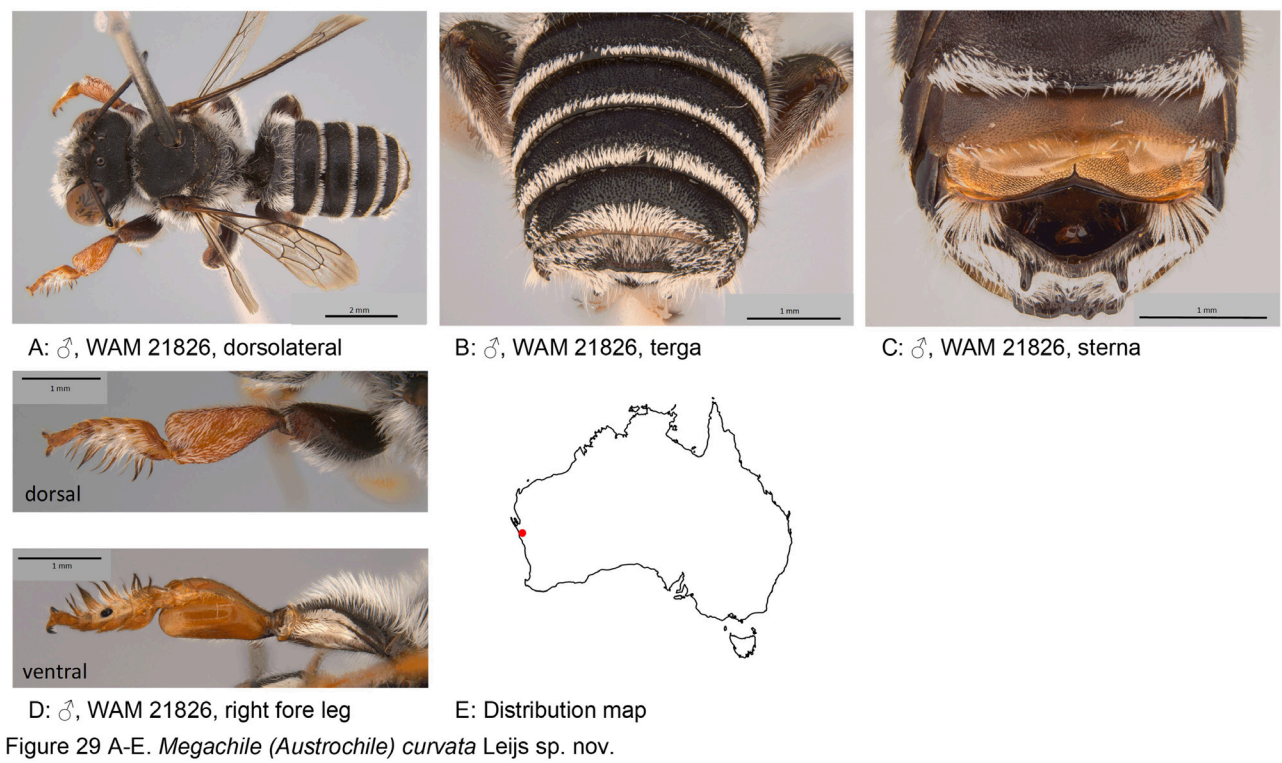


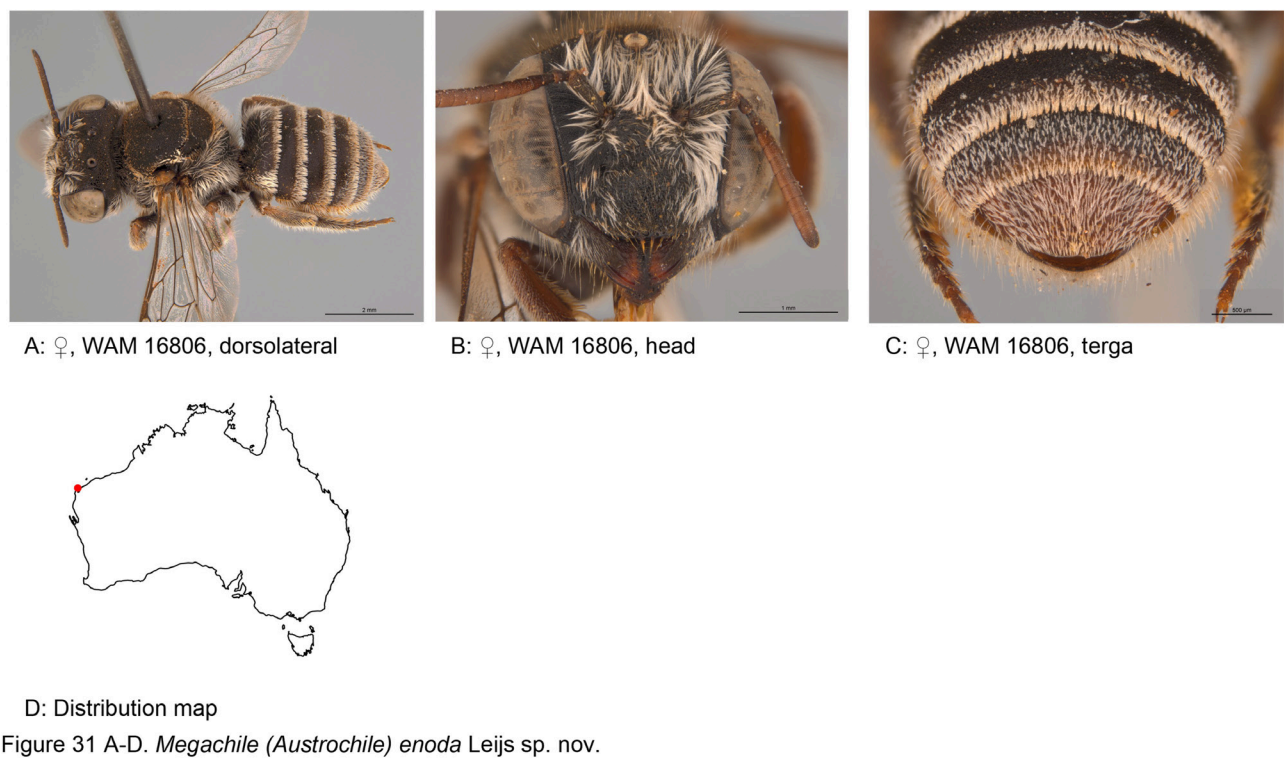
G: ♂, MAGNT I011697, left fore leg



H: Distribution map

Figure 28 A-H. *Megachile (Austrochile) crenulata* Leijs sp. nov.





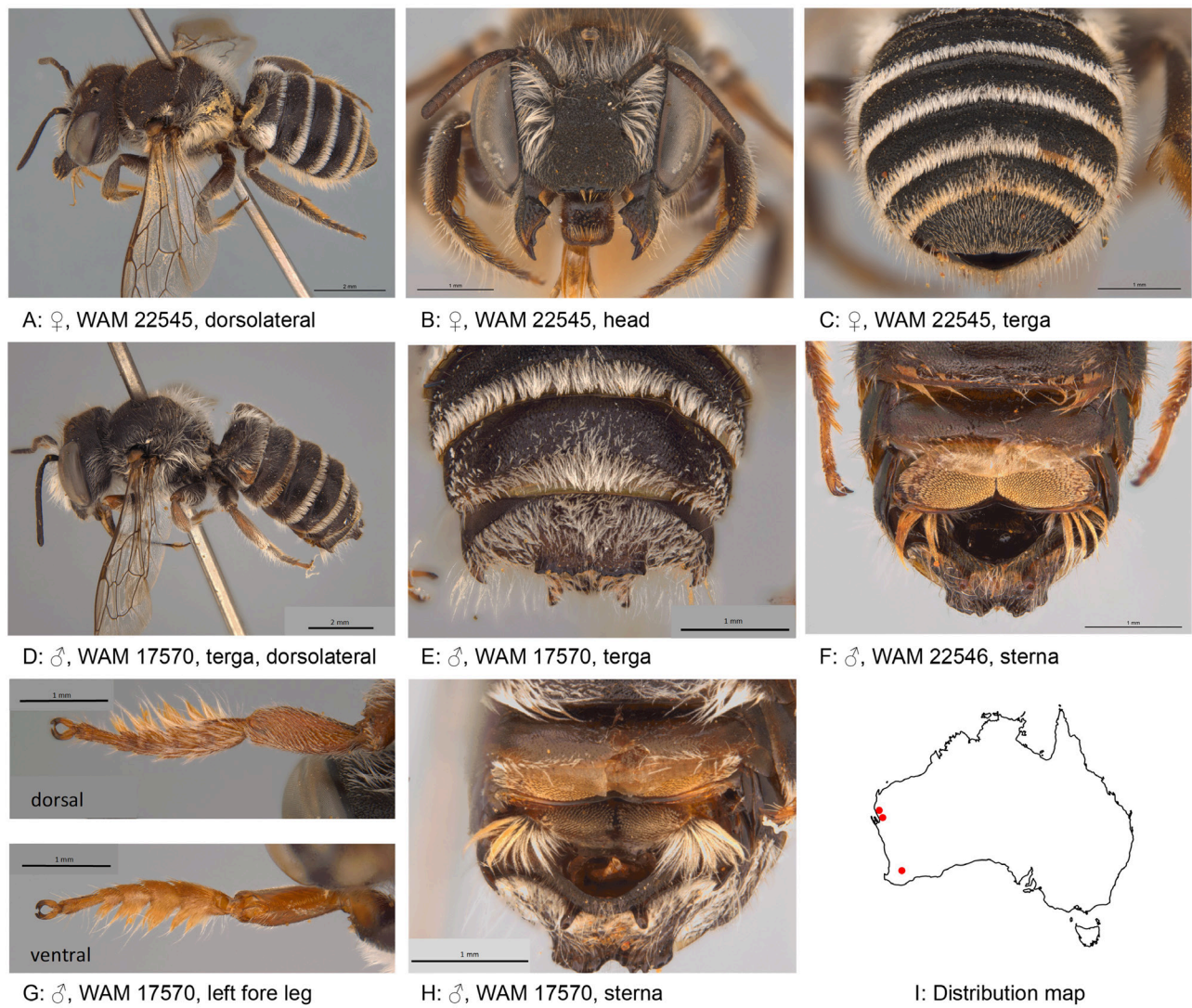
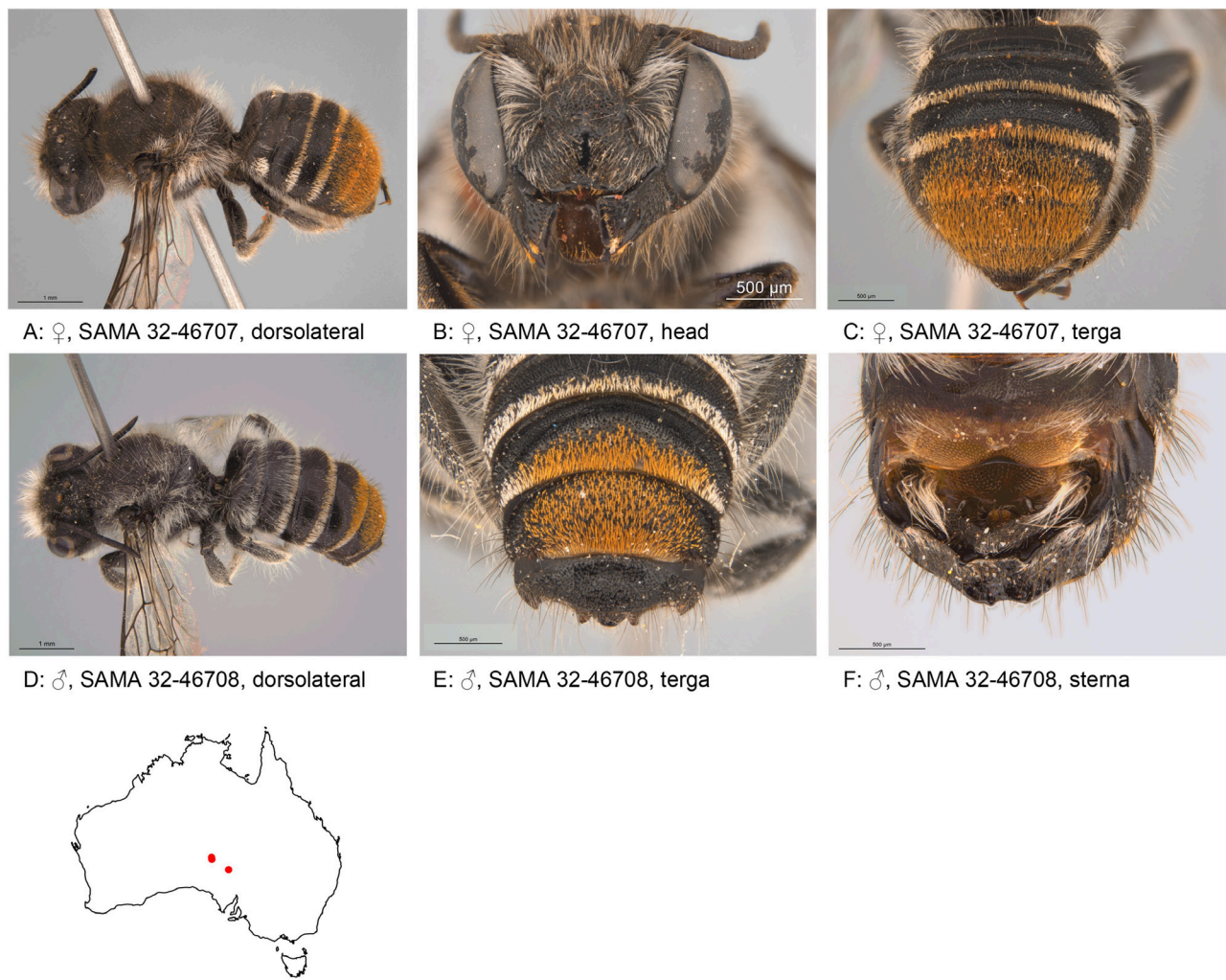
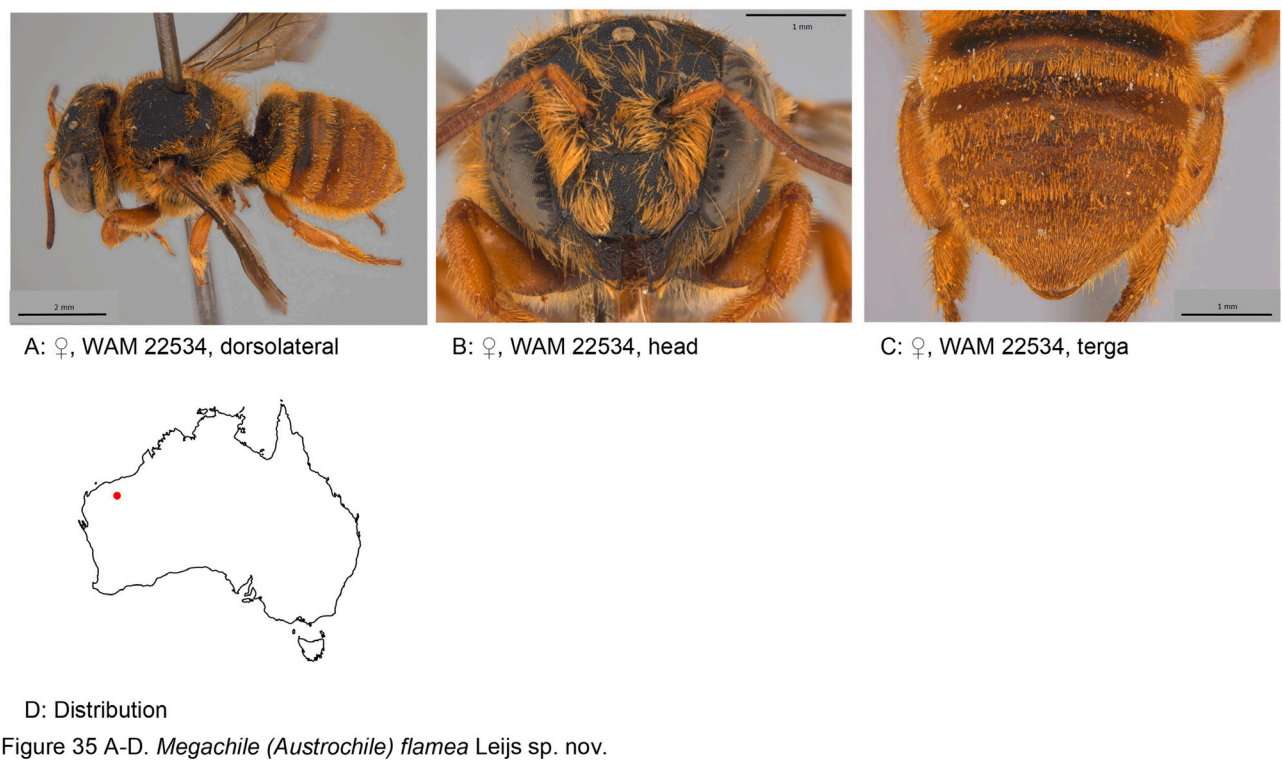
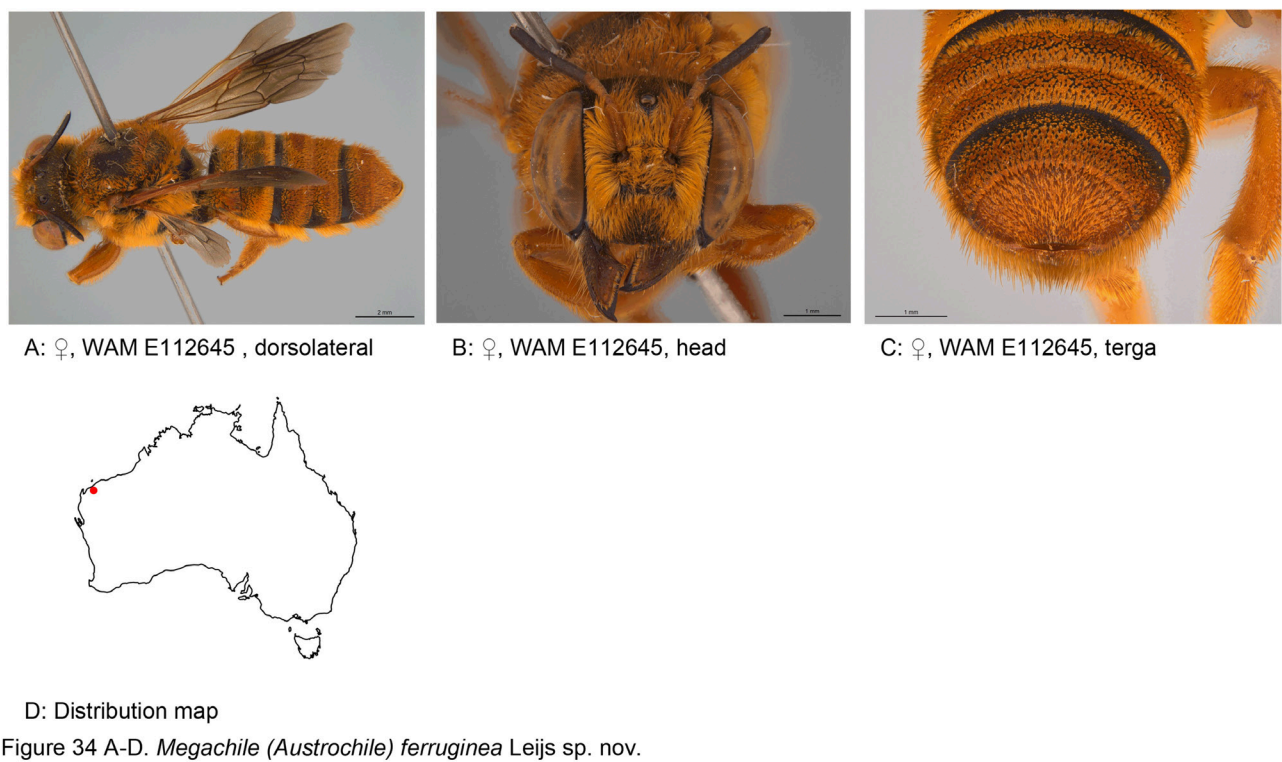
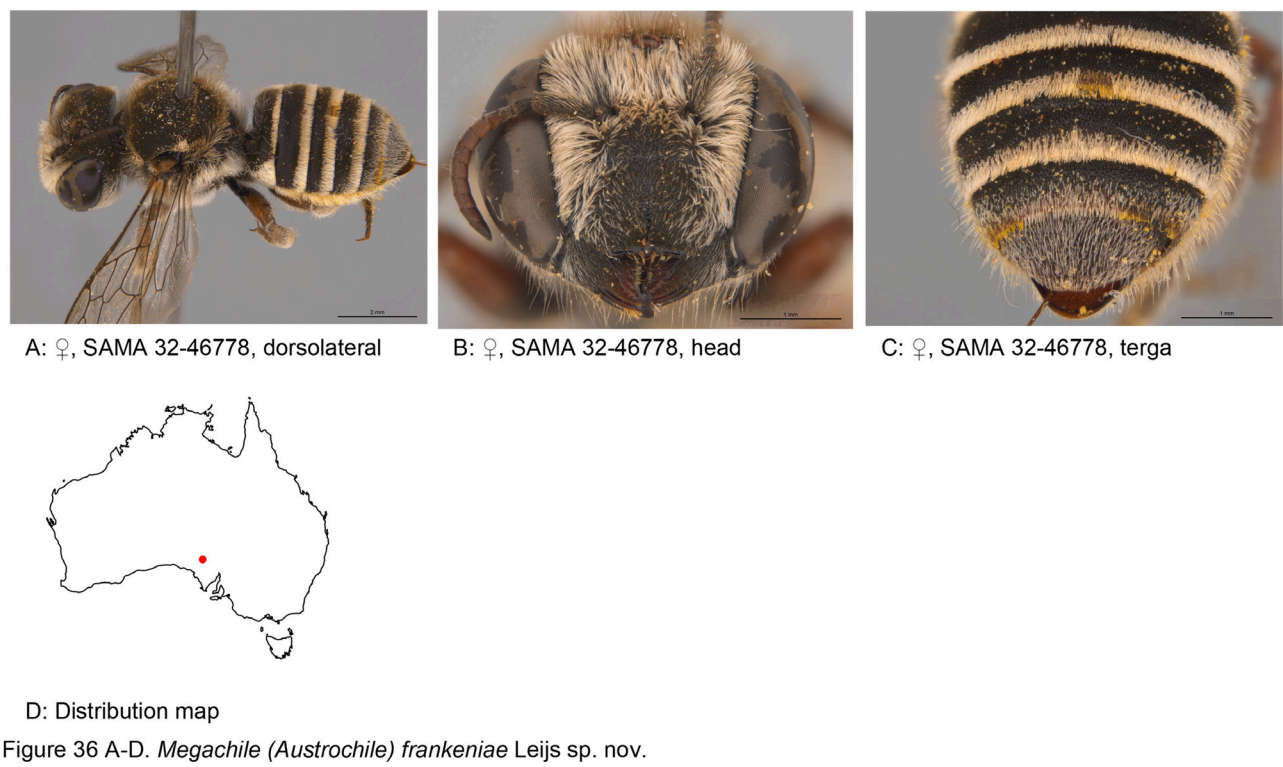


Figure 32 A-I. *Megachile (Austrochile) falcicula* Leijs sp. nov.



G: Distribution map
Figure 33 A-G. *Megachile (Austrochile) fennelli* Leijs sp. nov.





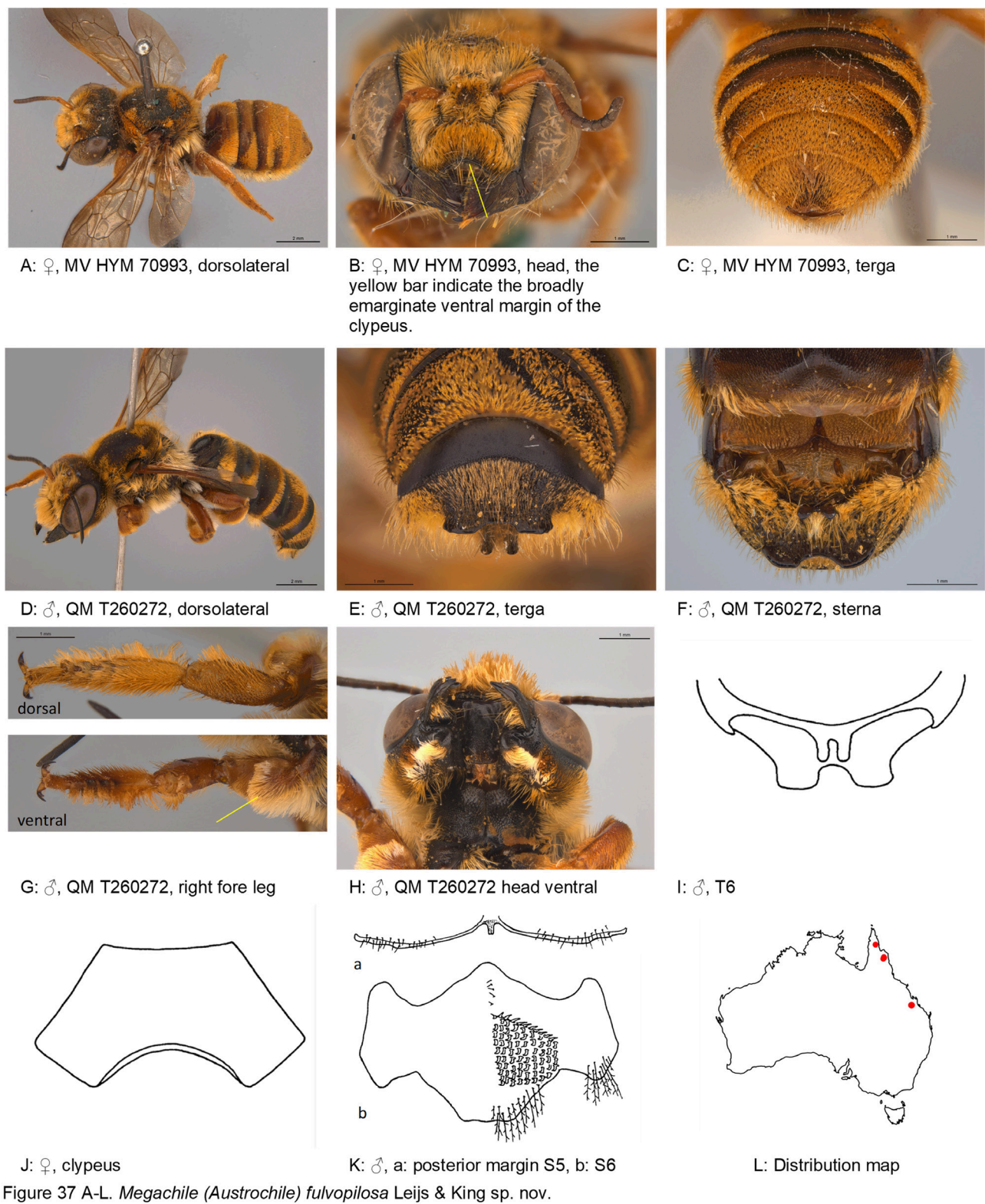


Figure 37 A-L. *Megachile (Austrochile) fulvopilosa* Leijs & King sp. nov.

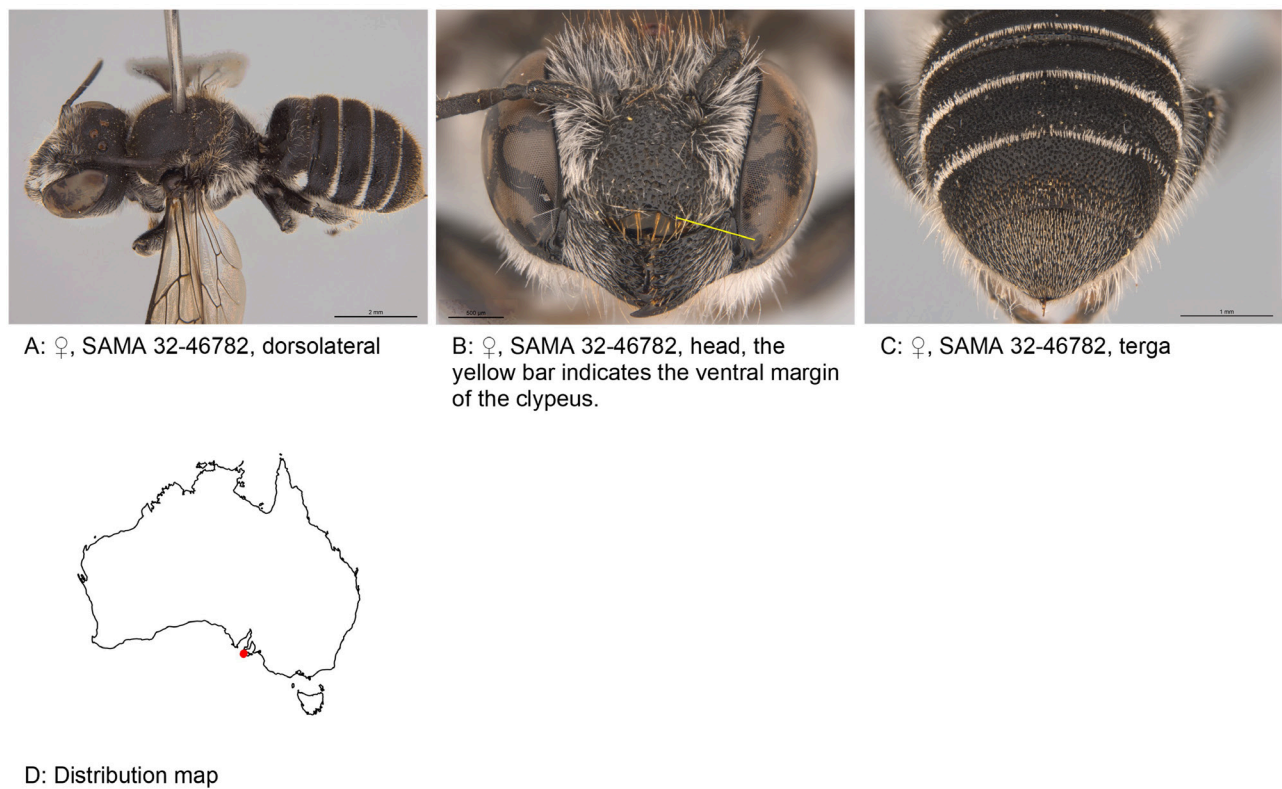


Figure 38 A-D. *Megachile (Austrochile) glatzi* Leijs sp. nov.

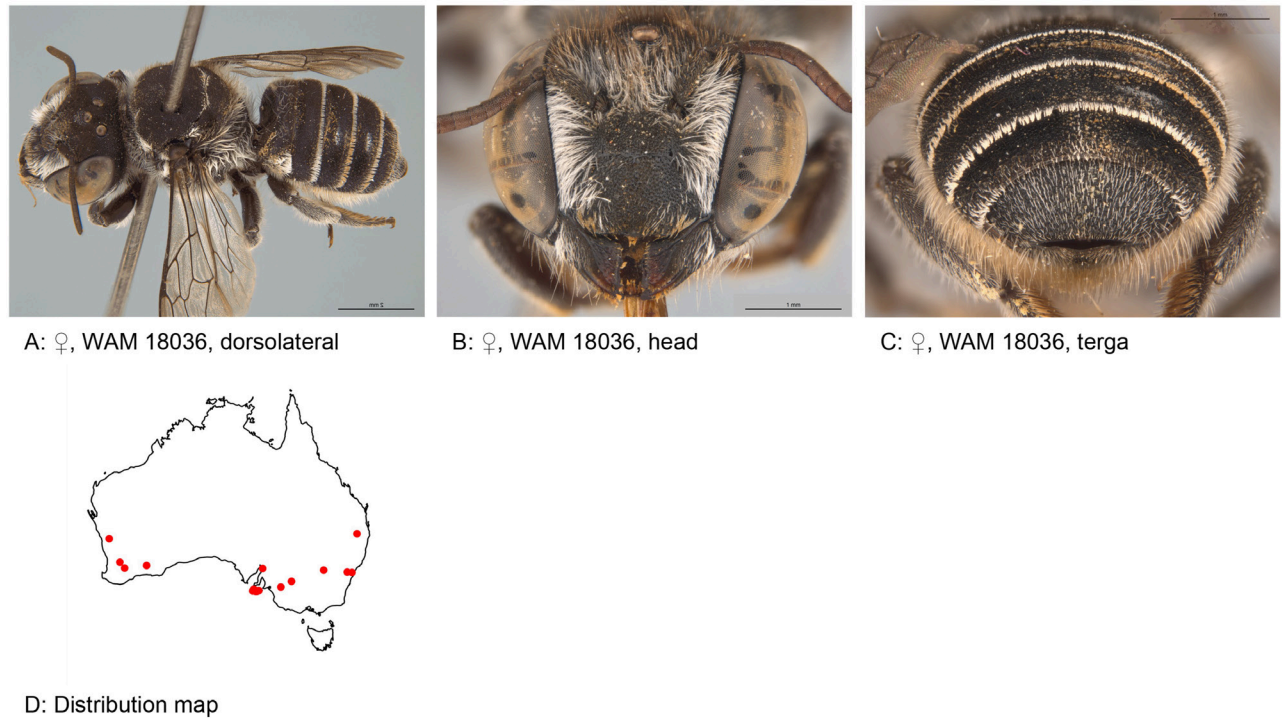
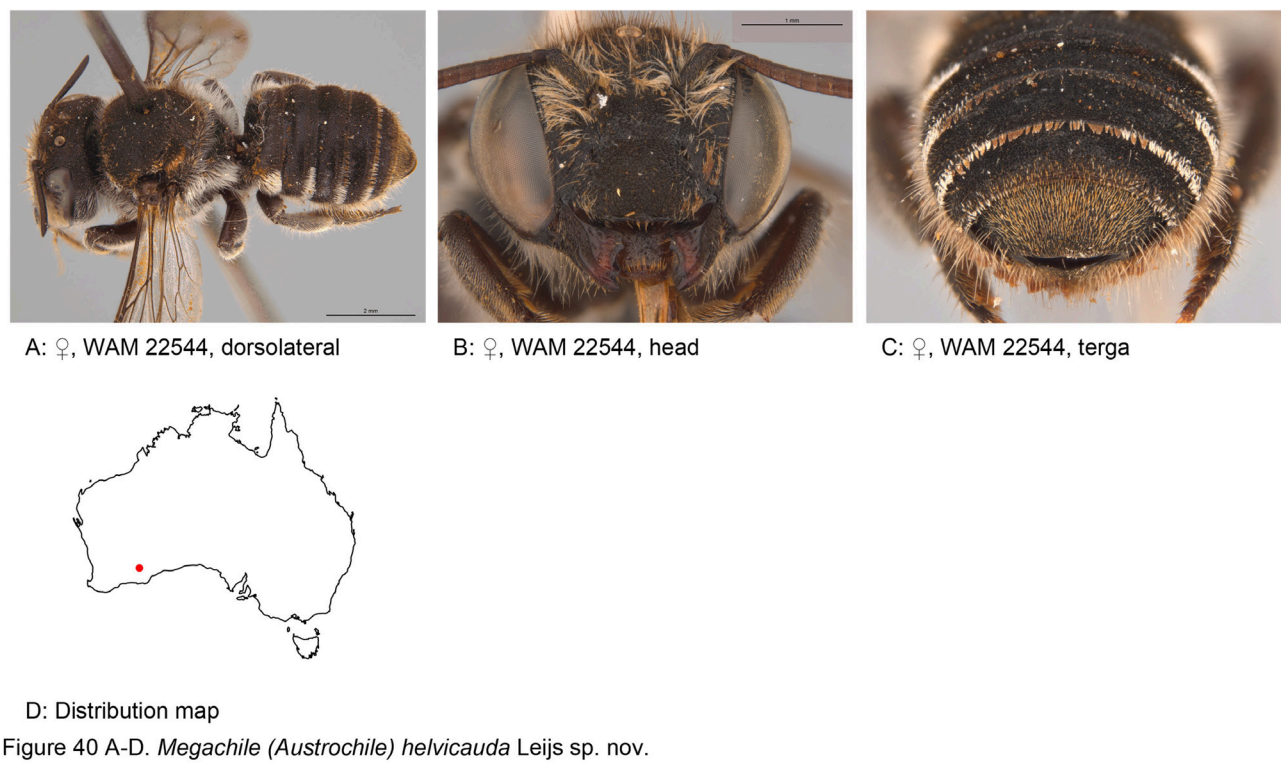


Figure 39 A-D. *Megachile (Austrochile) hamoni* Leijs sp. nov.



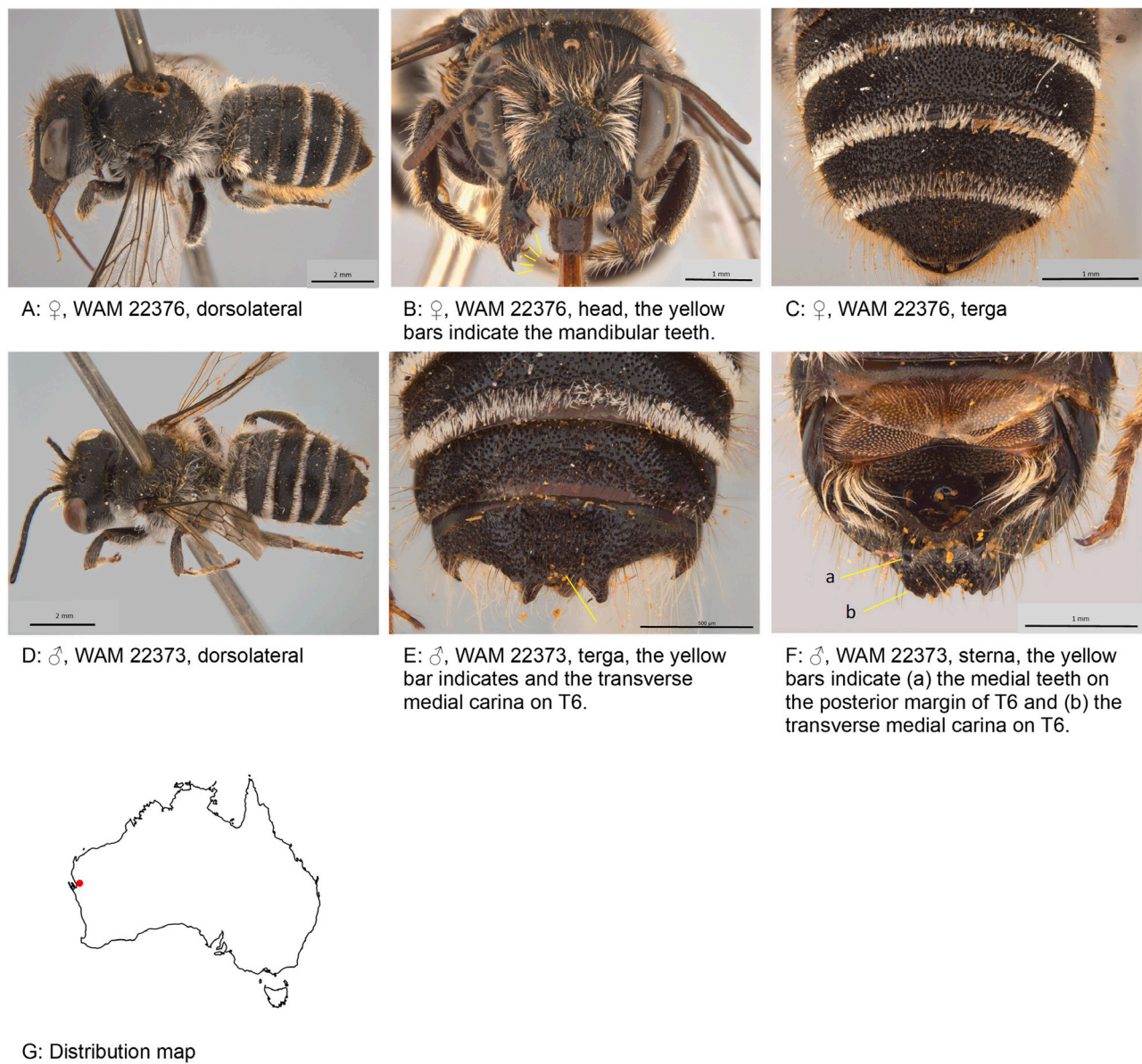


Figure 41 A-G. *Megachile (Austrochile) helvola* Leijs sp. nov.

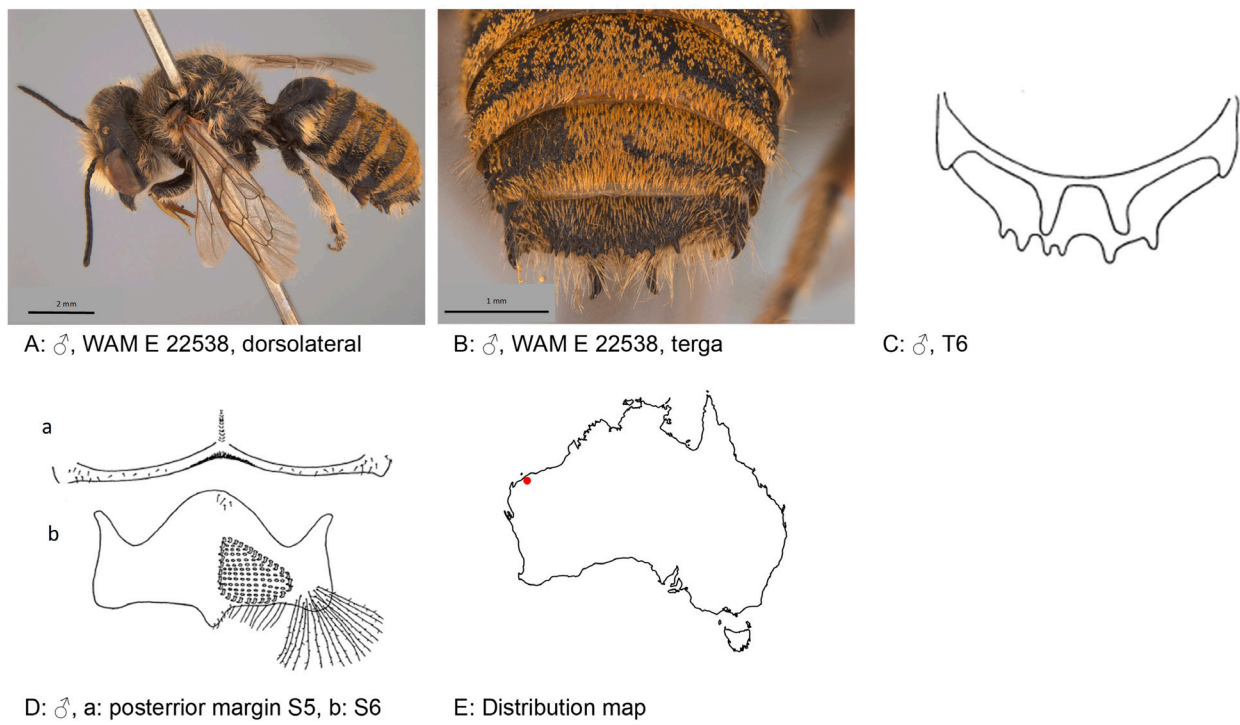
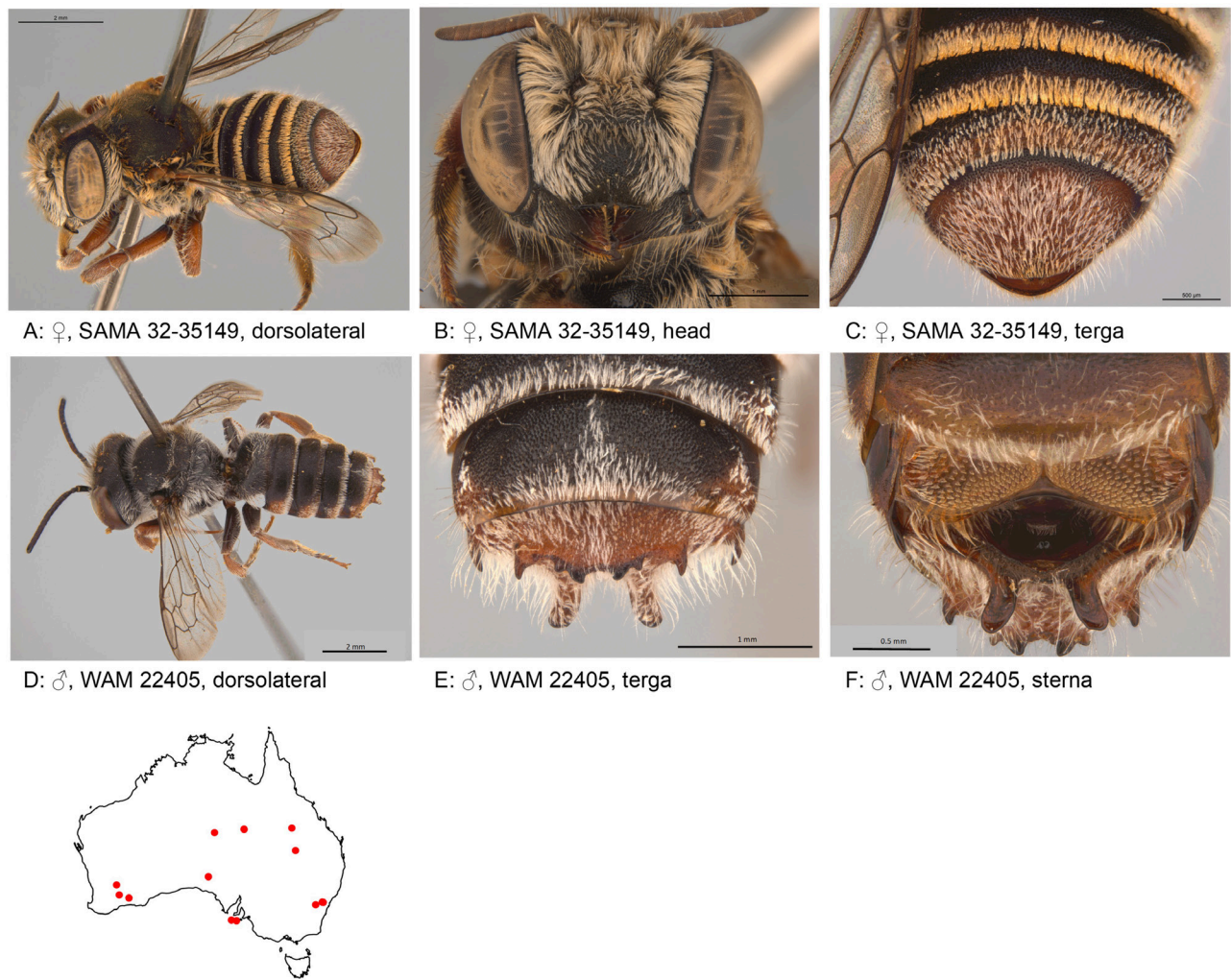
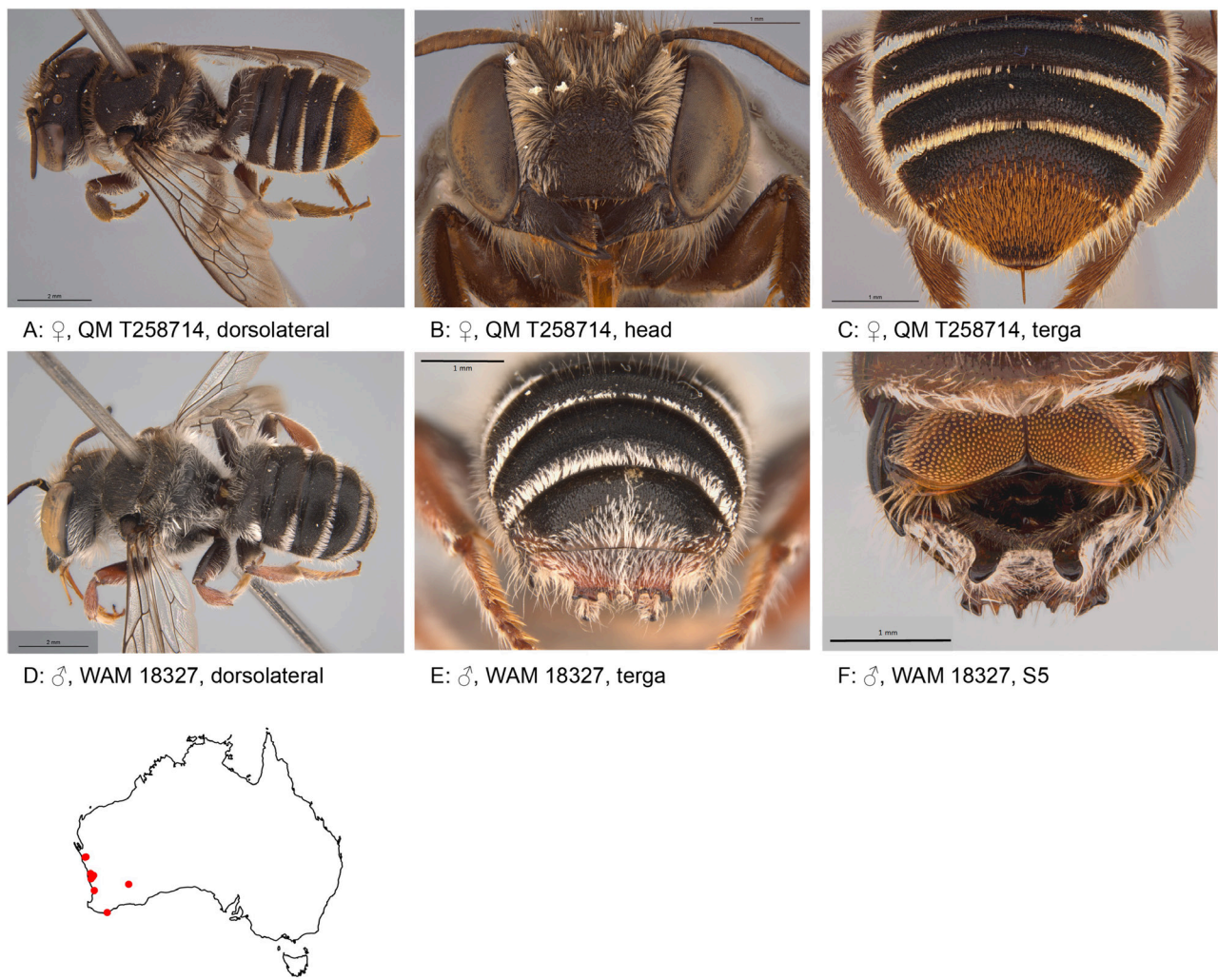


Figure 42 A-E. *Megachile (Austrochile) houstoni* Leijs & King sp. nov.



G: Distribution map

Figure 43 A-G. *Megachile (Austrochile) hudsoni* Leijs sp. nov.



G: Distribution map
Figure 44 A-G. *Megachile (Austrochile) kirbyana* (Cockerell, 1906)

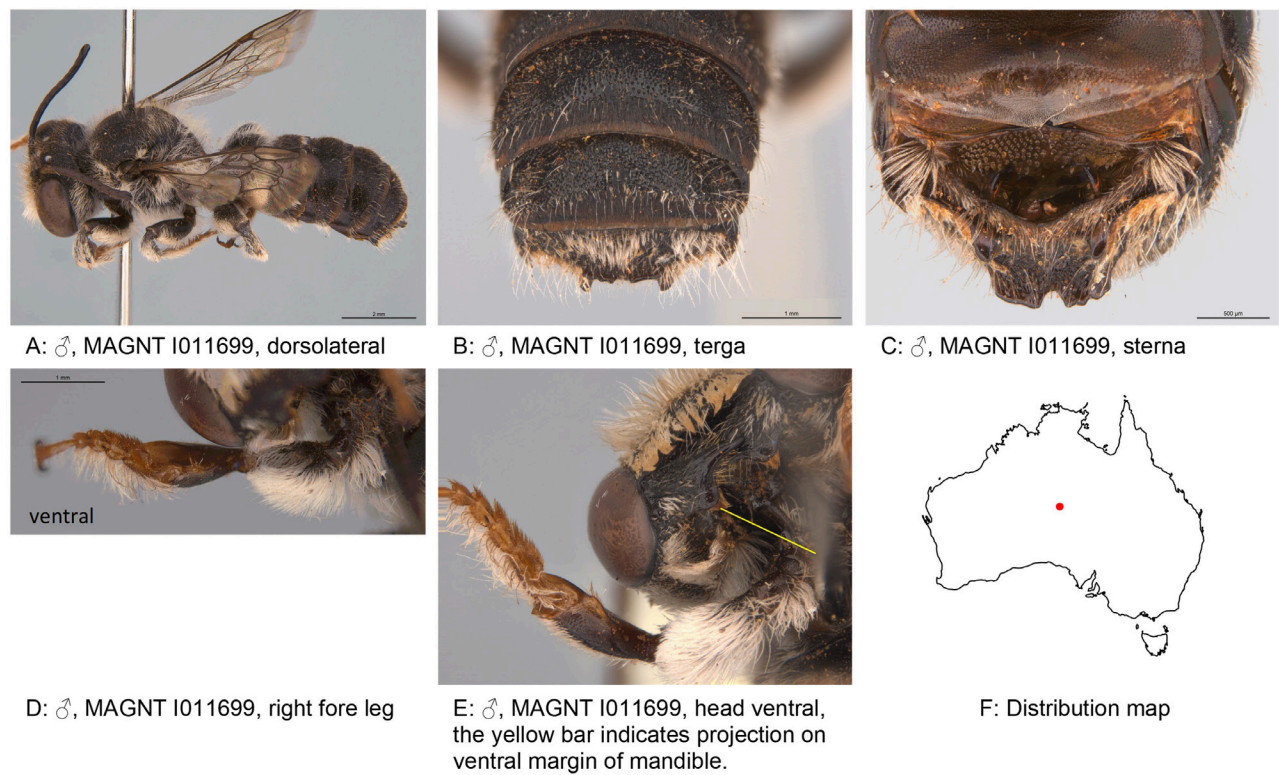


Figure 45 A-F. *Megachile (Austrochile) lobata* Leijs sp. nov.

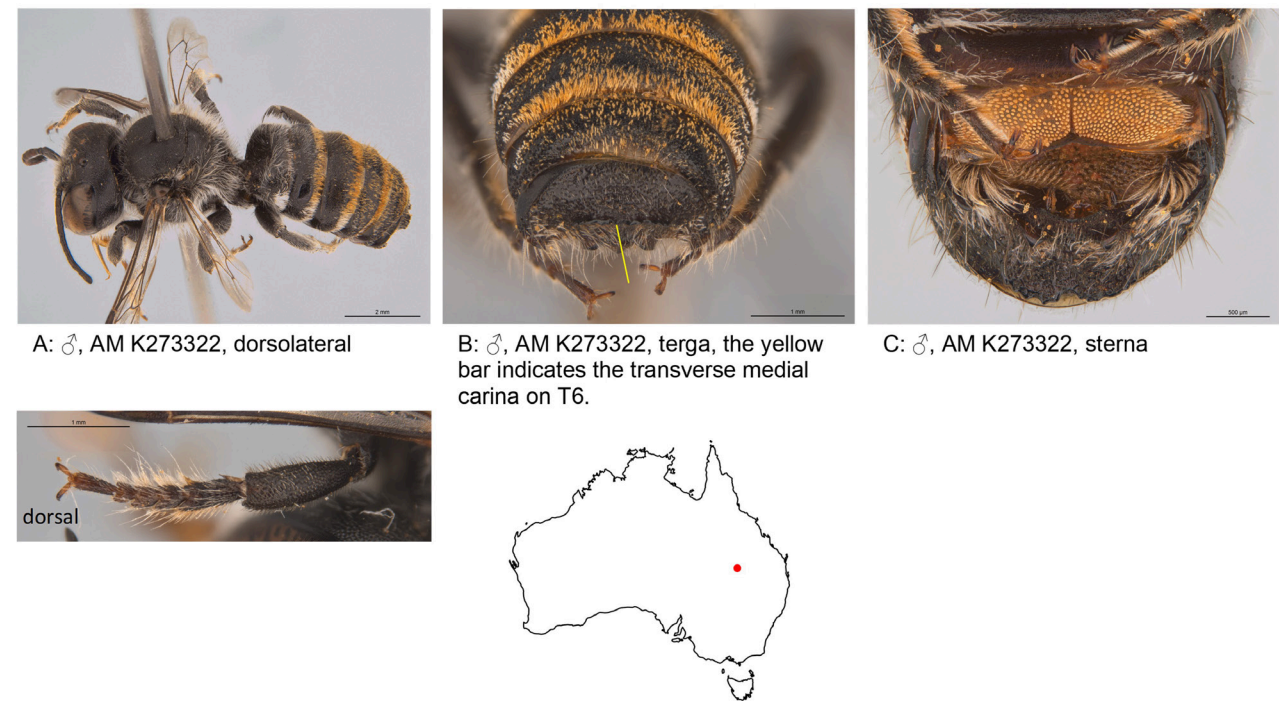
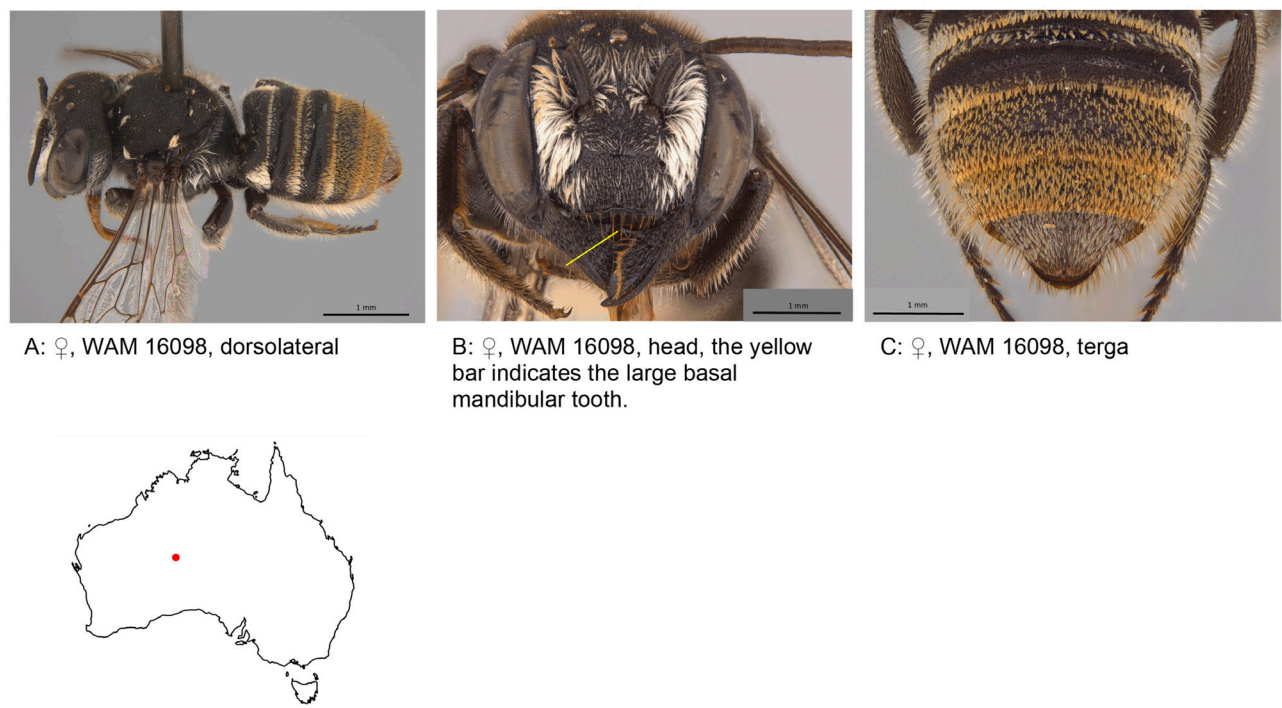


Figure 46 A-E. *Megachile (Austrochile) lucidacincta* Leijs sp. nov.



A: ♀, WAM 16098, dorsolateral

B: ♀, WAM 16098, head, the yellow bar indicates the large basal mandibular tooth.

C: ♀, WAM 16098, terga

D: Distribution map

Figure 47 A-D. *Megachile (Austrochile) mandibularis* Leijs sp. nov.



A: ♀, SAMA 32-40806, dorsolateral



B: ♀, SAMA 32-40806, head



C: ♀, SAMA 32-40806, terga



D: ♂, SAMA 32-37540, dorsolateral



E: ♂, SAMA 32-37540, terga



F: ♂, SAMA 32-37540, sterna



G: ♂, SAMA 32-37540, left fore leg



H: ♂, SAMA 32-37540 head ventral



I: Distribution map

Figure 48 A-I. *Megachile (Austrochile) maxillaris* Leijs sp. nov. AEC4675

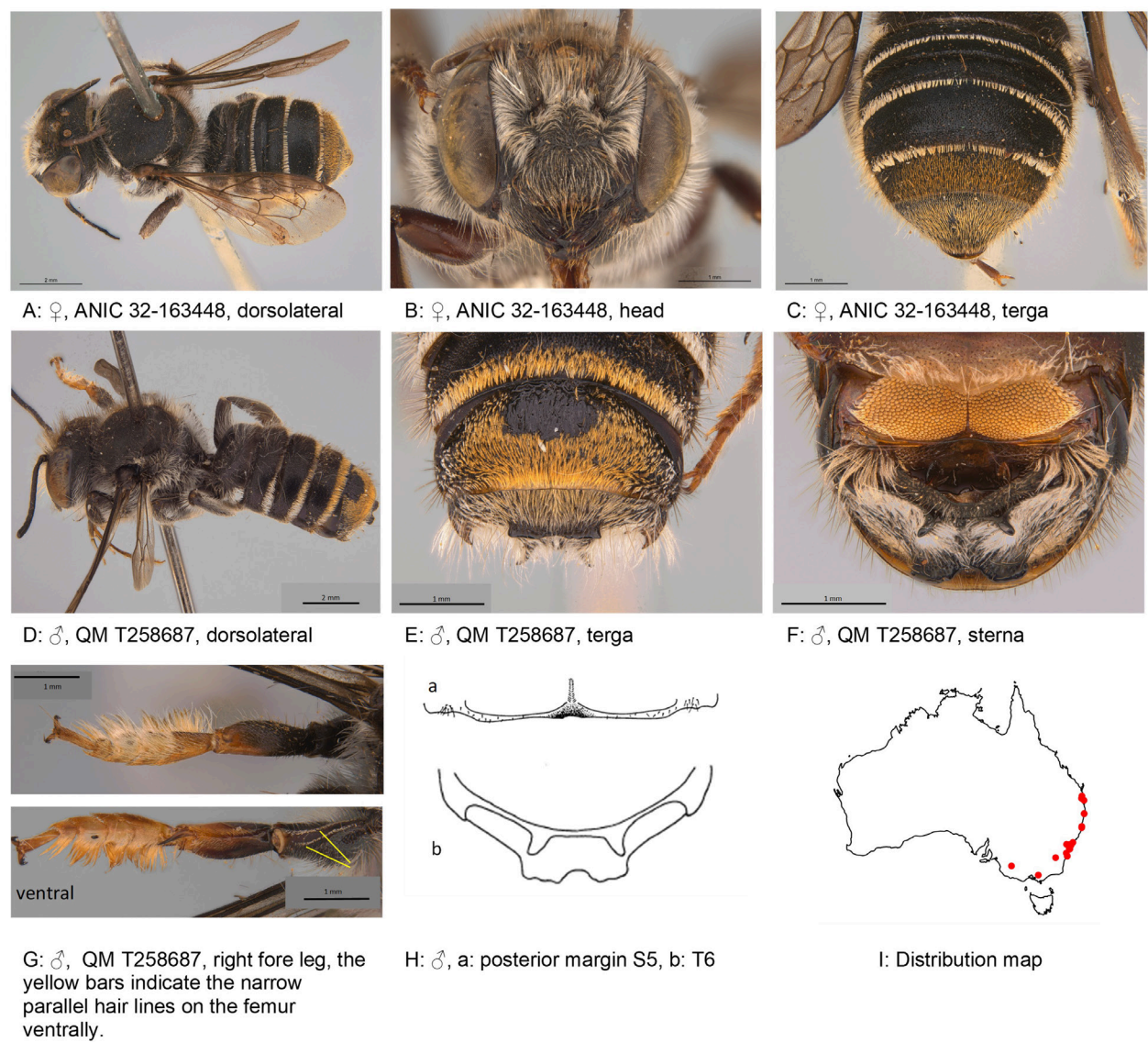


Figure 49 A-I. *Megachile (Austrochile) modesta* Smith, 1862

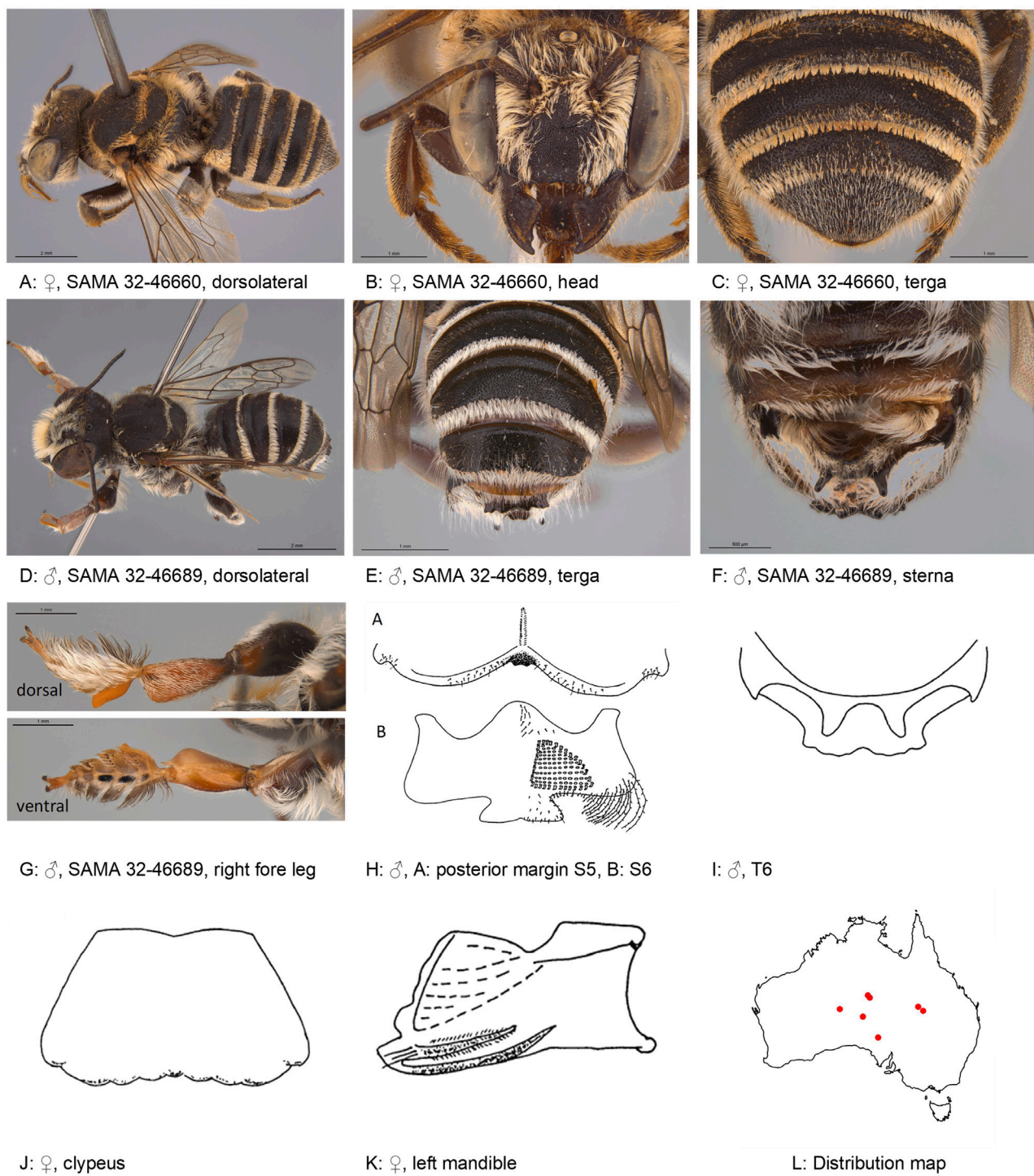


Figure 50 A-L. *Megachile (Austrochile) monteithi* Leijs & King sp. nov.



A: ♀, SAMA 32-37512, dorsolateral



B: ♀, SAMA 32-37512, head



C: ♀, SAMA 32-37512, terga



D: ♂, SAMA 32-37545, dorsolateral



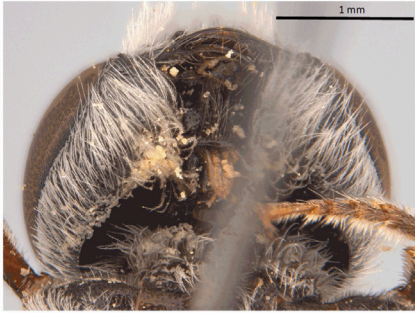
E: ♂, SAMA 32-37545, terga



F: ♂, SAMA 32-37545, sterna



G: ♂, SAMA 32-37545, right fore leg

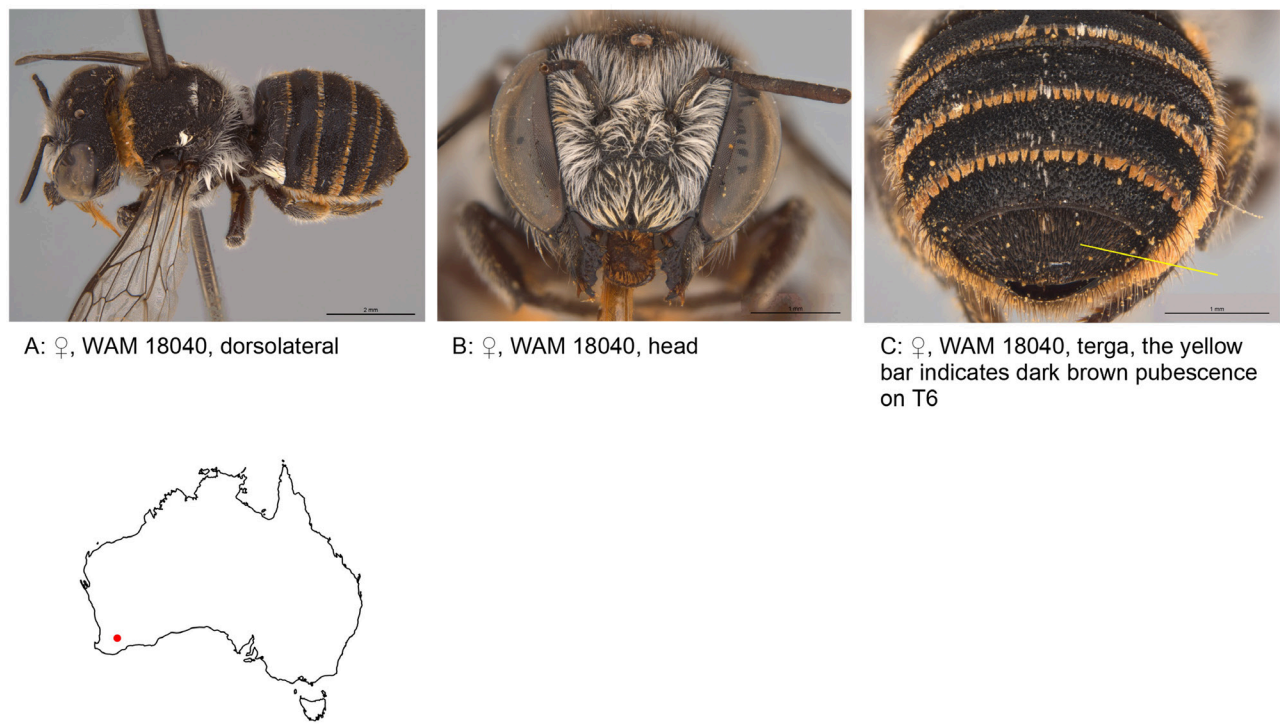


H: ♂, SAMA 32-37545, head ventral



I: Distribution map

Figure 51 A-I. *Megachile (Austrochile) multispina* Leijs sp. nov.



A: ♀, WAM 18040, dorsolateral

B: ♀, WAM 18040, head

C: ♀, WAM 18040, terga, the yellow bar indicates dark brown pubescence on T6

D: Distribution map

Figure 52 A-D. *Megachile (Austrochile) nigricauda* Leijs sp. nov.

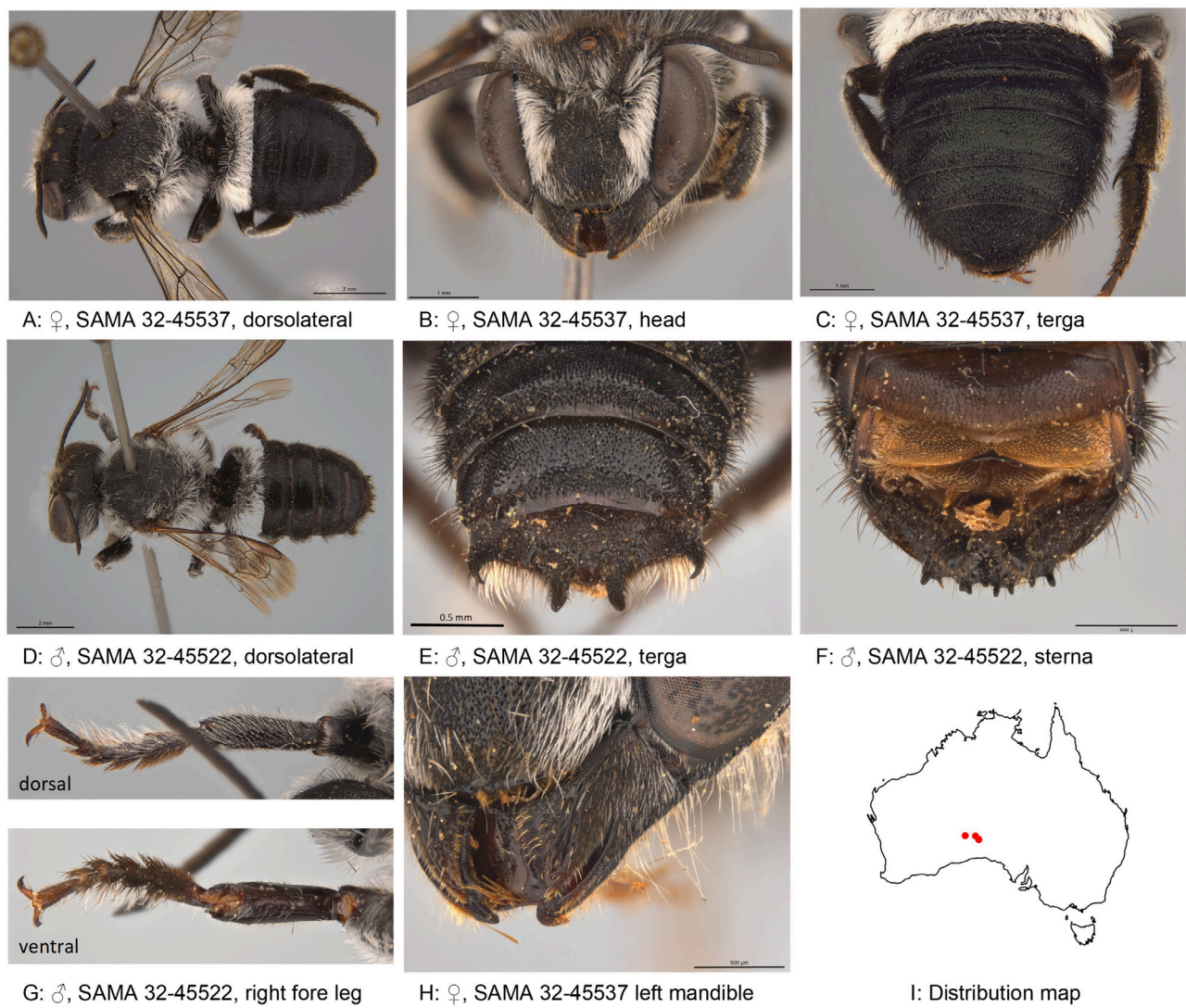
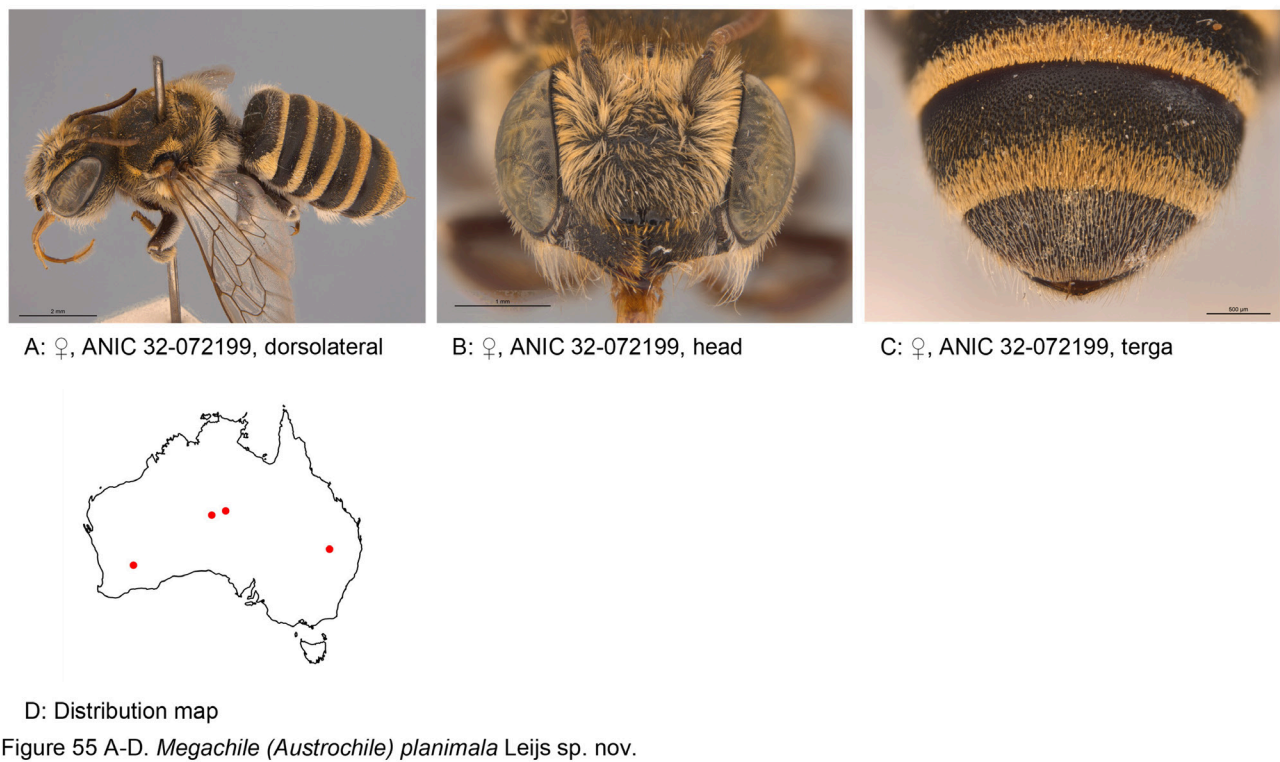
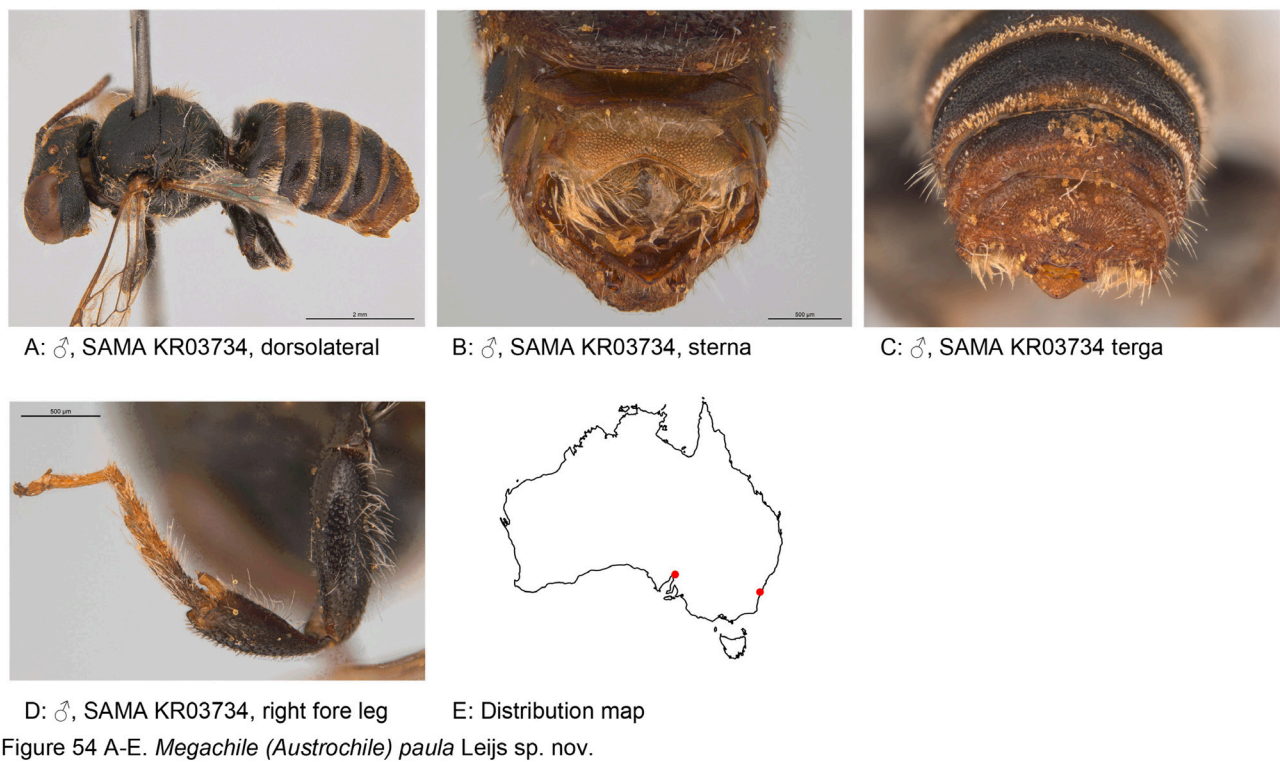


Figure 53 A-I. *Megachile (Austrochile) nigriscopa* Leijs sp. nov.



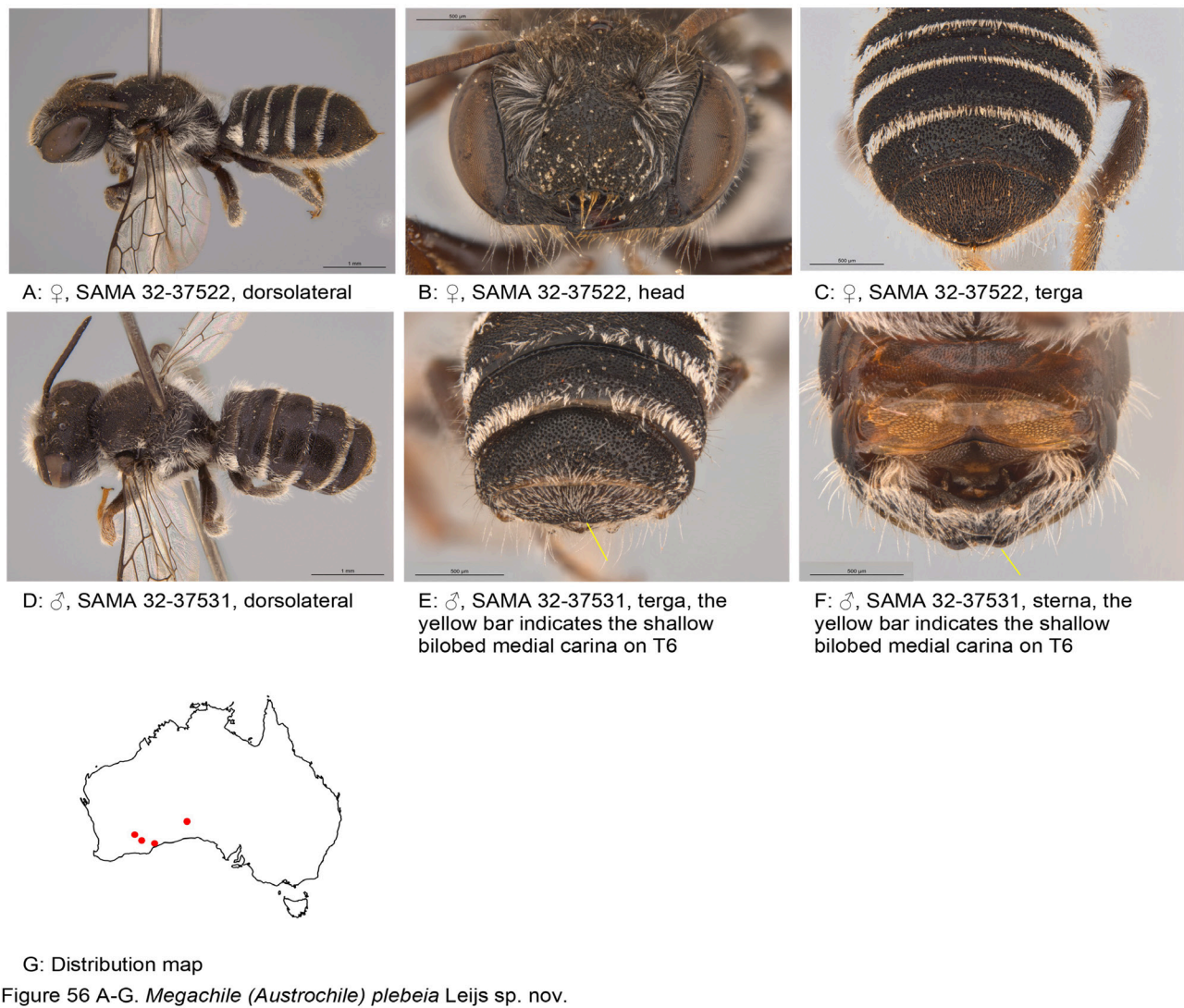


Figure 56 A-G. *Megachile (Austrochile) plebeia* Leijs sp. nov.



A: ♀, WAM 18143, dorsolateral



B: ♀, WAM 18143, head



C: ♀, WAM 18143, terga



D: ♂, WAM E 109871, dorsolateral



E: ♂, WAM E 109871, terga



F: ♂, WAM E 109871, sterna, the yellow bar indicates the short medial teeth on T6.

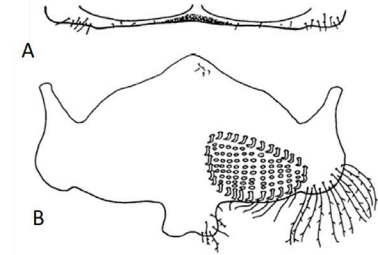


dorsal



ventral

G: ♂, WAM E 109871, right fore leg



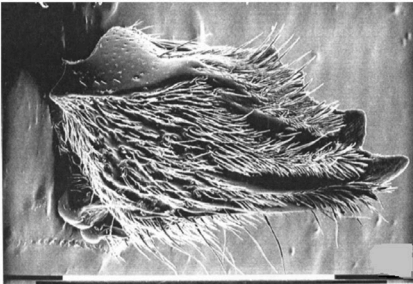
H: ♂, A: posterior margin of S5, B: S6



I: ♂, T6



J: ♀, clypeus



K: ♀, right mandible (bar 1 mm)



L: Distribution map

Figure 57 A-L. *Megachile (Austrochile) preissi* Cockerell, 1910.

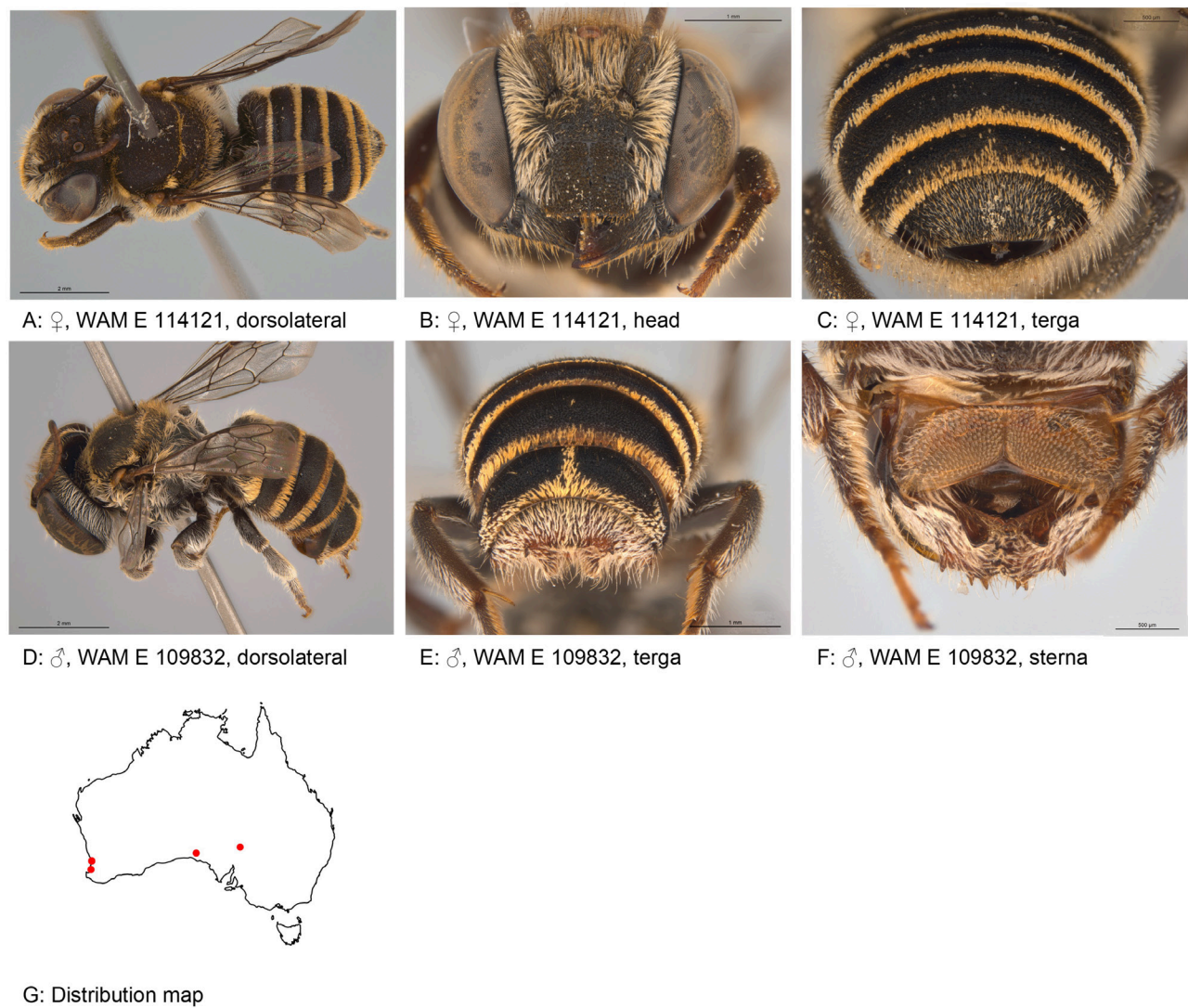


Figure 58 A-G. *Megachile (Austrochile) prendergastae* Leijs sp. nov.



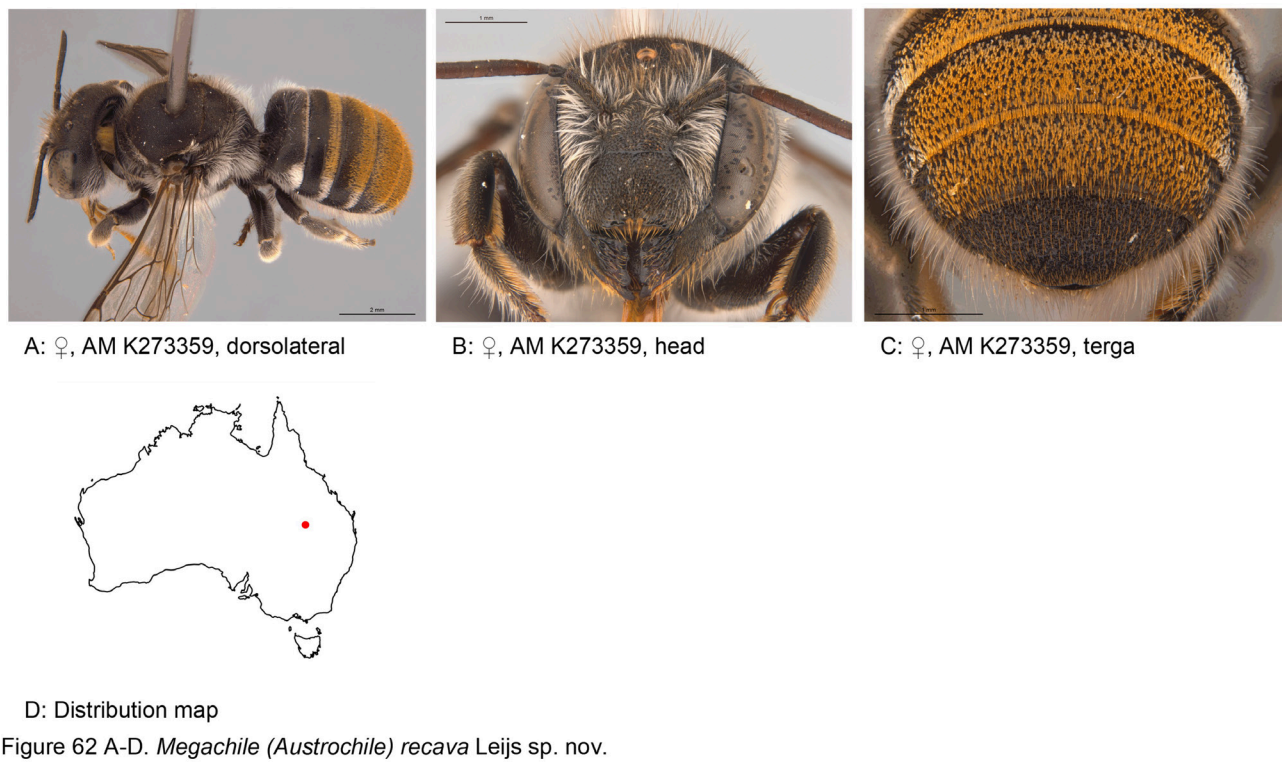
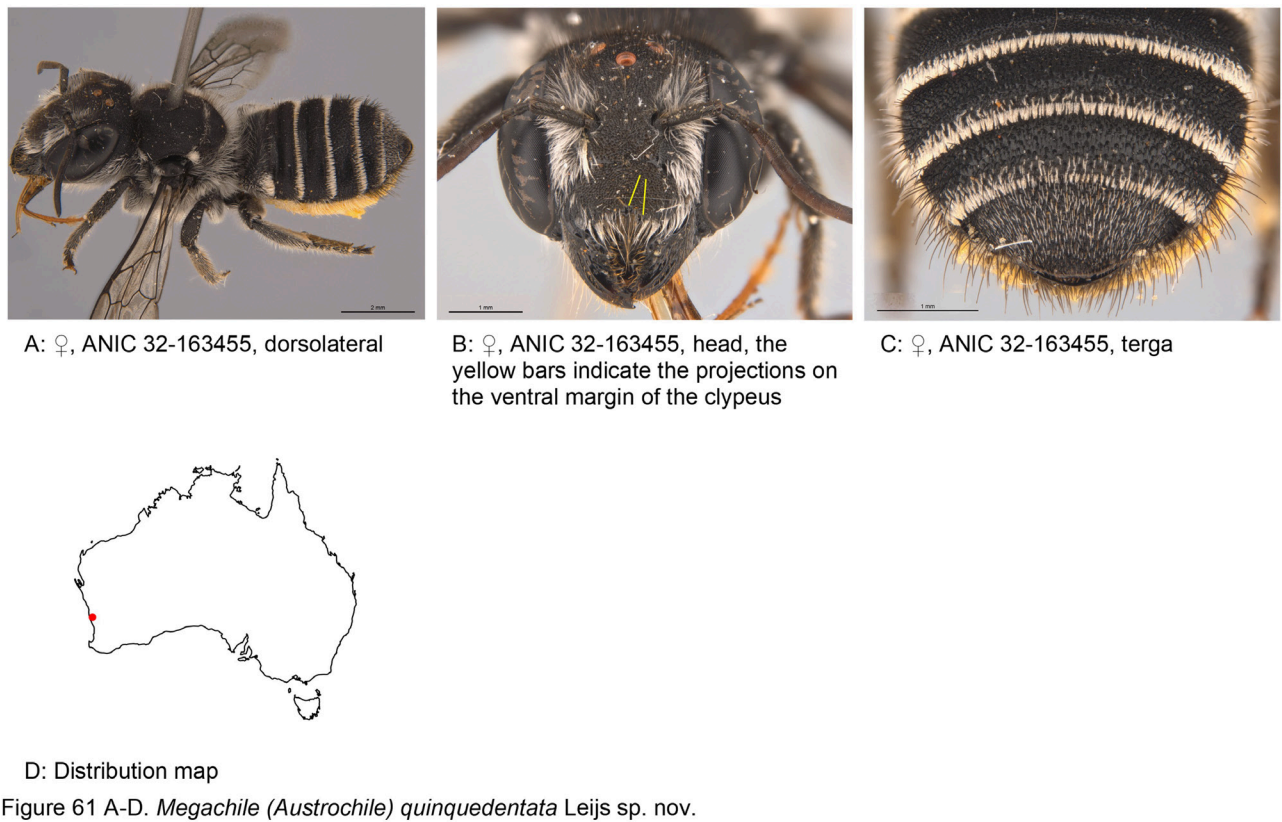
D: Distribution map

Figure 59 A-D. *Megachile (Austrochile) quadricincta* Leijs sp. nov.



D: Distribution map

Figure 60 A-D. *Megachile (Austrochile) quinquecincta* Leijs sp. nov.



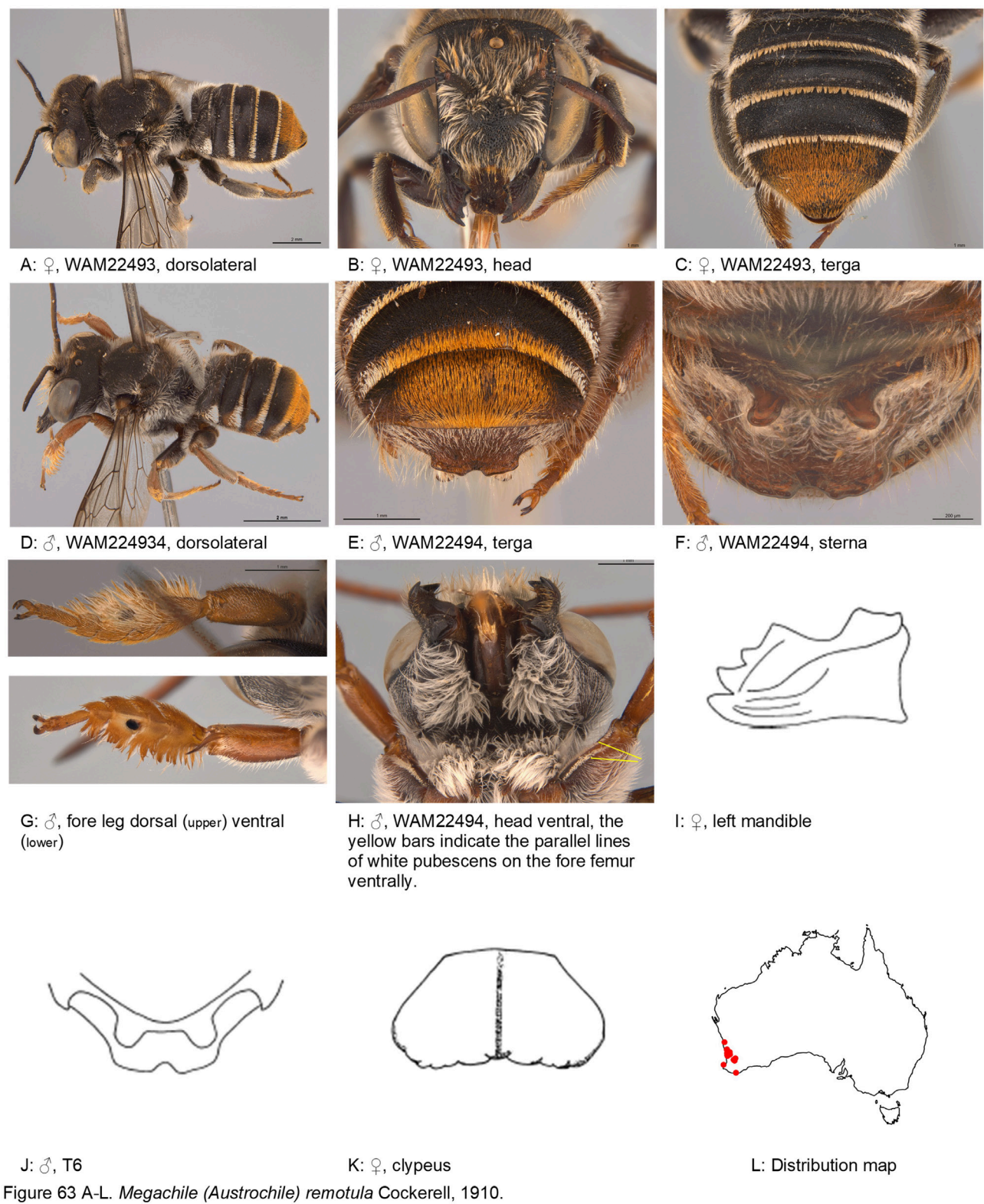
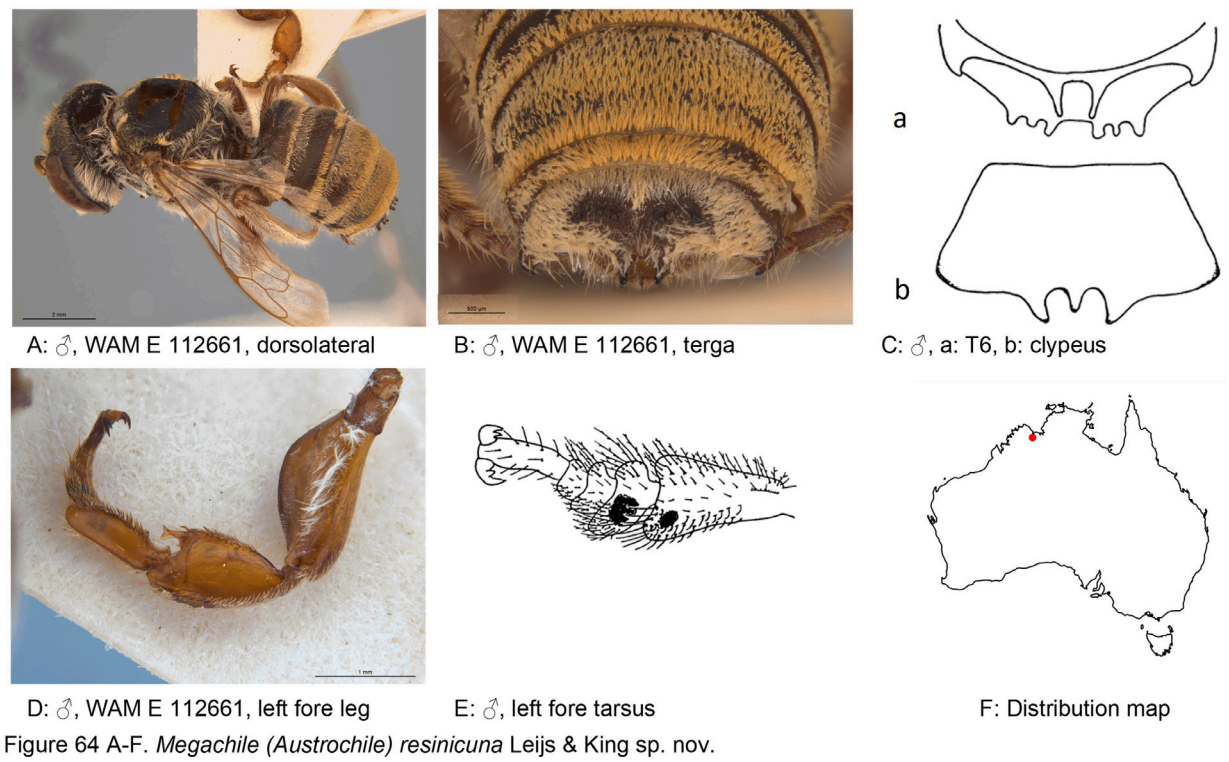


Figure 63 A-L. *Megachile (Austrochile) remotula* Cockerell, 1910.





A: ♀, WAM22466, dorsolateral



B: ♀, WAM22466, head



C: ♀, WAM22466, terga



D: ♂, WAM 22454, dorsolateral



E: ♂, WAM 22454, ventral



F: ♂, WAM 22454, sterna

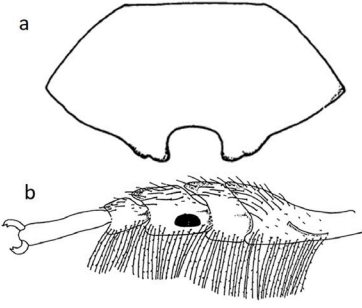


dorsal

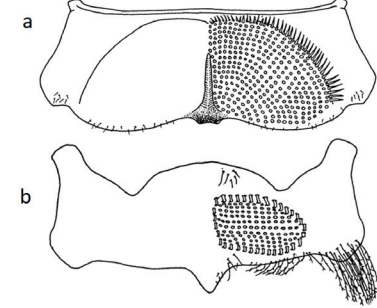


ventral

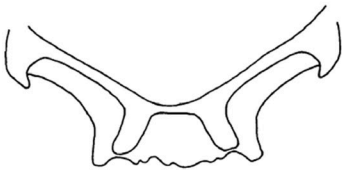
G: ♂, WAM 22454, right fore leg



H: ♂, a: clypeus, b: right fore tarsus



I: ♂, a: S5, b: S6



J: ♂, T6



K: Distribution map

Figure 65 A-K. *Megachile (Austrochile) resinifera* Meade-Waldo, 1915



A: ♀, WAM 22415, dorsolateral



B: ♀, WAM 22415, head



C: ♀, WAM 22415, terga



D: ♂, WAM 22416, dorsolateral



E: ♂, WAM 22416, terga



F: ♂, WAM 22416, sterna

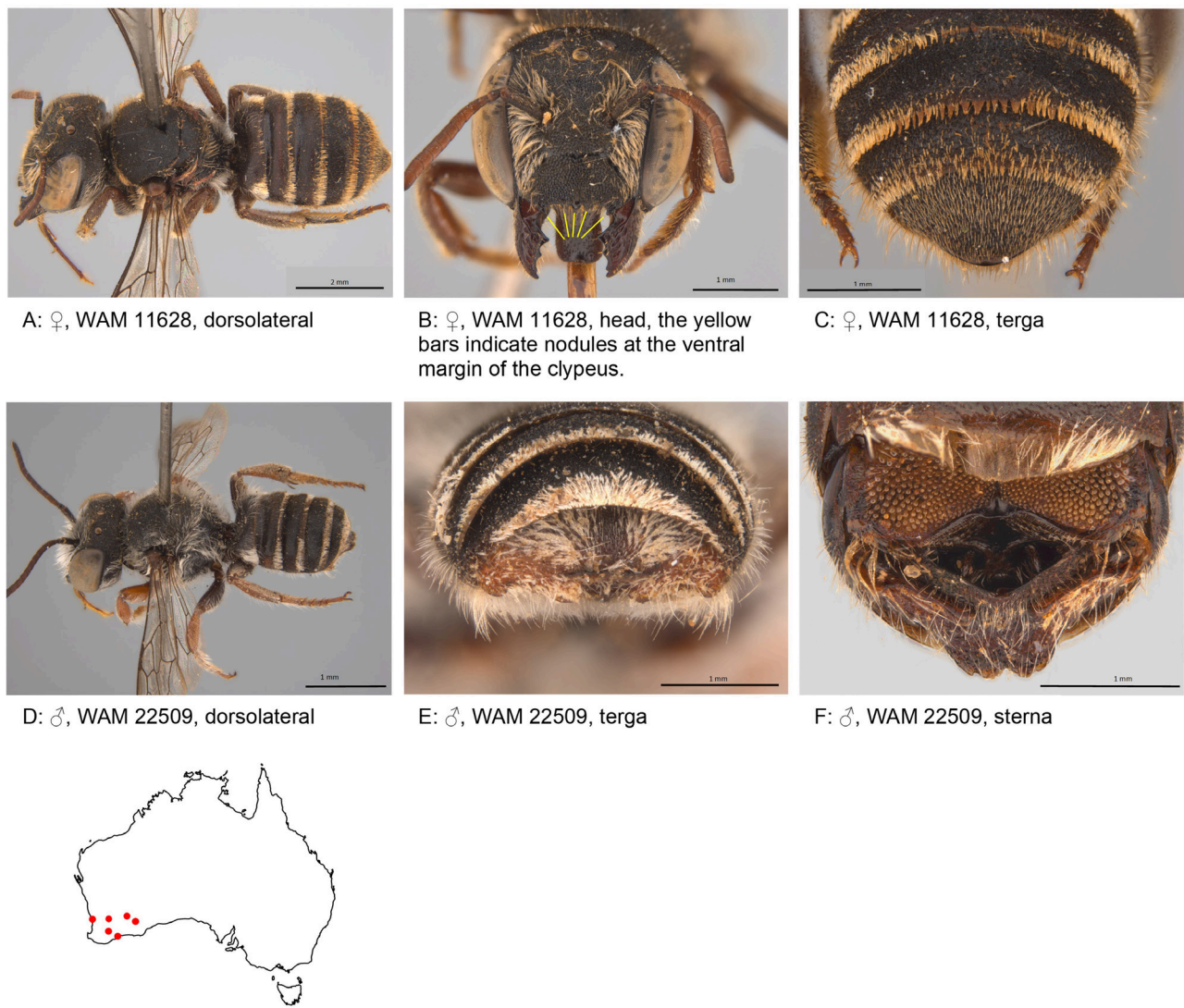


G: ♂, WAM 22416, left fore leg



H: Distribution map

Figure 66 A-H. *Megachile (Austrochile) rotnestensis* Rayment, 1934



G: Distribution map

Figure 67 A-G. *Megachile (Austrochile) rufipes* Leijs sp. nov.

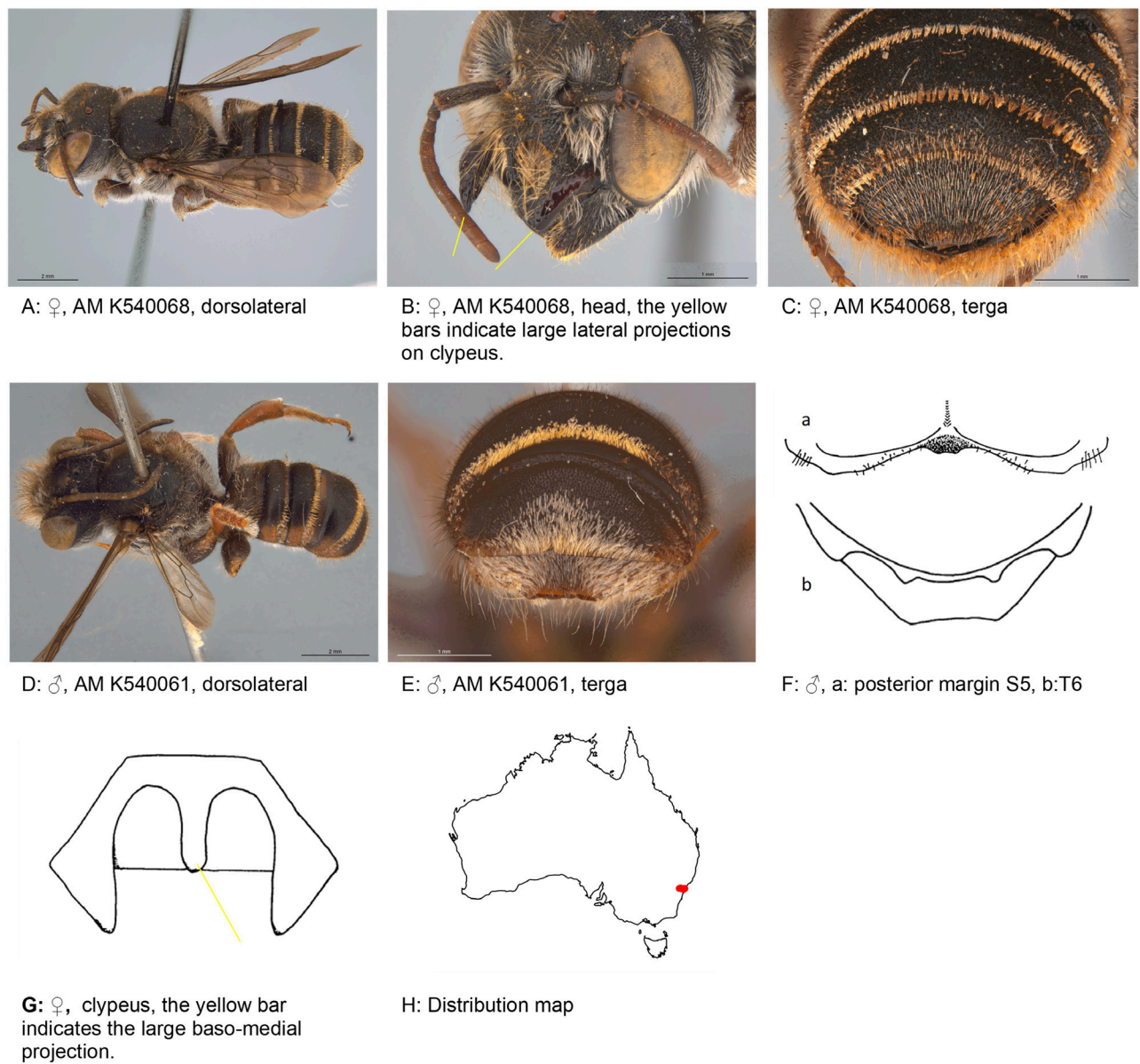


Figure 68 A-H. *Megachile (Austrochile) rufomaculata* Rayment 1935

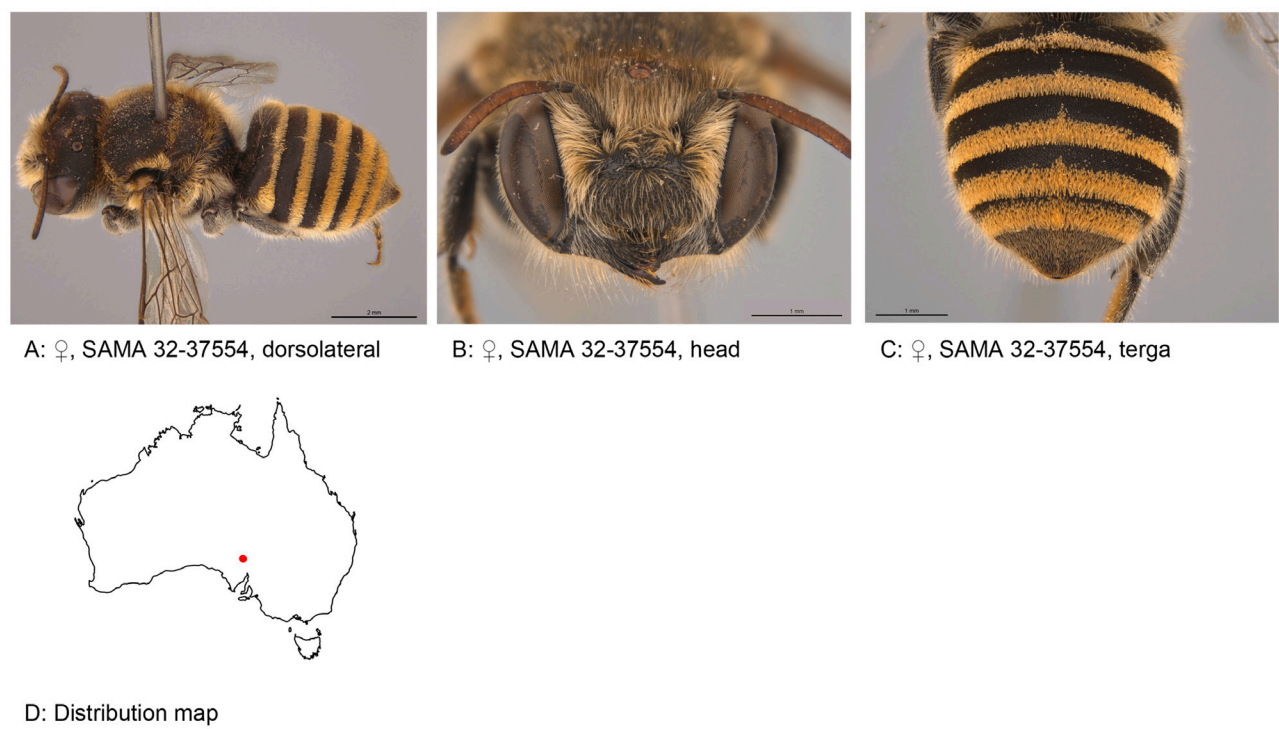


Figure 69 A-D. *Megachile (Austrochile) siliceacincta* Leijs sp. nov.

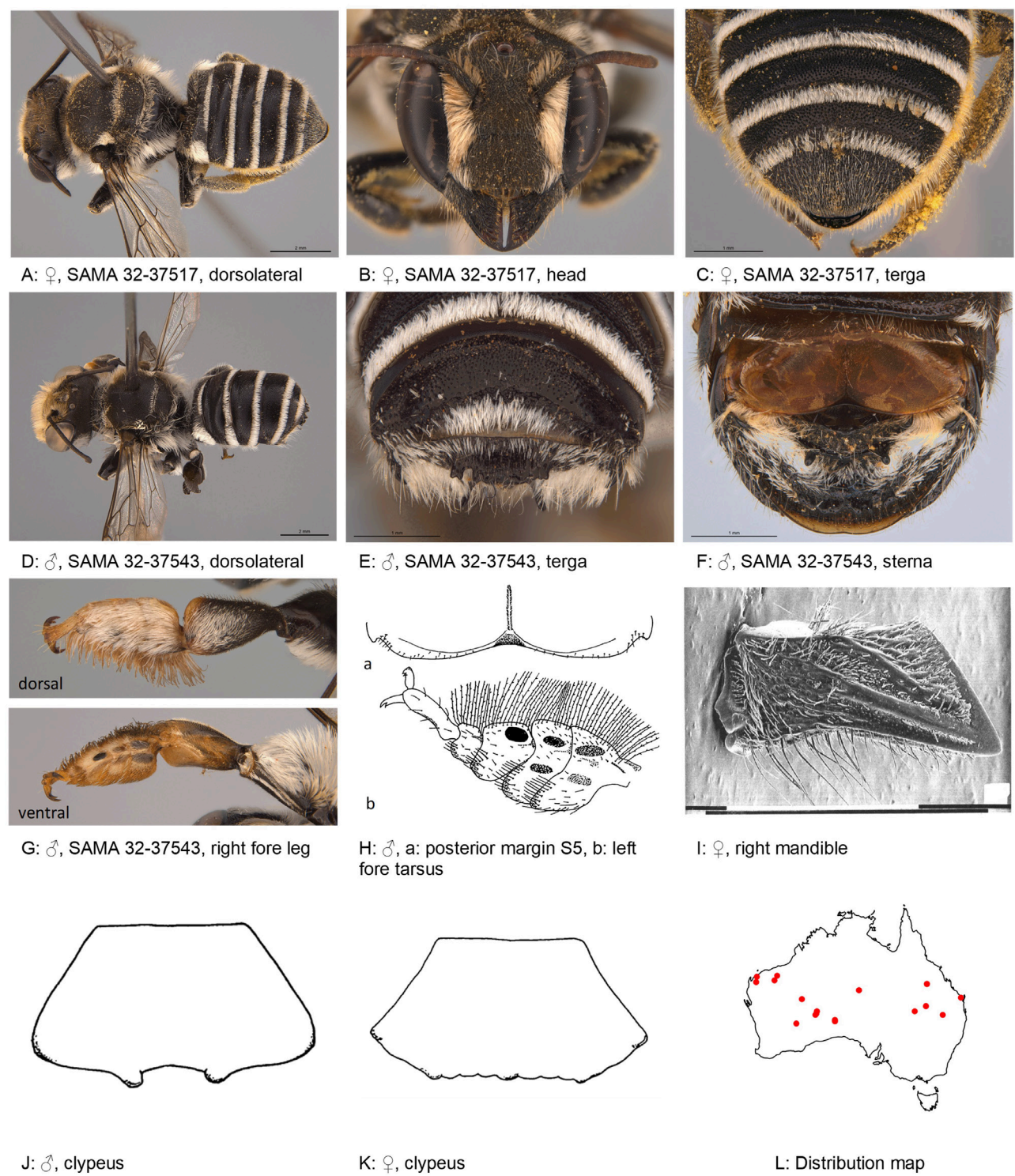


Figure 70 A-L. *Megachile (Austrochile) spinalta* Leijs & King sp. nov.



A: ♀, SAMA 32-46696, dorsolateral



B: ♀, SAMA 32-46696, head



C: ♀, SAMA 32-46696, terga



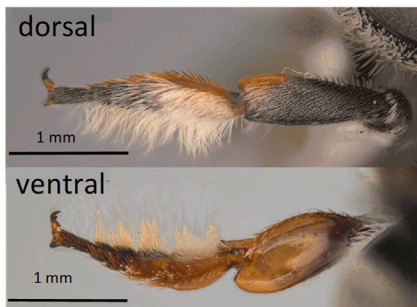
D: ♂, SAMA 32-46695, dorsolateral



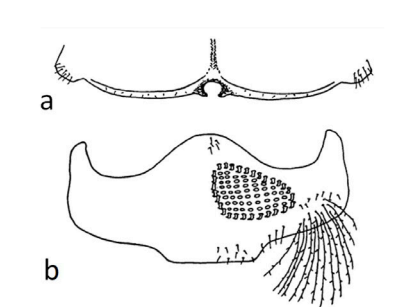
E: ♂, SAMA 32-46695, terga



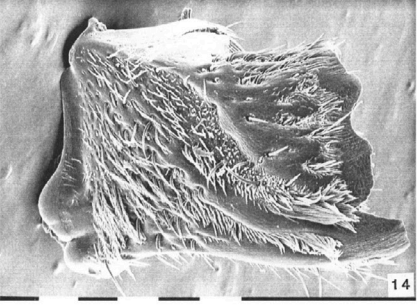
F: ♂, SAMA 32-46695, sterna



G: ♂, SAMA 32-46695 fore leg



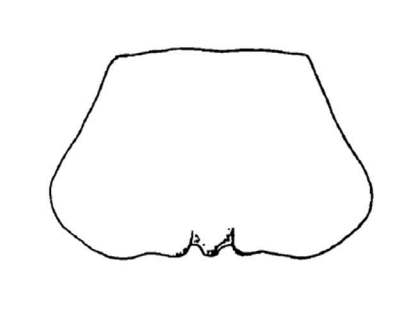
H: ♂, a: S5, b: S6



I: ♀, SEM right mandible. Tips Te1, Te2 broken



J: Resin-pot brood cells on twig
QM T258685



K: ♀, clypeus



L: Distribution map

Figure 71 A-L. *Megachile (Austrochile) tarltoni* Leijs & King sp. nov.



A: ♀, SAMA 32-37501, dorsolateral



B: ♀, SAMA 32-37501, head, the yellow bar indicates the smooth ventral margin of the clypeus.



C: ♀, SAMA 32-37501, terga



D: ♂, SAMA 32-39547, dorsolateral



E: ♂, SAMA 32-39547, terga



F: ♂, SAMA 32-39547, sterna



G: ♂, SAMA 32-46689, right fore leg



H: ♂, SAMA 32-46689, head ventral

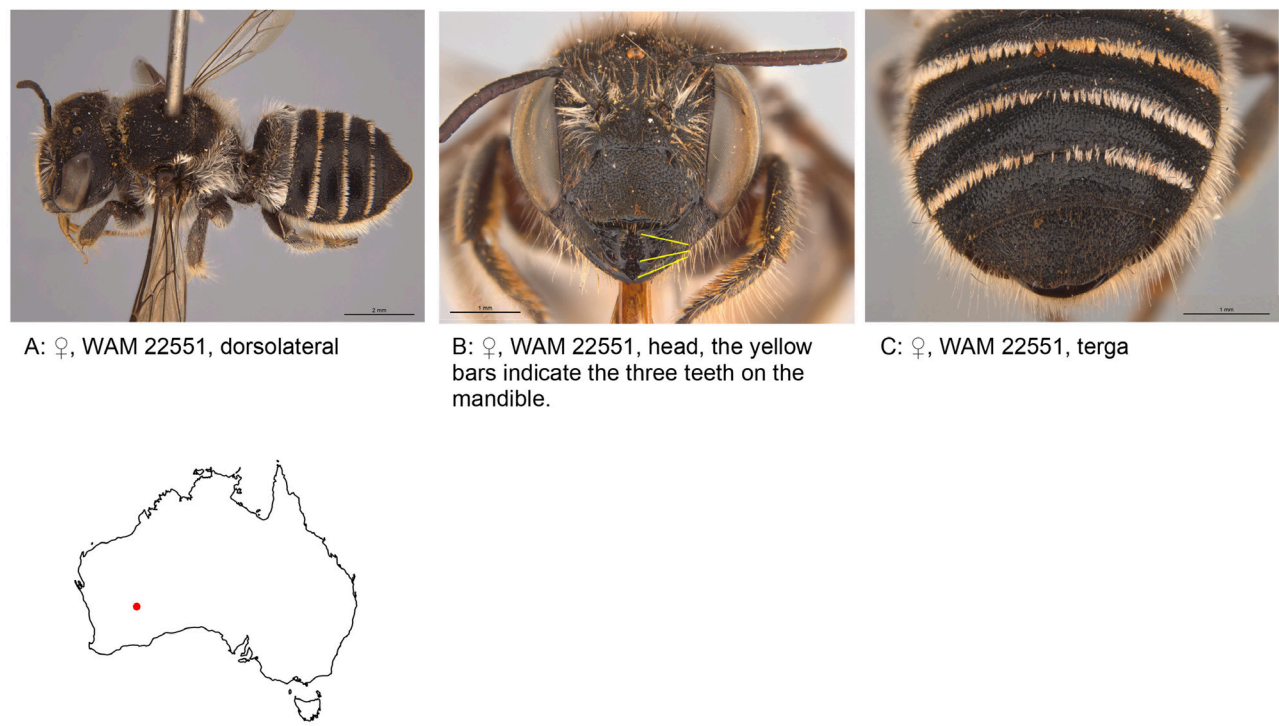


I: ♂, SAMA 32-46689, right fore leg



I: Distribution map

Figure 72 A-I. *Megachile (Austrochile) tarsata* Leijs sp. nov.



A: ♀, WAM 22551, dorsolateral

B: ♀, WAM 22551, head, the yellow bars indicate the three teeth on the mandible.

C: ♀, WAM 22551, terga

D: Distribution map

Figure 73 A-D. *Megachile (Austrochile) tridentata* Leijs sp. nov.

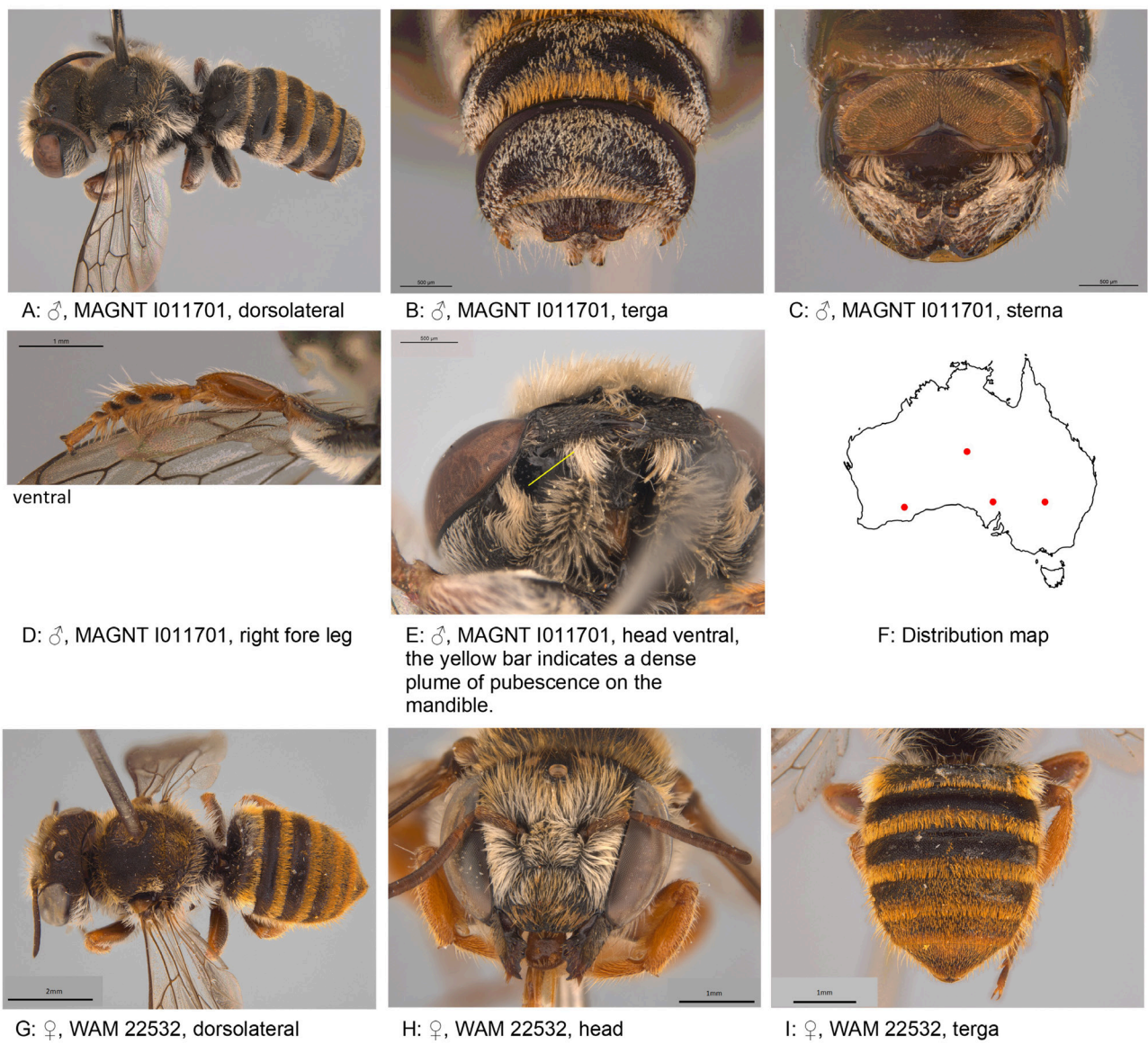


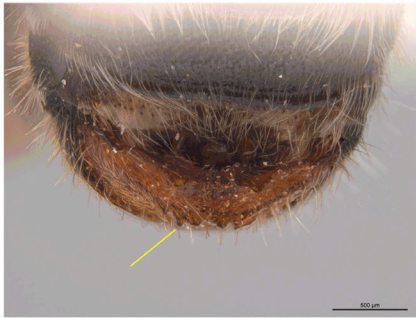
Figure 74 A-I. *Megachile (Austrochile) trinotata* Leijs sp. nov



A: ♂, AM K 359743, dorsolateral



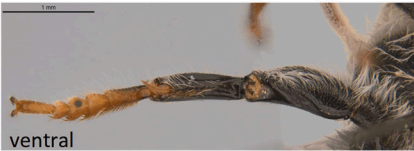
B: ♂, AM K 359743, terga



C: ♂, AM K 359743, sterna, the yellow bar points to the multidented medial carina.



dorsal



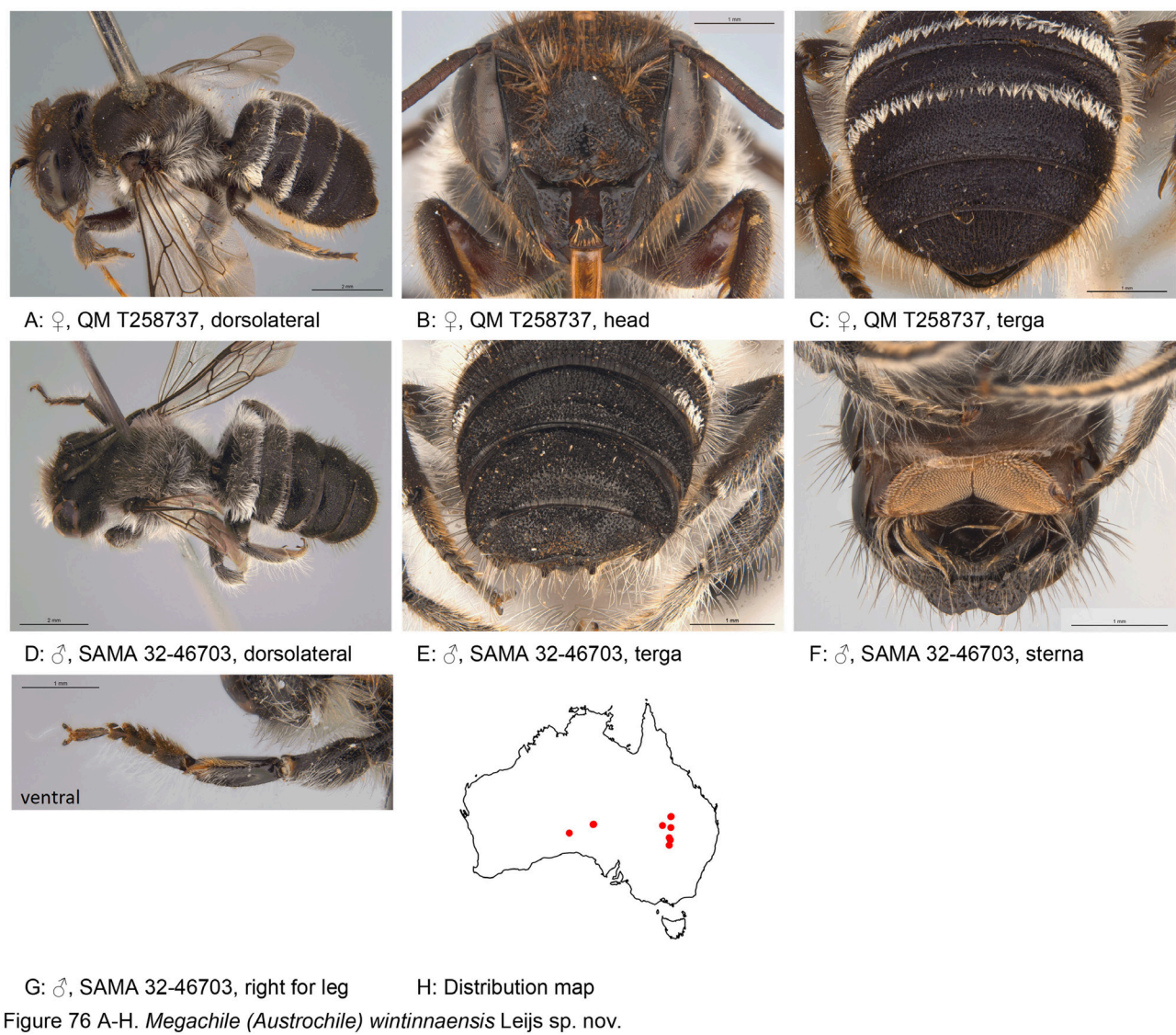
ventral

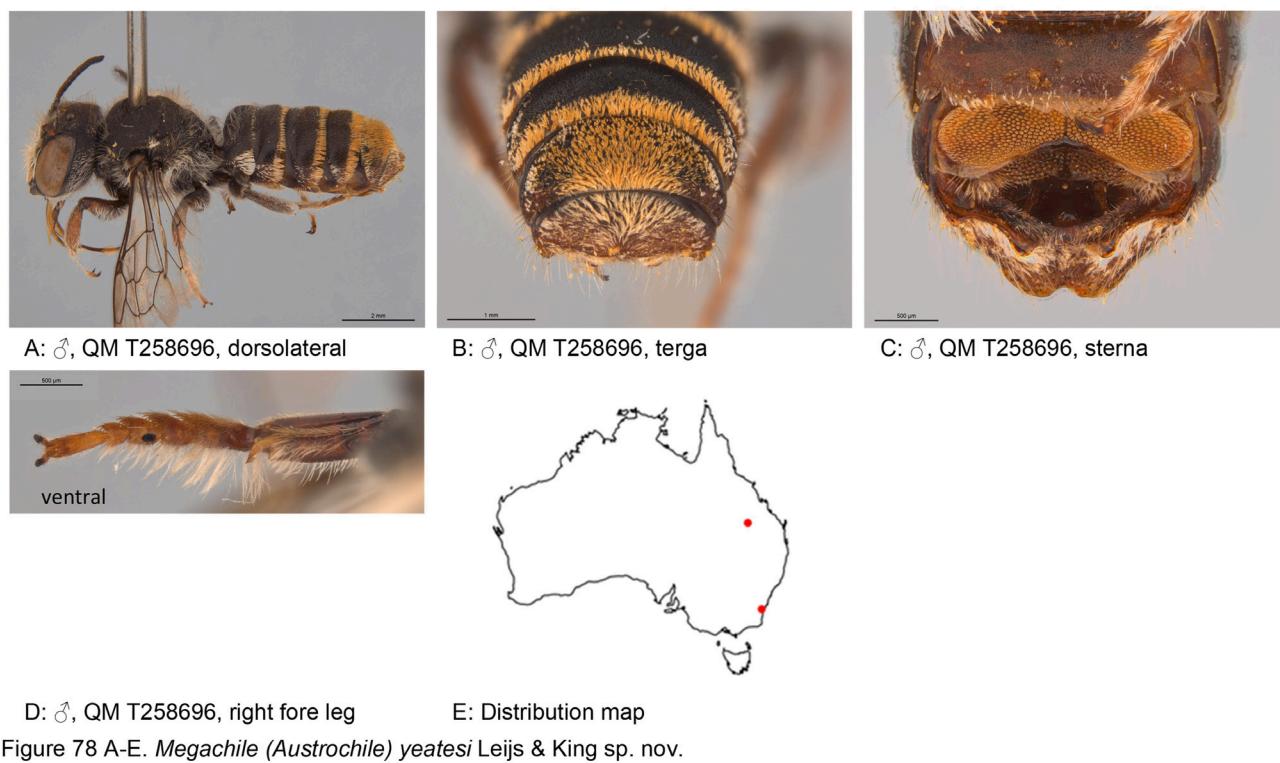
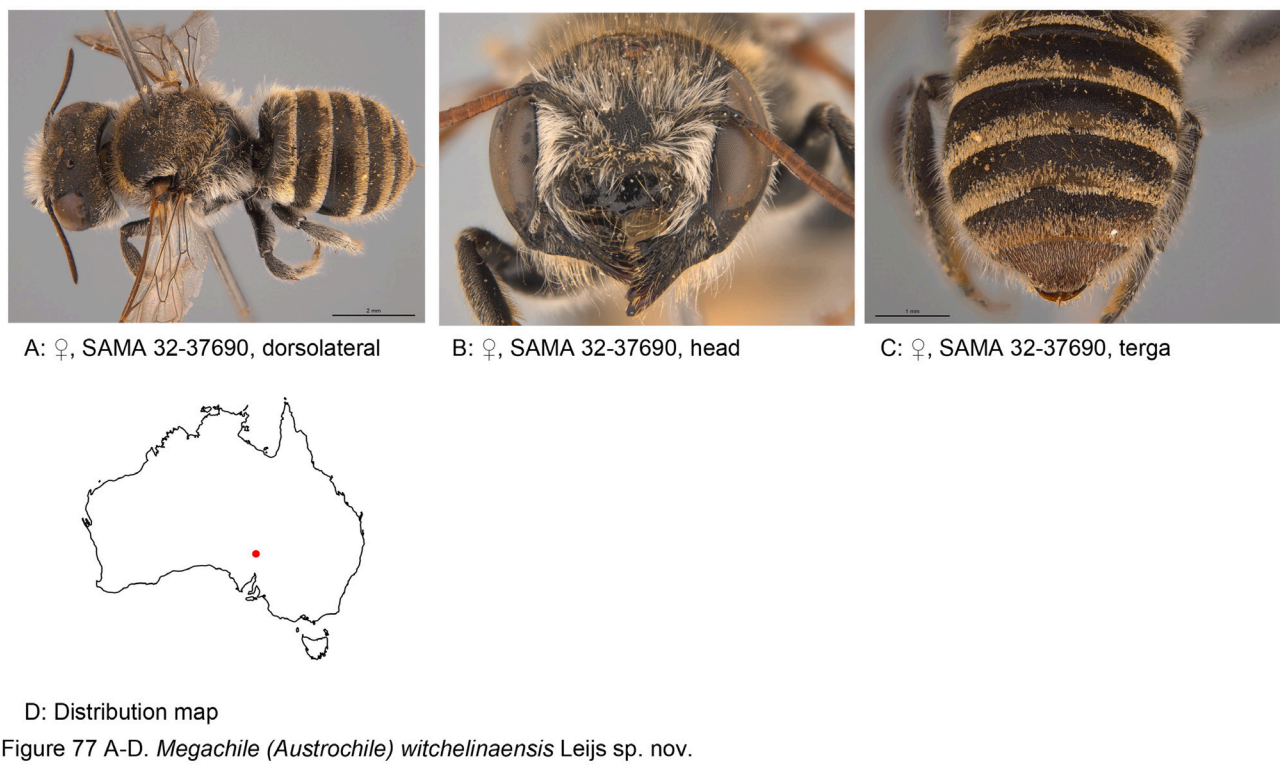
D: ♂, AM K 359743, right fore leg



E: Distribution map

Figure 75 A-E. *Megachile (Austrochile) uninotata* Leijs sp. nov.





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