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# Revision of the bee subgenus *Amegilla* (*Asaropoda*) Cockerell, 1926 (Hymenoptera: Apidae) in New Guinea

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Abstract. Bees of the subgenus *Amegilla* (*Asaropoda*) Cockerell, 1926 (Hymenoptera: Apidae) are large and conspicuous, but despite their nominally easy detectability, uncertainty persists as to their distribution in Southeast Asia. Considered to be endemic to Australia, New Guinea, and the Bismark Archipelago, little material evidence has been available to support their existence outside of Australia. Based on new revision of museum material, the presence of *Amegilla* (*Asaropoda*) *bombiformis* (Smith, 1854) on the island of New Guinea is positively confirmed, being present in Papua New Guinea (PNG) and newly reported from Indonesia (Papua). Three new species are described: *Amegilla* (*Asaropoda*) *angustissima* **sp. nov.** (PNG: Misima Island), *Amegilla* (*Asaropoda*) *ruficauda* **sp. nov.** (PNG: mainland and New Ireland), and *Amegilla* (*Asaropoda*) *sinewita* **sp. nov.** (PNG: New Britain). An identification key is presented to facilitate further study. This work increases the number of *Amegilla* (*Asaropoda*) species to 24, confirms their presence in New Guinea and the Bismark Archipelago, and adds to the emerging trend of substantial undescribed bee diversity on New Guinea and surrounding islands.

## Introduction

Bees of the subgenus *Amegilla* (*Asaropoda*) Cockerell, 1926 (Hymenoptera: Apidae) are large, robust, and often brightly coloured species that are predominantly found in Australia; currently, 21 species are known globally following recent revisionary work (Brooks, 1988; Leijs *et al*., 2020; Wood & Bossert, 2025). All recognised species have to date been described from Australian specimens, but there is some uncertainty over the wider distribution of the subgenus. In the original description (as a genus), Cockerell (1926: 216) included just two species and wrote that the type species *Amegilla bombiformis* (Smith, 1854) was Australian, but no other distributional information was mentioned. In his global subgeneric reclassification of *Amegilla*, Brooks (1988: 511) wrote, when discussing the subgenera *Notomegilla* Brooks, 1988 and *Asaropoda*: "In addition, *Notomegilla* is restricted to Australia and *Asaropoda* to Australia, New Guinea and the Bismarck Archipelago". However, the publications or records underpinning this statement are obscure. Leijs *et al*. (2020: 46, 53) repeated this information but did not provide any precise citations to support the position of Brooks (1988).

Working back chronologically through the literature, Michener (1965: 217) also repeats the statement that *Asaropoda* is present on New Guinea without precise information. Rayment (1951: 73) wrote for *A. bombiformis*: "Binaturi River, New Guinea? Included by Cockerell. This last recorded by Cockerell, but … must be considered doubtful, since [Cockerell] had more than one species". I have been able to trace the work of Cockerell (1931: 34) who wrote for *A. bombiformis*: "Also Binaturi River in New Guinea", but without precise information. Moving back further, Lucas (1915: 133) wrote for *Saropoda bombiformis*: "von Binaturi R., Papua", providing a citation for Cockerell (1914). It is in this work that Cockerell (1914: 468) gives precise information for *A. bombiformis*, writing: "♀.—Binaturi R, Papua, March 1913 (*S. H. M.* ; Froggatt coll. 216 c). Agrees with Australian specimens". It is unclear where

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this specimen may be; some of Froggatt's material is in London, though some is also present in the ANIC collection in Canberra (*pers. obs.*).

A recent examination of Australian museum collections in preparation for a revision of *Amegilla* (*Zonamegilla*) Popov, 1950 species east of the Wallace Line unexpectedly produced a number of *Asaropoda* species from New Guinea. The objective of the current work is therefore to document the distribution of this subgenus in the New Guinea region, to provide empirical support for the broad distributional statement of Brooks (1988), and to characterise its specific diversity.

## Methods

Morphological terminology follows Michener (2007), with the exception of the marginal zones of the terga, which are here referred to as marginal areas and antennal segments which are numbered A1–12(13) (rather than scape, pedicel, and antennomeres 1–10(11)). The following abbreviations are used in the species descriptions: A = antennal segments, S = metasomal sterna, and T = metasomal terga.

Specimens were measured from the centre of the clypeus at the front of the head to the apical tip of the metasoma to the nearest 0.5 mm. Photographs were taken using an Olympus E-M1 Mark II with a 60 mm macro lens. Additional close-ups were taken with the addition of a Mitutoyo M Plan Apo 5X infinity corrected objective lens. Photographs were stacked using Helicon Focus B (HeliconSoft, Ukraine) and plates were prepared in GNU Image Manipulation Program (GIMP) 2.10. Post-processing of some images was made in Photoshop Elements (Adobe Systems, USA) to improve lighting to highlight specific characters.

A distribution map was made in the program R using the packages ggplot2 and rnaturalearth. Distributional data for *A. bombiformis* was downloaded from the Atlas of Living Australia (2026) and combined with records presented here.

The following abbreviations are used for museum collections: AMS Australian Museum (Sydney, Australia); ANIC Australian National Collection of Insects (Canberra, Australia); NHMUK Natural History Museum (London, United Kingdom); NHMW Naturhistorisches Museum Wien (Vienna, Austria); OUMNH Oxford University Museum of Natural History (Oxford, United Kingdom); RMNH Naturalis Biodiversity Center (Leiden, the Netherlands). Unless otherwise stated, all specimens were determined by the author.

## Results

## Taxonomy

### Order Hymenoptera Linnaeus, 1758

### Family Apidae Latreille, 1802

### Subfamily Anthophorinae Dahlbom, 1835

### Genus *Amegilla* Friese, 1897

### Subgenus *Asaropoda* Cockerell, 1926

**Subgeneric diagnosis**. A discussion of the characters allowing recognition of the subgenus is necessary here. A detailed subgeneric diagnosis was provided by Brooks (1988: 513–515) and further refined by Leijs *et al*. (2020: 54–55). In practical terms, in the New Guinea region, *Asaropoda* species can be recognised simply by their lack of iridescent metallic hairs that are present in *Notomegilla* and *Zonamegilla* species. They can also be recognised by their large body size (in excess of 12 mm), the third submarginal cell and second medial cell without hairs, and S6 slightly elongate, apically rounded, and with a smooth, largely hairless and predominantly polished surface, its apex with a distinct tuft of posteriorly projecting hairs. This diagnosis applies for each of the three new species described below, and is not repeated in each species entry.

### *Amegilla (Asaropoda) angustissima* sp. nov.

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Figs 1-2

**Holotype. PAPUA NEW GUINEA** • 1♀; Misima Island, Umana Camp [precise location untraceable]; 500 m a.s.l.; 6 Nov. – 7 Dec. 1963; W.W. Brandt leg.; ANIC, ANIC00014432.

**Diagnosis.** Due to the yellow-orange clypeus (Fig. 1B; without the pale colouration extending to the lower paraocular areas) that lacks defined dark markings on its surface, the light orange-brown pubescence of the body (Fig. 1A–F), the almost iridescent-orange metasomal hairbands (Fig. 1F), and the abundant black hairs at the base of T2 (Fig. 1F), it is most similar to *A. bombiformis*, and keys to this species using Leijs *et al*. (2020). *Amegilla angustissima* differs due to the narrow apical hairband of T2 (Fig. 1F) which has orange hairs covering only 20% of the dorsal surface, with 80% covered with black hairs (in *A. bombiformis* with black hairs only covering around 40% of the dorsal surface of T2), the presence of abundant black hairs laterally at the base of T3–4 (Fig. 1F; in *A. bombiformis* with the dorsal surface of T3–4 almost entirely covered with orange hairs, without large patches of black hairs), and the dark brown antennal scape (Fig. 1B; in *A. bombiformis* with the antennal scape extensively orange-marked). Comparative images of *A. bombiformis* can be found in Leijs *et al*. (2020: 76).

*Amegilla angustissima* can be separated from *A. sinewita* **sp. nov.** by the dark brown scape (in *A. sinewita* with the scape orange-marked, Fig. 4B), the comparatively narrow apical hairband on T2 which covers just 20% of the surface (in *A. sinewita* with the apical hairband of T2 comparatively broader and covering 30% of the surface, Fig. 4F), the darker brown hairs of the scutum (Fig. 1A, C–D; in *A. sinewita* with hairs predominantly light golden-brown, Fig. 4A, C–D), and due to the punctation of the scutum which is distinctly punctate with the individual puncture borders clear and with shining interspaces (Fig. 1D; in *A. sinewita* which has the scutum indistinctly punctate with the individual puncture borders obscure and with the interspaces dull to

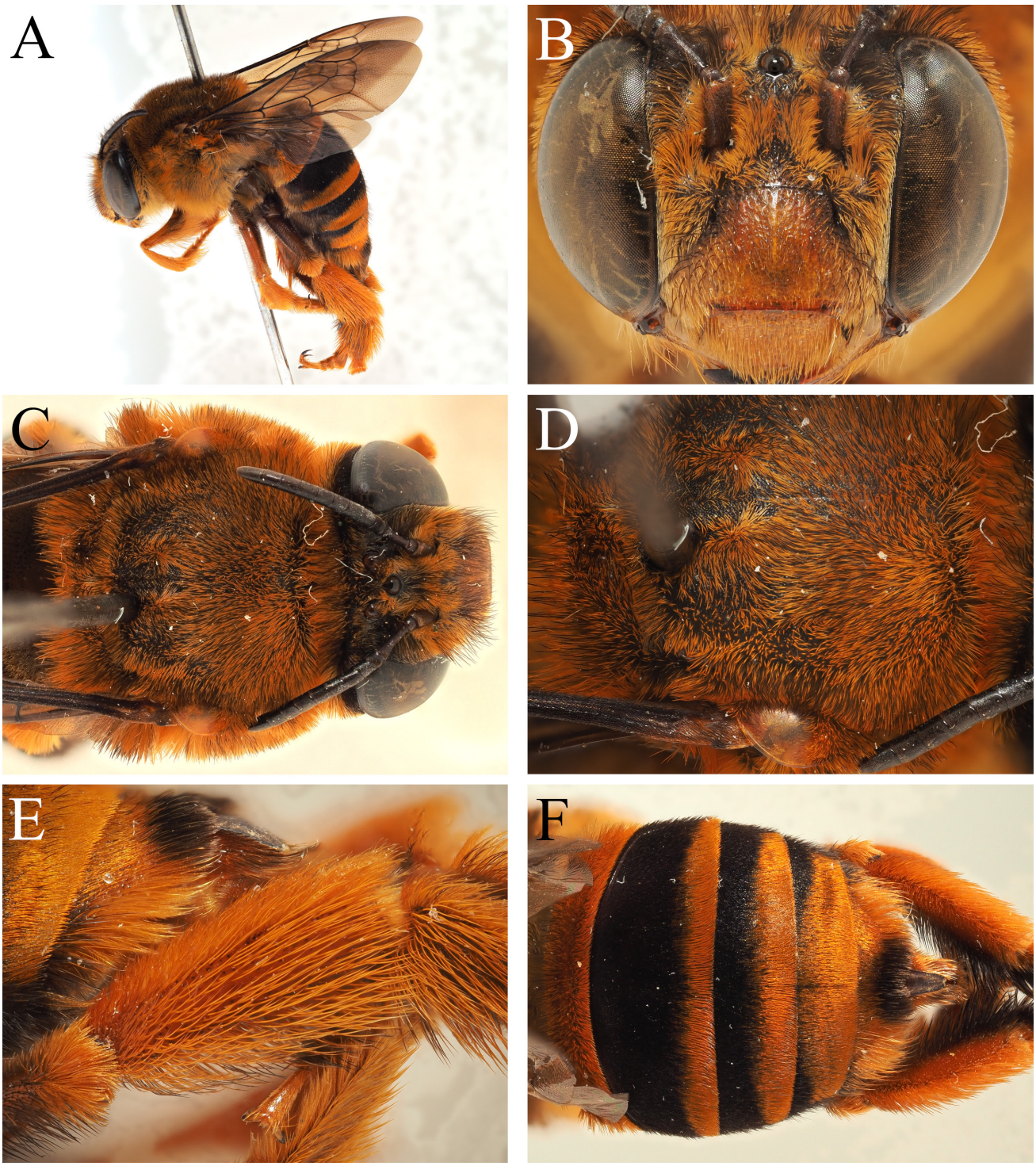


**Figure 1.** *Amegilla* (*Asaropoda*) *angustissima* **sp. nov.** female (ANIC). A. Habitus, lateral view; B. Head, frontal view; C. Mesosoma, dorsal view; D. Scutum, dorsal view dorsal; E. Hind tibia, lateral view; F. Metasoma, dorsal view.

weakly shining, Fig. 4D). Based on current knowledge, the two species are strongly separated geographically (Fig. 2), with *A. angustissima* found on the island of Misima in the Louisiade Archipelago at moderate altitude (500 m a.s.l.), and *A. sinewita* found in north-eastern New Britain above 1000 m a.s.l.

**Description. Female.** Body length 16 mm. Head. Clypeus and labrum almost entirely orange, with obscure black markings laterally; paraocular areas, frons, vertex, and gena black; mandibles basally yellow, becoming dark brown apically (Fig. 1B). Clypeus largely without adpressed hairs, with mixture of short golden and long black erect hairs, not obscuring underlying surface. Paraocular areas, frons, and vertex with short golden-brown partially decumbent hair, laterally obscuring underlying surface, with longer erect black hairs; longest black hairs on vertex exceeding length of scape. Gena with moderately long golden-brown hairs. Labrum more-or-less quadrate, anterior margin convex, surface covered in abundant erect golden hairs. Antennal

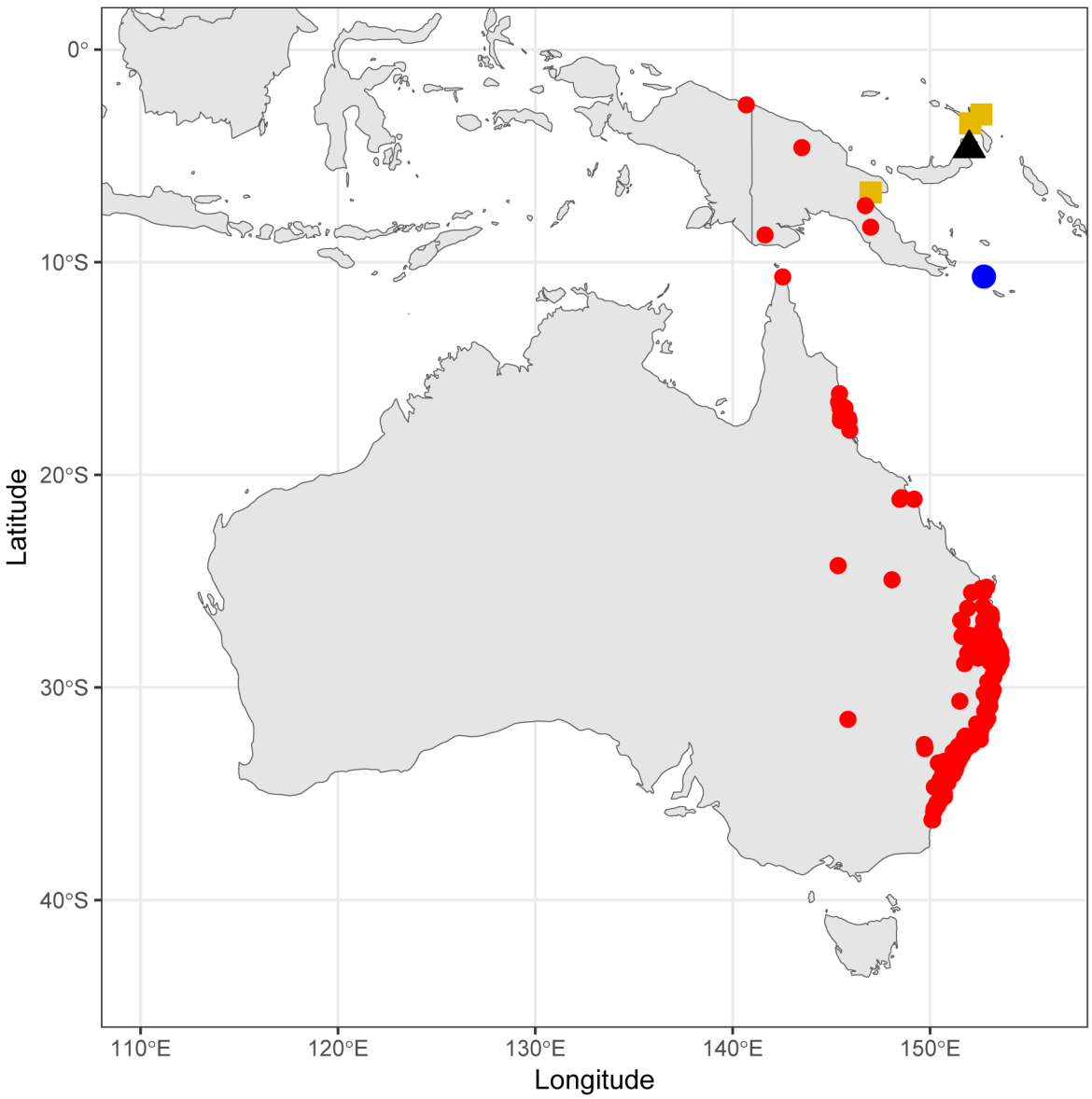


**Figure 2.** Distribution map of *Amegilla* (*Asaropoda*) species in Australia and New Guinea; *Amegilla angustissima* **sp. nov.** (blue dot); *Amegilla bombiformis* (Smith, 1854) (red dots); *Amegilla ruficauda* **sp. nov.** (yellow squares); and *Amegilla sinewita* **sp. nov.** (black triangle).

scape dark brown, A3 exceeding length of A4+5, slightly shorter than A4+5+6; A4 subquadrate, shorter than A5.

Mesosoma. Mesosoma dorsally covered with short dark brown hairs intermixed with black, laterally on mesepisternum becoming golden-brown with fewer black hairs (Figs 1A, C). Scutum densely and distinctly punctate, punctures almost confluent, separated by <0.5 puncture diameters but individual puncture borders clear, with shining interspaces (Fig. 1D). Propodeum laterally with short, very densely plumose pale hairs, appearing wool-like. Legs with integument predominantly orange, hind coxa, trochanter, and femur dark brown. Pubescence of anterior leg orange, mid leg orange on tarsi and tibia, black on ventral surface of femur; on hind leg ventral surface of trochanter and femur with long black hairs, tibia and basitarsus with long orange hairs on external face, plumose only along dorsal margin (Fig. 1E), posterior face with contrasting long black simple hairs. Tarsal claws lacking arolia, with distinct inner basal tooth. Wings predominantly hyaline, weakly infuscate.

Metasoma. Majority of T1 declivous, only marginal area and small fraction of disc visible in dorsal view; horizontal section lightened orange, declivous section dark and covered with decumbent layer of short, plumose, golden-yellow hairs. Integument of remaining terga dark, covered with dense and fine hair-bearing punctures, punctures separated by 0.5–1.5 puncture diameters; surface obscurely shining. Disc of T2 predominantly covered in short black hairs, covering 80% of visible surface, remaining 20% on marginal area covered with orange apical hairband, hairs completely decumbent (Fig. 1F). Disc of T3 with black hairs covering approximately 50% of visible surface, apical hairband of orange hairs broadened medially. Disc of T4 almost entirely covered with orange hairs, with small patches of black hairs laterally. Terminal fringe composed of golden hairs laterally, medially with dense tuft of dark brown hairs (Fig. 1F). Pygidial plate elongate, apex rounded, laterally with weakly raised carina, dorsal surface covered with fine latitudinal wrinkles. Apical margin of S5 entirely covered

with dense fringe of long reddish bristles covering entire breadth of segment, obscuring underlying surface. S6 slightly elongate, apically rounded, ventral surface largely polished, with scattered very short hairs; apically with distinct tuft of posteriorly projecting hairs.

**Male.** Unknown.

**Etymology.** The nominative singular feminine superlative form (suffix -*issimus*) of the Latin adjective *angustus* meaning narrow (hence "the most narrow") in reference to the narrow and diminished apical tergal bands that allow separation from *A. bombiformis*.

**Distribution.** Papua New Guinea (Misima Island) (Fig. 2).

## *Amegilla (Asaropoda) bombiformis* (Smith, 1854)

*Saropoda bombiformis* Smith, 1854: 318, ♀♂ [Australia, NHMUK, examined]

Full chresonomy can be seen in Leijs *et al*. (2020: 74).

**Material examined. AUSTRALIA** • 1♀; Richm River, Austra. [Richmond River]; NHMUK (**lectotype**) • 1♀; Australien; 1878; Fischer leg.; NHMW • 3♂; Berowra Creek, nr. Hornsby, N.S. Wales; 20 Dec. 1968; G.F. Mees leg.; RMNH, RMNH.INS.1714032 • 2♀; Kap York; [undated]; NHMW • 2♀; N. Holl. [New Holland]; 1861; NHMW • 1♀; N.S. Wales; [before 1921]; H. Hedicke det. 1921; RMNH, RMNH.INS.1714659 • 1♀; Newport, N.S.W., Aus.; 21–30 Mar. 1982; E.A. Fonseca leg.; OUMNH • 1♀; Sydney; 1912; RMNH, RMNH.INS.1714658; **INDONESIA** • 1♀; Hollandia [Jayapura], Dutch N.G.; 1945; E.L. Troughton leg.; AMS; **PAPUA NEW GUINEA** • 2♂; East Sepik Province, Amboin Patrol Post. Karawari Lodge; 1–30 Apr. 1983; A. C. Messer leg.; ANIC • 1♀; Morehead, Western Distr.; 1 May 1971; Balderson & Baker leg.; ANIC • 1♀; Morobe District, Wau; 9 Dec. 1973; J.P. Spradbery leg.; ANIC • 1♀; [no precise information]; 4 Jan. 1968; C. Monier leg.; AMS • 2♀; Tapini; 20–22 Dec. 1972; W. Majcher & G. Williams leg.; AMS.

**Notes.** The lectotype was designated by Brooks (1988: 556). The species is common in eastern and predominantly coastal parts of Australia (Leijs *et al*. 2020), but without many previous precisely referenced specimens for New Guinea. Although Froggatt's specimen could not be located, Cockerell's (1914) record from the southern tip of New Guinea (Binaturi River) can now be supplemented by specimens which extend the range as far as the northern coast of the island at Jayapura, where it is newly reported for Indonesia. The opportunity is taken to report additional Australian specimens from European museums, as these are unlikely to have been previously examined by Australian workers. The oldest non-type specimen examined was from 1861 (NHMW), though it was lacking precise geographical data. Searches in the NHMUK collection may produce the Binaturi River specimen.

**Distribution.** Indonesia* (Papua), Papua New Guinea (Western, Central, Morobe, East Sepik), Australia (Queensland, New South Wales) (Cockerell, 1914; 1931; Leijs *et al.,* 2020) (Fig. 2).

## *Amegilla (Asaropoda) ruficauda* sp. nov.

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Figs 2-3

**Holotype. PAPUA NEW GUINEA** • 1♀; New Ireland Province, Lihir Island, town area; -3.0500°S, 152.6000°E; 20–26 Oct. 2001; M. Moulds & M. Humphrey leg.; AMS, K.681946.

**Paratypes. PAPUA NEW GUINEA** • 1♀; New Ireland, Komalabu village, W coast; -3.4667°S, 152.0333°E; 30 Oct. 2001; M. Moulds & M. Humphrey leg.; AMS, K.681947 • 1♀; Lae, Morobe Dist.; 3 Apr. 1974; D.P. Sands leg.; ANIC, 32-065497.

**Diagnosis.** *Amegilla ruficauda* can be recognised as distinct from the species around *A. bombiformis* (*bombiformis*-group) due to the largely dark pubescence of T1–3, with the hairs on the disc of T1 largely erect and not obscuring the underlying surface (Fig. 3G–H; in the *bombiformis*-group with the terga largely displaying bright iridescent-golden hairs over substantial parts of their surface, with the hairs on the disc of T1 in large part decumbent and obscuring the underlying surface), the apical margins of T1–3 which have bright to obscure but uniformly narrow apical hairbands, these strongly contrasting the surfaces of T4–5 which are entirely covered with golden-orange hairs (Fig. 3G–H; in the *bombiformis*-group with the apical margins of T2–4 with bright and comparatively broad apical hairbands, these clearly broadest medially and without a strong contrast between basal and distal segments), and the pubescence of the mesosoma generally darker, varying from almost entirely black to rich brown intermixed with abundant black hairs (Fig. 3A–B, E–F; in the *bombiformis*-group with the pubescence generally brighter, that of mesosoma largely light golden-brown, with at most a few intermixed black hairs on the mesepisternum). In the holotype specimen from Lihir Island, the integument on T2 is extensively lightened reddish (Fig. 3G), whereas it is always dark in the *bombiformis*-group. *Amegilla ruficauda* also averages slightly smaller at 12–14 mm in length compared to 15–17 mm in length for the *bombiformis*-group.

This largely dark colouration of the metasomal pubescence lends superficial similarity to the *houstoni*- and *youngi*-groups of Leijs *et al*. (2020: 52) (currently known only from Australia). *Amegilla ruficauda* keys out to couplet 6, but members of these groups display the clypeus with predominantly bright yellow markings which are covered and darkened medially by the presence of clear longitudinal black stripes (e.g. *Amegilla epaphrodita* Leijs, 2020, *Amegilla houstoni* Brooks, 1988), or have clear pale hairbands or pale hairs at the apex of the metasoma (e.g. *Amegilla nitidiventris* Leijs, 2020 or *Amegilla youngi* Leijs, 2020), or display a combination of both. In contrast, *A. ruficauda* lacks any dark markings on the clypeus and displays bright golden-orange hairs covering T4–5. It is therefore unlike any currently known Australian species.

**Description. Female.** Body length 12–14 mm. Head. Clypeus and labrum variable, from entirely orange-marked to dark brown; paraocular areas predominantly dark (Fig. 3D), with narrow markings along outer margin of clypeus in light specimen (Fig. 3C). Clypeus largely hairless medially, laterally with scattered erect dark hairs; paraocular areas,

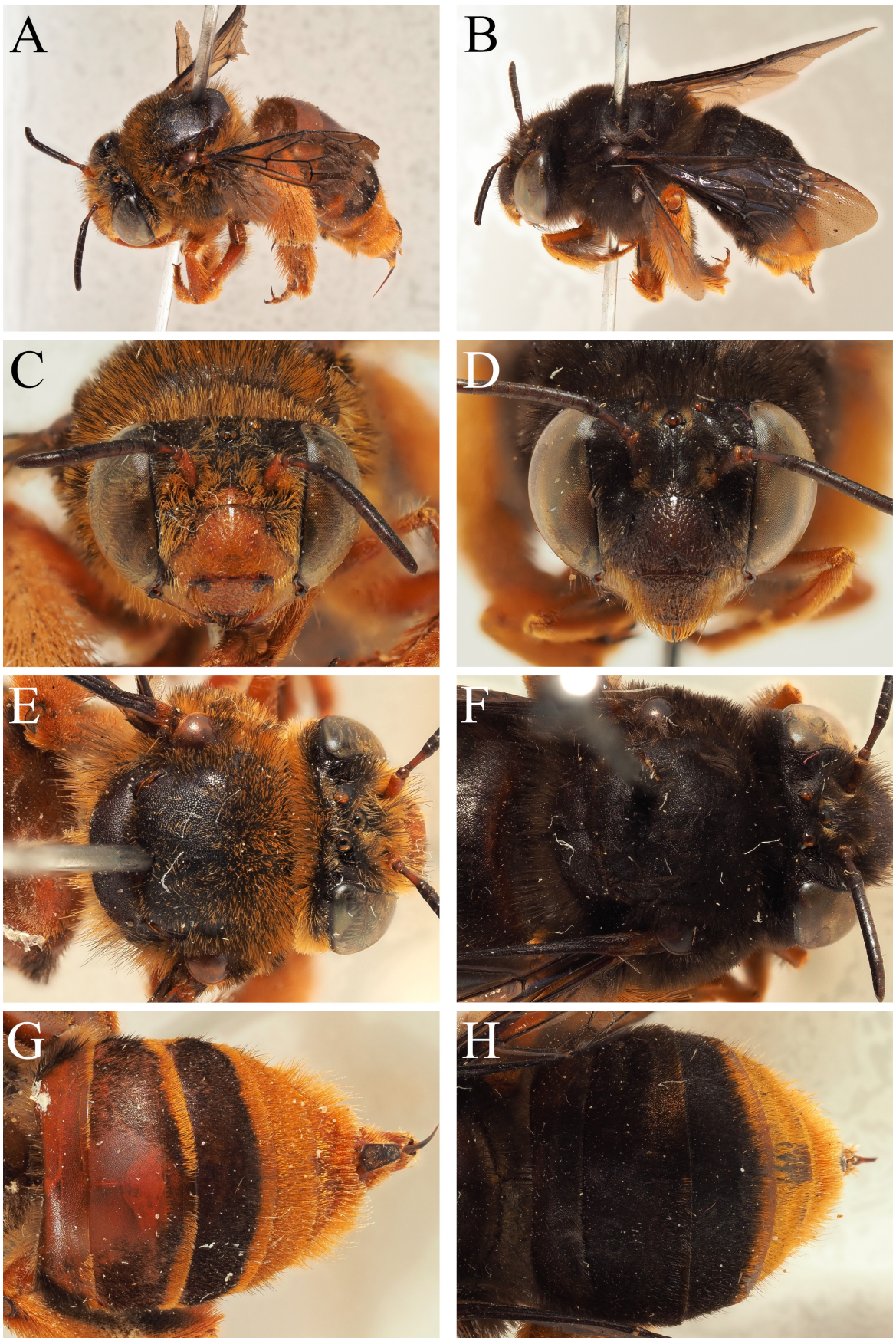


**Figure 3.** *Amegilla* (*Asaropoda*) *ruficauda* **sp. nov.** female holotype from Lihir Island (AMS). A. Habitus, lateral view; C. Head, frontal view; E. Mesosoma, dorsal view; G. Metasoma, dorsal view. *Amegilla* (*Asaropoda*) *ruficauda* **sp. nov.** female paratype from Lae (ANIC). B. Habitus, lateral view; D. Head, frontal view; F. Mesosoma, dorsal view; H. Metasoma, dorsal view.

frons, vertex, and gena with mixture of golden-brown and black hairs, predominantly erect with some decumbent ventrally; hairs extensively golden-brown (Fig. 3C) to extensively black with occasional intermixed golden-brown hairs around antennal insertions and anterior ocellus (Fig. 3D). Labrum quadrate, anterior margin weakly convex, impunctate and slightly depressed; surface covered with erect golden to golden-orange hairs. Antennal scape dark brown to entirely orange-marked, A3 exceeding length of A4+5, slightly shorter than A4+5+6; A4 subquadrate, shorter than A5.

Mesosoma. Mesosoma dorsally and laterally covered with intermixed golden-brown and black hairs (Fig. 3A, E) to entirely black-haired (Fig. 3B, F). Scutum densely and distinctly punctate, punctures almost confluent, typically separated by <0.5 puncture diameters but individual puncture borders clear, with shining interspaces. Legs with integument predominantly orange to dull orange, hind femur and trochanter dark brown. Pubescence of legs predominantly golden-orange, in dark specimens with black hairs on ventral margins of femorae; hind tibia and basitarsus with long orange hairs on external face, plumose only along dorsal margin, posterior face with contrasting long black simple hairs. Tarsal claws lacking arolia, with distinct inner subapical tooth. Wings moderately but distinctly infuscate.

Metasoma. Majority of T1 declivous, only marginal area and small fraction of disc visible in dorsal view; horizontal surface lightened red (Fig. 3G) to entirely black (Fig. 3H), with dark erect pubescence. Remaining tergal integument variable, from extensively red marked on T2 and dark on remaining segments to entirely dark, covered with dense and fine hair-bearing punctures, punctures separated by 0.5–1.5 puncture diameters; surface obscurely shining. Discs of T2–3 covered with short black hairs, discs of T4–5 entirely covered with golden-orange hairs (Fig. 3G–H). Apical margins of T1 obscurely and T2–3 clearly displaying narrow golden-orange hairbands (Fig. 3G) to predominantly black, with hints of hairband on T2 and with weakly produced hairband on T3 (Fig. 3H). Terminal fringe composed of uniformly golden hairs. Pygidial plate elongate, apex rounded, laterally with weakly raised carina, dorsal surface covered with fine latitudinal wrinkles. Apical margin of S5 entirely covered with dense fringe of long reddish bristles covering entire breadth of segment, obscuring underlying surface. S6 slightly elongate, apically rounded, ventral surface largely polished, with scattered very short hairs; apically with distinct tuft of posteriorly projecting hairs.

**Male.** Unknown.

**Etymology.** From the Latin adjective *rufus* (red) and noun *cauda* (tail) meaning red-tailed, in reference to the contrasting reddish hairs at the apex of the metasoma. It is a compound noun in apposition.

**Notes.** Understanding colour variation in Anthophorine bees remains a challenge. Dark or melanistic forms of species (in the female sex) such as *Anthophora* (*Paramegilla*) *onosmarum* Morawitz, 1875 can occur in sympatry, though with dark forms predominating in the western part of its distribution, and light forms in the east (Wood & Praz 2024). Using morphometrics, Carion *et al*. (2025) recently resolved the status of *Amegilla* (*Glossamegilla*) *bouwmani* (Lieftinck, 1944) which is a brightly coloured form of *Amegilla* (*Glossamegilla*) *amymone* (Bingham, 1896), with both forms occurring on the island of Sumatra. The colour variation here seen between bright (Fig. 3A, C, E, G) and dark (Fig. 3B, D, F, H) coloured specimens is strongly reminiscent of the case of *bouwmani-amymone*. Whilst *A. ruficauda*, as considered here, shows much lighter pubescence and integumental colouration on Lihir Island, no structural differences were observed compared to the dark specimens from mainland New Ireland and New Guinea. Moreover, the paratype from Komalabu village (New Ireland) is intermediate, displaying both dark mesosoma and metasomal pubescence but also an entirely orange-marked clypeus. It is possible that the material from mainland New Guinea represents a different undescribed species, but in the absence of additional material, the intermediate specimen from Komalabu, and any male specimens, a conservative position is taken. Sampling along the coast of New Britain would hopefully produce material to fill the observed distributional gap.

**Distribution.** Papua New Guinea (Morobe, New Ireland) (Fig. 2).

## *Amegilla (Asaropoda) sinewita* sp. nov.

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Figs 2, 4

**Holotype. PAPUA NEW GUINEA** • 1♀; New Britain, Mt. Sinewit; 3500 ft. a.s.l.; 27 Jun. – 17 Sep. 1963; W.W. Brandt leg.; ANIC, ANIC00014433.

**Diagnosis.** Due to the yellow-orange clypeus that lacks defined dark markings on its surface (without the pale colouration extending to the lower paraocular areas; Fig. 4B), the light pubescence of the body (Fig. 4A), the almost iridescent-golden metasomal hairbands (Fig. 4F), the orange-marked antennal scape (Fig. 4A), and the abundant black hairs at the base of T2 (Fig. 4C, F) it is most similar to *A. bombiformis*, and keys to this species using Leijs *et al*. (2020). *Amegilla sinewita* differs due to the narrow apical hairband of T2 which has orange hairs covering only 30% of the dorsal surface, with 70% covered with black hairs (Fig. 4C, F; in *A. bombiformis* with black hairs only covering around 40% of the dorsal surface of T2) and the presence of abundant black hairs laterally at the base of T3–4 (Fig. 4F; in *A. bombiformis* with the dorsal surface of T3–4 almost entirely covered with golden-orange hairs, without large patches of black hairs).

*Amegilla sinewita* can be separated from *A. angustissima* by the orange-marked antennal scape (Fig. 4B; in *A. angustissima* with the scape dark brown, Fig. 1B), the comparatively broader hairband on T2 which covers 30% of the surface (Fig. 4F; in *A. angustissima* with this hairband covering just 20% of the surface, Fig. 1F), and by the punctation of the scutum which is indistinctly punctate with the individual puncture borders obscure and with the interspaces dull to weakly shining (Fig. 4D; in *A. angustissima* with the scutum distinctly punctate with the individual puncture borders clear and with shining interspaces, Fig. 1D). Based on current knowledge, the two species are strongly separated geographically (Fig. 2).

**Description. Female.** Body length 17 mm. Clypeus and labrum almost entirely orange, with obscure black markings

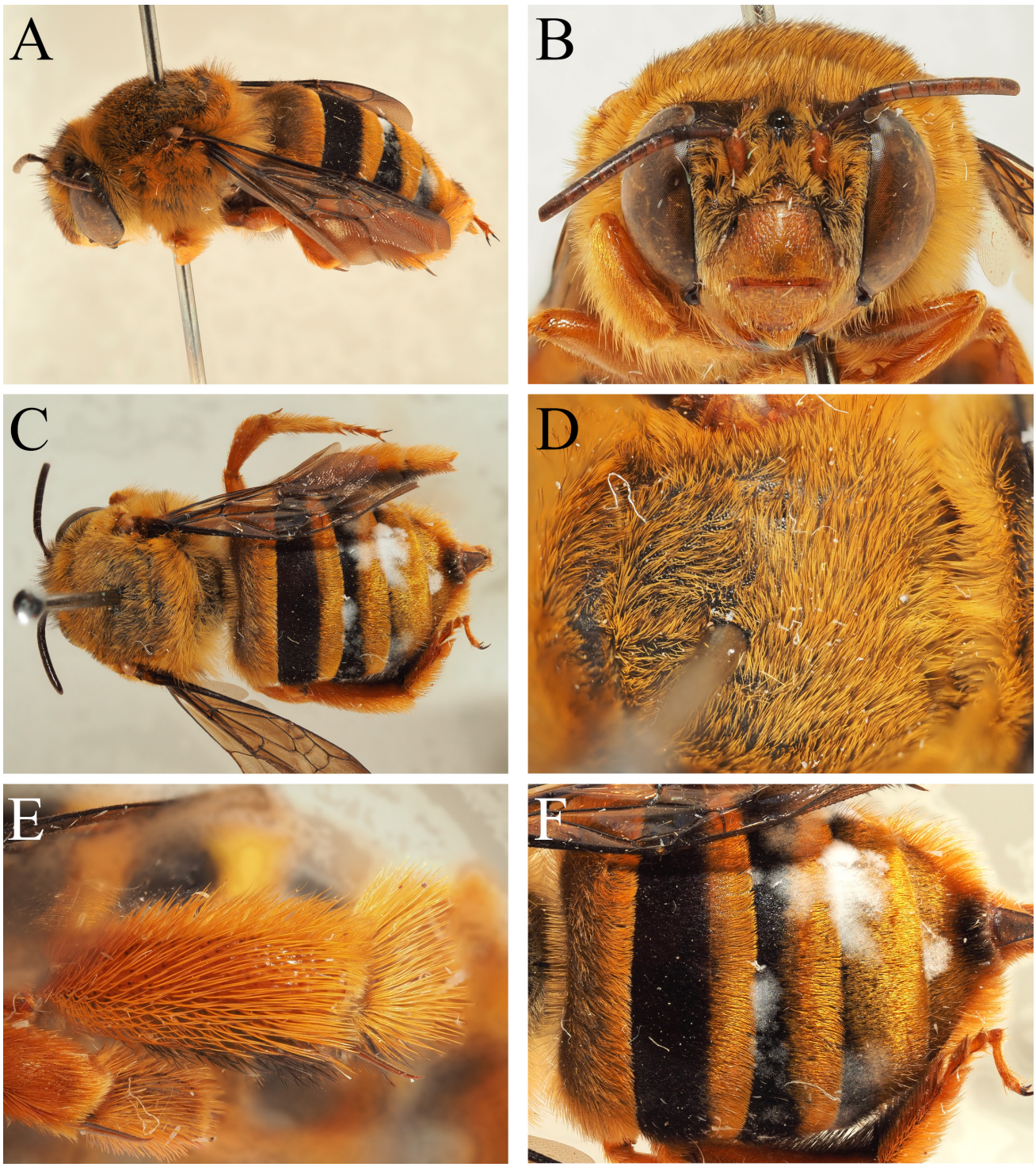


**Figure 4.** *Amegilla* (*Asaropoda*) *sinewita* **sp. nov.** female (ANIC). A. Habitus, lateral view; B. Head, frontal view; C. Habitus, dorsal view; D. Scutum, dorsal view dorsal; E. Hind tibia, lateral view; F. Metasoma, dorsal view.

laterally; paraocular areas with exception of small orange-marked triangular area medially, frons, vertex, and gena black; mandibles basally yellow, becoming dark brown apically (Fig. 4B). Clypeus largely without adpressed hairs, with mixture of short golden and long black erect hairs, not obscuring underlying surface. Paraocular areas, frons, and vertex with short golden-brown partially decumbent hair, ventro-laterally obscuring underlying surface, with longer erect black hairs; longest black hairs on vertex exceeding length of scape. Gena with moderately long golden-brown hairs. Labrum more-or-less quadrate, anterior margin convex, surface covered in abundant erect golden hairs. Antennal scape entirely orange-marked, A3 exceeding length of A4+5, slightly shorter than A4+5+6; A4 subquadrate, shorter than A5.

Mesosoma. Mesosoma dorsally covered with short golden-brown hairs intermixed with black, laterally on mesepisternum becoming golden-brown with fewer black

hairs (Fig. 4A, C). Scutum densely but indistinctly punctate, punctures almost confluent with individual puncture borders obscure, interspaces dull to weakly shining (Fig. 4D). Propodeum laterally with short, very densely plumose pale hairs, appearing wool-like. Legs with integument lightened orange to reddish-brown. Pubescence of legs predominantly orange, ventral surface of mid and hind femorae with long intermixed black hairs; hind tibia and basitarsus with long orange hairs on external face, plumose only along dorsal margin (Fig. 4E), posterior face with contrasting long black simple hairs. Tarsal claws lacking arolia, with distinct inner subapical tooth. Wings predominantly hyaline, weakly infuscate.

Metasoma. Majority of T1 declivous, only marginal area and small fraction of disc visible in dorsal view; horizontal section brownish, declivous section dark and covered with thin decumbent layer of short, plumose, golden-yellow hairs. Integument of remaining terga dark, covered with dense and fine hair-bearing punctures, punctures separated by 0.5–1.5 puncture diameters; surface obscurely shining. Disc of T2 predominantly covered in short black hairs, covering 70% of visible surface, remaining 30% on marginal area covered with golden-orange apical hairband, hairs completely decumbent (Fig. 4F). Disc of T3 with black hairs covering approximately 50% of visible surface, apical hairband of golden hairs broadened medially. Disc of T4 predominantly covered with golden hairs, with moderate patches of black hairs laterally. Terminal fringe composed of golden hairs laterally, medially with dense tuft of dark brown hairs (Fig. 4F). Pygidial plate elongate, apex rounded, laterally with weakly raised carina, dorsal surface covered with fine latitudinal wrinkles. Apical margin of S5 entirely covered with dense fringe of long reddish bristles covering entire breadth of segment, obscuring underlying surface. S6 slightly elongate, apically rounded, ventral surface largely polished, with scattered very short hairs; apically with distinct tuft of posteriorly projecting hairs.

**Male.** Unknown.

**Etymology.** Named after Mount Sinewit on the island of New Britain, the collecting locality and the highest peak (2,063 m a.s.l.) in the Baining Mountains.

**Distribution.** Papua New Guinea (East New Britain) (Fig. 2).

## Identification key for *Amegilla* (*Asarapoda*) species on New Guinea

Since males are unknown for three of the four species, only females are keyed here.

1. Disc of T1 with sparse pubescence, this largely erect, dark, and not obscuring the underlying surface (Fig 3 G–H). Apical margins of T1–3 with bright to obscure but uniformly narrow apical hairbands, these strongly contrasting with the surfaces of T4–5 which are entirely covered with golden-orange hairs (Fig. 3G–H). Pubescence of body variable but typically dark, that of mesosoma varying from almost entirely black to rich brown intermixed with abundant black hairs (Fig. 3A–B; E–F). Integument of T2 variable, from black to extensively lightened dark reddish (Fig. 3G–H). Smaller, body length 12–14 mm ..... ***ruficauda* sp. nov.**

—— Disc of T1 with abundant pubescence, this predominantly orange and in large part decumbent, overlying the marginal area and obscuring the underlying surface (Fig. 4C, F). Apical margins of T2–4 with bright and comparatively broad apical hairbands, these clearly broadest medially and without strong contrast between basal and distal segments (Fig. 1F; 4C, F). Pubescence of body bright, that of mesosoma largely light golden-brown to dark brown, the mesepisternum with at most a few intermixed black hairs (Figs. 1A; C–D; 4A–D). Integument of T2 always dark (Figs 1F; 4F). Larger, body length 15–17 mm (*bombiformis*-group) ..... 2

2. Metasomal pubescence predominantly orange, discs of T3–4 almost entirely without black hairs. Disc of T2 with black hairs covering more-or-less the basal 40%, never with more than 50% of the disc black-haired. Antennal scape entirely orange-marked. Widespread on New Guinea (Fig. 2) …..... ***bombiformis* (Smith)**

—— Metasoma with abundant dark pubescence, discs of T3–4 with extensive areas of short black pubescence at least laterally (Figs 1F; 4F). Disc of T2 with black hairs covering at least 70% of the surface. Antennal scape variable, from dark brown (Fig. 1B) to entirely orange-marked (Fig. 4B). Currently known either from New Britain or Misima Island, but not on New Guinea itself (Fig. 2) ..... 3

3. Disc of T2 with black hairs covering 80% of the surface (Fig. 1F). Antennal scape dark brown, without obvious orange markings (Fig. 1B). Scutum dorsally with dark brown hairs intermixed with black (Fig. 1A, C–D). Scutum distinctly punctate, individual puncture borders clear, with shining interspaces (Fig. 1D). Found on Misima Island (Fig. 2) ..... ***angustissima* spec. nov.**

—— Disc of T2 with black hairs covering 70% of the surface (Fig. 4F). Antennal scape conspicuously orange-marked over its entire surface (Fig. 4B). Scutum dorsally with golden-brown hairs intermixed with black (Fig. 4A, C–D). Scutum indistinctly punctate, individual puncture borders obscure, with interspaces dull to weakly shining (Fig. 4D). Found on New Britain (Mount Sinewit) (Fig. 2) ..... ***sinewita* spec. nov.**

## Discussion

The specimens presented here provide clarity for the statement of Brooks (1988: 511), and conclusively demonstrate that *Amegilla* (*Asaropoda*) species are indeed widespread across the eastern half of the island of New Guinea, extending further eastward onto the Bismark Archipelago. Extensive searches by myself in the RMNH *Amegilla* collection have produced no *Amegilla* (*Asaropoda*) specimens from the western half of New Guinea. Given that the RMNH represents the most extensive collection from this region, it suggests that the group may be genuinely rare or almost absent from the western half of the island. However, given the vast expanse of difficult to access and under-sampled tropical forest, it is impossible to draw strong conclusions.

Amongst global islands, New Guinea is known to be one of the major centres of endemic bee diversity (Marshall *et al*. 2026). Whilst checklists of the island fauna have been drawn up for some time (e.g. Friese 1909), much study is fragmentary in nature (e.g. Friese 1911; Cheesman 1948; Michener 1965; 1980; Hirashima & Lieftinck 1982; Hirashima & Roberts 1984; Hirashima 1988), with few focused and comprehensive or near comprehensive revisions of bee groups or genera (e.g. Lieftinck 1959; Hirashima 1967; Pauly 1986). Consequently, it is challenging to understand just how much of the bee diversity of New Guinea has been characterised, how many older names represent valid species, and how many new species are awaiting discovery in the wild or are waiting in museum collections.

Misima Island is part of the Louisiade Archipelago, a group of islands is known for an incredible diversity of endemic reptiles and amphibians that have received much taxonomic attention in recent years (Oliver *et al*. 2022; Weijola & Kraus 2023; Oliver & Richards 2025). Apart from *A. angustissima*, only one bee species has previously been published from the island of Misima (L. Marshall, *pers. comm.*), this being *Thyreus nitidulus* (Fabricius, 1804) in Lieftinck (1959: 116) who reported a specimen collected in 1956 which is deposited in the American Museum of Natural History in New York. Since *Thyreus nitidulus* is parasitic on *Amegilla* (*Zonamegilla*) species, clearly at least one additional bee species must be present. Based on examination of a small number of Halictidae: Nomiinae specimens from Misima and Rossel islands, the level of undescribed endemic bee diversity in this archipelago is expected to be high (*unpublished data*), and much work remains to be done to more completely understand the true diversity of bee species on islands in the New Guinea region (Marshall *et al*. 2026).

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## References

Atlas of Living Australia occurrence download (2026) *Amegilla bombiformis* (Smith, 1854). [Accessed on 25 March 2026] https://doi.org/10.26197/ala.b1563c72-02bf-4f02-8bc1-eb79060af498

Brooks, R.W. 1988. Systematics and Phylogeny of the Anthophorine Bees (Hymenoptera: Anthophoridae; Anthophorini). *The University of Kansas Science Bulletin* 53 (9): 436–575.

Carion, F., M. Gérard, G. Ghisbain, and T. J. Wood. 2025. Unravelling *Amegilla* (*Glossamegilla*) diversity across the Wallace Line: new species, wing morphometrics, and biogeographic boundaries (Hymenoptera, Apidae). *ZooKeys* 1256: 1–79. https://doi.org/10.3897/zookeys.1256.162903

Cheesman, L. E. 1948. Bees of New Guinea and the New Hebrides. *Annals and Magazine of Natural History* Series 12 1(5): 318–335. https://doi.org/10.1080/00222934808653914

Cockerell, T. D. A. 1914. Descriptions and records of bees—LXIV. *Annals and Magazine of Natural History* Series 4 14(84): 464–472. https://doi.org/10.1080/00222931408693602

Cockerell, T. D. A. 1926. Descriptions and records of bees—CXII. *Annals and Magazine of Natural History* Series 9 18(104): 216–227. https://doi.org/10.1080/00222932608633504

Cockerell, T. D. A. 1931. The bees of Australia. *The Australian Zoologist* 7: 34–54.

Dahlbom, A. G. 1835. Clavis novi hymenopterorum systematis, anatomia externa, metamorphosi moribusque horum animalium simul consideratis; adjecta Synopsi larvarum ejusdem ordinis scandinavicarum eruciformium. Lundae, typis excudit C. F. Berling, 40 pp. https://doi.org/10.5962/bhl.title.66004

Friese, H. 1897. Die Bienen Europa's (Apidae europaeae). Theil III. Solitäre Apiden. Genus *Podalirius*. Friedländer & Sohn, Berlin, 316 pp.

Friese, H. 1909. Die Bienenfauna von Neu-Guinea. *Annales Musei Nationalis Hungarici* 7: 179–288.

Friese, H. 1911. Apidae. Resultate der Expedition zum Schneegebirge in Niederländ. Süd-Neu-Guinea, 1909/10. *Nova Guinea* 9: 261–263.

Hirashima, Y. 1967. Metallic forms of *Nomia* (*Mellitidia*) of New Guinea in the collection of Bishop Museum (Hymenoptera, Halictidae). *Journal of the Faculty of Agriculture, Kyushu University* 14(2): 311–331.
https://doi.org/10.5109/22764

Hirashima, Y. 1988. Bees of the genus *Palaeorhiza* Perkins (Hymenoptera, Colletidae) of Papua New Guinea collected by the Kyushu University Expedition, I. *Esakia* 26: 5–19.
https://doi.org/10.5109/2502

Hirashima, Y. and M. A. Lieftinck. 1982. Systematic studies on the genus *Palaeorhiza* of New Guinea collected by the Third Archbold Expedition (I) (Hymenoptera, Colletidae). *Esakia* 19: 1–50.
https://doi.org/10.5109/2422

Hirashima, Y. and H. Roberts. 1984. Bees of the genus *Palaeorhiza* Perkins (Hymenoptera, Colletidae) in the National Forest Insect Collection of the forest research station, Bulolo, Papua New Guinea (I). *Esakia* 22: 115–128.
https://doi.org/10.5109/2458

Latreille, P. A. 1802. Histoire naturelle générale et particulière des crustacés et des insectes. Ouvrage faisant suite à l'histoire naturelle générale et paticulière, composé par Leclerc de Buffon, rédigée par C. S. Sonnini. Familles naturelles des genres. Tome troisième. Dufart, Paris. 467 pp.
https://doi.org/10.5962/bhl.title.15764

Leijs, R., J. Dorey and K. Hogendoorn. 2020. The genus *Amegilla* (Hymenoptera, Apidae, Anthophorini) in Australia: a revision of the subgenus *Asaropoda*. *ZooKeys* 908: 45–122.
https://doi.org/10.3897/zookeys.908.47375

Lieftinck, M.A. 1959. Revision of the Indo-Australian species of the genus *Thyreus* Panzer (=*Crocisa* Jurine). (Hym., Apoidea, Anthophoridae). Part 2. *Thyreus nitidulus* (Fabricius). *Nova Guinea* 10: 99–130.

Linnaeus, C. 1758. Systema naturae per regna tria naturae, secundum classes, ordinus, genera, species, cum characteribus, differentiis, synonymis, locis. Tomus I. Editio decima, reformata. Impensis Direct. Laurentii Salvii, Holmiae. 824 p.
https://doi.org/10.5962/bhl.title.542

Lucas, R. 1915. Hymenoptera für 1914. (Mit Nachträgen zu früheren Berichten.). *Archiv für Naturgeschichte. Abteilung B* 81 (6): 1–218.

Marshall, L., J. S. Ascher, R. J. Whittaker, M. C. Orr, A. C. Hughes, J. Schrader, P. Weigelt, H. Kreft and N. J. Vereecken. 2026. Global Patterns and Drivers of Bee Diversity and Endemism on Islands [preprint]. *bioRxiv*
https://doi.org/10.64898/2026.02.28.708622

Michener, C. D. 1965. A Classification of the bees of the Australian and South Pacific Regions. *Bulletin of the American Museum of Natural History* 130: 1–362.

Michener, C. D. 1980. The Large Species of *Homalictus* and Related Halictinae from the New Guinea Area (Hymenoptera, Apoidea). *American Museum Novitates* 2693: 1–21.

Michener, C. D. 2007. *The Bees of the World*. John Hopkins University Press, Baltimore, 913 pp.
https://doi.org/10.56021/9780801885730

Oliver, P. M. and S. J. Richards. 2025. A new species of *Lepidodactylus* (Gekkonidae) from Misima Island, Papua New Guinea. *Zootaxa* 5601(2): 368–376.
https://doi.org/10.11646/zootaxa.5601.2.10

Oliver, P. M., D. S. Bower, P. J. McDonald, F. Kraus, J. Luedtke, K. Neam, L. Hobin, A. L. M. Chauvenet, A. Allison, E. Arida, S. Clulow, R. Günther, E. Nagombi, B. Tjaturadi, S. L. Travers and S. J. Richards. 2022. Melanesia holds the world's most diverse and intact insular amphibian fauna. *Communications Biology* 5: 1182.
https://doi.org/10.1038/s42003-022-04105-1

Pauly, A. 1986. Les abeilles de la sous-famille des Halictinae en Nouvelle-Guinée et dans l'Archipel Bismark (Hymenoptera: Apoidea: Halictidae). *Zoologische Verhandelingen* 227: 1–58.

Popov, V. B. 1950. Concerning the genus *Amegilla* Friese (Hymenoptera, Apoidea). *Entomologicheskoe Obozrenie* 31: 257–261. [in Russian]

Rayment, T. 1951. A critical revision of species in the genus *Asaropoda* by new characters.*Memoires of the Natural History Museum Victoria* 17: 65–86.
https://doi.org/10.24199/j.mmv.1951.17.07

Smith, F. 1854. Catalogue of Hymenopterous Insects in the Collection of the British Museum. Part II. Apidae. London, Printed by order of the Trustees, 199–465 pp.

Weijola, V. and F. Kraus. 2023. Two new species of monitor lizards (Squamata: *Varanus*) endemic to the Louisiade and Tanimbar Archipelagos with a key to the subgenus *Euprepiosaurus*. *Journal of Natural History* 57(13–16): 947–975.
https://doi.org/10.1080/00222933.2023.2218574

Wood, T. J. and C. J. Praz. 2024. Discovery of *Anthophora onosmarum* Morawitz, 1876 in Europe (Hymenoptera, Apidae). Alpine Entomology 8: 153–160.
https://doi.org/10.3897/alpento.8.138225

Wood, T.J. and S. Bossert 2025. Primary bee types in the Genoa museum; a partial treatise with taxonomic and nomenclatural implications (Hymenoptera: Anthophila). *Annali del Museo Civico di Storia Naturale "G. Doria"* 118: 267–378.