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An illustrated type catalogue of the bee species collected by Alfred Russel Wallace and described by Frederick Smith from Southeast Asia (Hymenoptera: Apoidea)

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Abstract. Alfred Russel Wallace travelled across the Malay Archipelago between 1854–1862, collecting more than 100 000 natural history specimens. Amongst them, the bees were acquired by William Wilson Saunders who sent them to Frederick Smith for description, and between 1857–1865 Smith described 89 bee species from this material. Here, we present a photographic catalogue of Smith's Wallacean type material for which material is present in the Oxford University Museum of Natural History collection, totalling 84 species. Lectotype designations are formally published for 13 species, as well as for two additional species described by Heinrich Friese. New synonymies are formally made: *Megachile clotho* Smith, 1860 is synonymised with *Megachile tuberculata* Smith, 1857 **syn. nov.**; *Megachile placida* Smith, 1862 is synoymised with *Megachile foliata* Smith, 1860 **syn. nov.**; *Megachile albocaudata* Friese, 1903 is synonymised with *Megachile terminalis* Smith, 1858 **syn. nov.**; *Xylocopa insularis* Smith, 1857 and *Xylocopa bangkaensis* Friese, 1903 are synonymised with *Xylocopa caerulea* (Fabricius, 1804) **syn. nov.**; and *Xylocopa dormeyeri* Enderlein, 1909, *Xylocopa caeruleiformis* Meade-Waldo, 1914, and *Xylocopa caeruleiformis* var. *fusca* Meade-Waldo, 1916 are synonymised with *Xylocopa tumida* Friese, 1903 **syn. nov.**, this being the senior name for the taxon referred to as *Xylocopa insularis* sensu auctorum. A neotype is designated for *Bombus coeruleus* Fabricius, 1804 in order to preserve the current usage of this name (as a species of *Xylocopa*). The presentation of this illustrated type catalogue highlights both the extraordinary ground-breaking work of Wallace and Smith, but also the paucity of revisionary work on bees in Southeast Asia which has been carried out since then, particularly in the Wallacean region; it is hoped that this catalogue will facilitate and stimulate future work in this area.

Keywords. Malaysia, Indonesia, solitary bees, historical collection, synonymy.

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Introduction

The story of Alfred Russel Wallace as a counterpart to Darwin in the development of the theory of evolution is well known. Furthermore, his travels have been immortalised in print as a classic story of discovery (Wallace 1869). However, relatively less attention has been paid to his actual scientific contributions, of which there are many. Wallace is a well-known pioneer in the study of both South America and Southeast Asia, facing shipwreck and disease in his pursuit of biodiversity discovery. Even among well-studied groups like bees, Asia remains something of a final frontier for systematics. The biogeographically complex island systems present in this region combined with the complex historical and contemporary political context present daunting challenges for understanding not just patterns of biodiversity but also fundamental aspects of species delineation and identification (Warrit *et al.* 2023). Consequently, much basic work remains to be done in the study of the bee fauna of Southeast Asia.

The present paper is an effort with two objectives; the first is to illustrate the majority of the bee species described by Frederick Smith which were collected by Wallace (and his assistant Charles Allen who has been an underappreciated part of this voyage; Rookmaaker & van Wyhe 2012) during his expedition across Southeast Asia between 1854 and 1862, and the second is to highlight the formally unpublished work made by Donald Baker for his PhD thesis (Baker 1993) which dealt with Smith's type material in detail, but which remains under-read and without its taxonomic actions recognised under ICZN (1999) rules. We aim to make this material more visible and available for bee taxonomists globally (Earl of Cranbrook & Mann 2016) in line with other similar catalogues (e.g., Astafurova *et al*. 2022) in order to stimulate work on the understudied and intriguing Southeast Asian bee fauna. Although some bee groups have been revised, partially revised, or partially treated in this region (e.g., Blüthgen 1926; Maa 1939; van der Vecht 1952, 1953; Lieftinck 1955, 1956a, 1956b, 1957; Hirashima 1967, 1978, 1980, 1989; Pauly 1980, 2009; Hirashima & Lieftinck 1982; Baker 1995; Schwarz & Gusenleitner 2004; Sung *et al*. 2009; Rasmussen & Michener 2010; Engel *et al*. 2017; Astafurova *et al*. 2020), not all authors examined Smith's type material directly, and newly imaged types will facilitate revisionary taxonomy while building toward a synthetic catalogue of the region.

Frederick Smith (1805–1879) was one of the most prolific describers of bee species, with almost 950 bee species named during his lifetime, placing him third behind Heinrich Friese and Theodore D.A. Cockerell by number of species described (Rasmussen 2012). The majority of the specimens that he used to describe bees are present in the Natural History Museum in London (NHMUK), but a significant portion of these specimens are deposited in the Oxford University Museum of Natural History (OUMNH). This results from the often varied sources of specimens used by Smith to describe new species, including private collections. One such source was the material collected by Wallace during his expedition across Southeast Asia between 1854 and 1862 covering the modern day countries of Malaysia, Singapore, Indonesia, and Timor-Leste, with this expedition being popularised in the ground-breaking *The Malay Archipelago* (Wallace 1869). Wallace collected approximately 125 000 specimens, and these were sent back to the United Kingdom in multiple shipments in the period 1854–1861 to Samuel Stevens (1817–1899) who acted as a natural history agent in London in selling this material to institutions and private collectors (Baker 2001).

The majority of the bees (amongst many other insect groups) collected by Wallace during this expedition were sold to William Wilson Saunders (1809–1879) who was actively involved with the Royal Entomological Society and the Linnaean Society of London and who accumulated insects of all sorts.

Whilst principally a botanist himself, he engaged entomologists to process, catalogue, and describe the insects (Wallace 1869). For the Hymenoptera of Wallace, he engaged Smith, who described the bees in eight publications (Smith 1857, 1858a, 1859, 1860a, 1860b, 1862, 1863, 1865), producing a total of 89 species names. Saunders' collection was acquired in 1875 by the OUMNH (Anon 1879; Baker 1993).

The varied history of Smith's type material and its modern-day repositories was the main focus of Donald Baker's PhD thesis (Baker 1993). Baker (1922–2004) worked on many bee groups with a focus on the Apidae Latreille, 1802 and Megachilidae Latreille, 1802, but was unable to publish all of his findings, leaving many manuscript names and unpublished synonymies (O'Toole 2006; Engel & Dathe 2009). Baker (1993) proposed several lectotype designations and synonymies, but this thesis does not meet the ICZN (1999) criteria for a valid publication. Under Articles 8 and 9, as the thesis was not a formally published work and only seven hard copies were produced, and these limited numbers were not obtainable either for free or for a charge, it fails Articles 8.1.2 and 8.1.3. Although some of Baker's synonymies have already been accepted into authoritative online resources (Ascher & Pickering 2024), it is necessary to consider these proposals anew in the present work, and where appropriate to publish them to ensure their compliance with the code.

Material and methods

Species are arranged in the order in which they were described by chronological publication date and then by page number within Smith's works. Baker (1993: 170) notes that the years of publication for Smith's papers given by Michener (1965: 336) are incorrect, and provides precise publication dates based on page numbers and split issues. For example, Smith (1857) as cited here refers only to pages 42–88, these appearing in issue 6 published on 2 Nov. 1857, with pages 89–130 appearing in issue 7 published on 20 Feb. 1858; Michener (1965) gave the entire publication including pages 42–130 as dated to 1858. As the bees were described on pages 42–52, the correct year of publication is 1857. This excerpt from Baker (1993) is reproduced here, with the addition of superscript numbers to indicate the publications dealt with here concerning the bees:

> "5.9.1 Synopsis of Smith's papers dealing with the Hymenoptera collected by A.R. Wallace in 'The Malay Archipelago'
>
> *J.Proc.Linn.Soc., Zool.,*
>
> | | | |
> |---|---|---|
> | 2 (6): 42–88 | 2 Nov 57[1] | } Sarawak, Borneo; Mount Ophir, Malacca; Singapore |
> | 2 (7): 89–130 | 20 Feb 58 | } |
> | 3 (9): 4–27 | 20 Aug 58[2] | Celebes (1st collection) |
> | 3 (11): 132–158 | 1 Feb 59[3] | } Aru and Key |
> | 3 (12): 159–178 | 11 Apr 59 | } |
> | 5 (17b) [Supplement to Vol. 4]: | | |
> | 57–93 | 18 Jul 60[4] | Celebes (2nd collection) |
> | 93–143 | 18 Jul 60[5] | Bachian, Kaissa, Amboyna, Gilolo, Dory |
> | 6 (21): 36–48 | 1 Nov 61 | } Ceram, Celebes, Ternate, Gilolo |
> | 6 (22): 49–66 | 1 Mar 62[6] | } |
> | 7 (25): 6–48 | 4 Mar 63[7] | Mysol, Ceram, Waigiou, Bouru, Timor |
> | 8 (30): 61–94 | 13 Jan 65[8] | Sumatra, Sula, Gilolo, Salwatty, New Guinea" |

Additional superscript markings added here indicate the eight papers concerning bees: 1. Smith (1857); 2. Smith (1858a); 3. Smith (1859); 4. Smith (1860a); 5. Smith (1860b); 6. Smith (1862); 7. Smith (1863); and 8. Smith (1865).

In a catalogue of Wallacean types, it is necessary to talk about specimen labels, and how to recognise them. A meaningful proportion of Wallace's insect material was never prepared (Baker 2001: 255–259), and Wallace and Allen only labelled specimens that were pinned, with pinning taking place in the field soon after collecting (Wallace 1869; Baker 1993: 181–182). These field labels consisted of white or blue circular discs with an abbreviation (typically 1–3 letters) of the locality. Additional numbers were sometimes added which refer to lists in Wallace's field notebooks (see below). A summary of these label abbreviations is presented here from Baker (1993), with an * indicating that such labels have not been directly seen by either Baker or ourselves when dealing with the Wallacean bee material, with those entries marked in bold indicating the inverse. Contemporary spelling is indicated between (parentheses).

Wallace's data label abbreviations

Amb. / Amb	Amboyna (Ambon)	**M. / M**	Mysol [Allen] (Misool)
Aru	Aru Is.	**M / Morty I /**	Morty I [Allen]
Bac. / Bac	Batchian (Bacan)	**Morty Isl.**	(Morotai)
Bali*	Bali	**Mak./ Mak / MAK**	Macassar
Ban.*	Banda	Maki.*	Makian
Banca*	Banca (Bangka)	Mat.*	Matabello Is.
Bouru / Booro	Bouru (Buru)	**Men.**	Menado
Celebes	Celebes (Sulawesi)	**M. OPHIR**	Mt Ophir (Mount Ledang)
Cer. / Cer	Ceram (Seram)	**N**	New Guinea [Allen]
Cer. E.	Ceram E[ast]	N. G.*	New Guinea
Coup.*	Coupang [W Timor] (Kupang)	**S**	Sula [Allen] ?; Salwatty
		Sal	Salwatty
Del.*	Delli [E Timor] (Dili)	**SAR. / SAR. /**	Sarawak
Dor.	Dory (Manokwari)	**Sarawak**	
F [Flo.*]	Flores	**SING.**	Singapore
Gag.	Gagie (Gag)	Sum.*	Sumatra
Gil.	Gilolo (Halmahera)	**Ter.**	Ternate
Gor.*	Goram	Tid.*	Tidore
J.*	Java? Jobi?	**Tim.**	Timor
Kai.	Kaióa Is. (Kajoa)	**Tond.**	Tondano
Ke / Ké **/ Key I.**	Ké Is. (Kai)	**Wag.**	Waigiou
Lom.*	Lombok		

In the introduction to Baker's thesis it was stated that the majority of bee specimens collected by Wallace were sold to W.W. Saunders. This is the case, but it is not as strongly put as summarised by Wallace (1869): "The remaining orders of insects [those other than the Coleoptera and the Lepidoptera] ... are in the collection of Mr. William Wilson Saunders". Of the recorded 13 400 "other" orders of insects received by Stevens, some 2707 were purchased by the NHMUK between March 1855 and January 1863, or around 20% (Baker 1993: 184). It is likely that Saunders selected material first, before leaving the remainder to be sold separately. However, it is clear that the W.W. Saunders collection was the primary source of specimens available to Smith at the time of writing. Smith (1858b: 129) wrote:

"The valuable collection of *Hymenoptera* which I have described, and, by permission of the Society, have had the pleasure of laying before them, is the property of W.W. Saunders Esq., Fellow of the Society, and is the most complete collection formed by Mr. Wallace."

Smith would also have had access to specimens sold by Stevens to the NHMUK (e.g., under Accession No. 1857-36, see entry for *Trigona ventralis* Smith, 1857). It is therefore necessary to carefully consider the available material, identify syntypes, and select the most appropriate specimen for lectotype

designation. Baker was conservative in his choice of "lectotype" designations, favouring the OUMNH collection, but based on the available evidence and the known history of Smith's work on Saunders' collection, this is a reasonable position. Where valid syntypes are present in both the OUMNH and NHMUK collections, in the absence of an objective criterion to select one over the other, priority is given to the OUMNH collection, particularly if specimens bear one of Smith's original blue handwritten labels. Discussion is added below, where necessary.

For each species entry, comments from Baker (1993) are transcribed when necessary. These are given as direct quotations. In many cases, Baker annotated his comments using (parentheses) and [square brackets]; these are not contemporary modifications by the current authors. For all text occurring "between quotation marks", this is original text from Baker and use of [square brackets] is original use by Baker. Additionally, the original notebooks of Wallace were inspected via transcribed versions which have recently been made available (Beccaloni 2025). Wallace numbered some of his specimens, and his field comments can be traced this way. Unfortunately, his 1st notebook detailing the early part of his voyage has been lost. From the perspective of the bees, this is problematic, as the majority of the numbered type specimens were collected in 1854 in peninsular Malaysia and Singapore. Unfortunately, Wallace did not write much about bees either in his notebooks or in *The Malay Archipelago* (Wallace 1869), and so most original observations relating to their capture are lacking.

Modern distributions are given indicating islands or provinces within larger countries where this is enabled by available records. Given that the majority of Wallacean specimens are reported without exact localities, the reported ranges are necessarily variable in their level of precision. A detailed and annotated timeline of Wallace's travel can be found in several places, for example in modern versions of Wallace (1869), which can allow for general collecting localities within larger regions or islands to be inferred. For example, collections in Sarawak are likely to be restricted to the western part of Malaysian Borneo around Kuching ("Sarawak town"), east to the Sadong River (Simunjan coal works). Baker (1993, 2001) provided detailed annotations for Wallace's voyage; such a discussion of the likely precise collecting localities of Wallace is beyond the scope of this manuscript, and only small comments or relevant notes from Baker are included where appropriate. Estimated collecting dates are provided in the material examined, based on Wallace's itinerary (Wallace 1869 and subsequent commentaries; Baker 1993, 2001), with notes added where uncertainty exists.

For each species entry, full chresonomic lists for species are not presented in the interest of brevity, and also because for many species the current chresonomic lists may actually concern errors due to a lack of detailed revisionary taxonomy for many Southeast Asian bee groups. More detail is given for species for which new taxonomic actions are introduced. Additional material is presented for these species. For presented specimen entries, all label information is given verbatim, except for context which is provided between square brackets. Morphological terminology follows Michener (2007). Primary taxonomic literature is cited where possible to give the currently accepted classification combinations, and where such revisions are lacking, the global bee checklist of Ascher & Pickering (2024) is cited.

Where necessary, specimens were measured from the centre of the clypeus at the front of the head to the apical tip of the metasoma and rounded 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 10X infinity corrected objective lens in combination with an Olympus M.Zuiko 2× teleconverter lens, a 10 mm Kenko DG extension tube, and a Meike MK-P-AF3B 10 mm extension tube. Photographs were stacked using Helicon Focus B (HeliconSoft, Ukraine) and plates were prepared in GNU Image Manipulation Program (GIMP) ver. 2.10. Post-processing of some images was made in Photoshop Elements (Adobe Systems, USA) to improve lighting to highlight specific characters.

Abbreviations of repositories

MSNG = Museo Civico di Storia Naturale Giacomo Doria, Genoa, Italy
NHMUK = Natural History Museum, London, UK
NMV = Museums Victoria, Melbourne, Victoria, Australia
NHMW = Naturhistorisches Museum Wien, Vienna, Austria
OUMNH = Oxford University Museum of Natural History, Oxford, UK
RMNH = Naturalis Biodiversity Center, Leiden, the Netherlands
SEMC = Snow Entomological Museum Collection, University of Kansas Natural History Museum, Kansas, USA
SRC = Personal collection of Stephan Risch, Leverkusen, Germany
UMO = University Museum Oxford, an old abbreviation used by Donald Baker in his thesis for the OUMNH
USNM = Smithsonian National Museum of Natural History, Washington D.C., USA

Results

Class Insecta Linnaeus, 1758
Order Hymenoptera Linnaeus, 1758
Superfamily Apoidea Latreille, 1802

Species described by Smith (1857) from Peninsula Malaysia, Singapore, and Borneo

1. ***Halictus ceratinus*** Smith, 1857
Fig. 1

Halictus ceratinus Smith, 1857: 42, ♂.

Type material examined

Lectotype
MALAYSIA • ♂; Sarawak; [29 Oct. 1854–10 Feb. 1856]; OUMNH, ENT-HYME2476-01 (lectotype indicated by Baker 1993, de facto lectotype designated by Pauly 2009).

Paralectotype
MALAYSIA • 1 ♂; Sarawak; [29 Oct. 1854–10 Feb. 1856]; OUMNH, ENT-HYME2476-02.

Type locality

Borneo (Sarawak).

Notes

Baker (1993: 191–192) designated a lectotype for this species, placing it in combination with the genus *Lipotriches* Gerstäcker, 1858 (see text under 3. *Halictus basalis* below). Pauly (2009: 175) noted Baker's lectotype, and therefore acted as the first publisher of this designation.

Current status

Lipotriches (*Lipotriches*) *ceratina* (Smith, 1857) (Pauly 2009).

Distribution

India, Nepal, Myanmar, Laos, Vietnam, China, Japan, Korean Peninsula, Taiwan, Thailand, Malaysia (Peninsula, Borneo), Singapore, Philippines, Indonesia (Kalimantan, Sumatra, Java, Sulawesi) (Pauly 2009; Ascher & Pickering 2024).

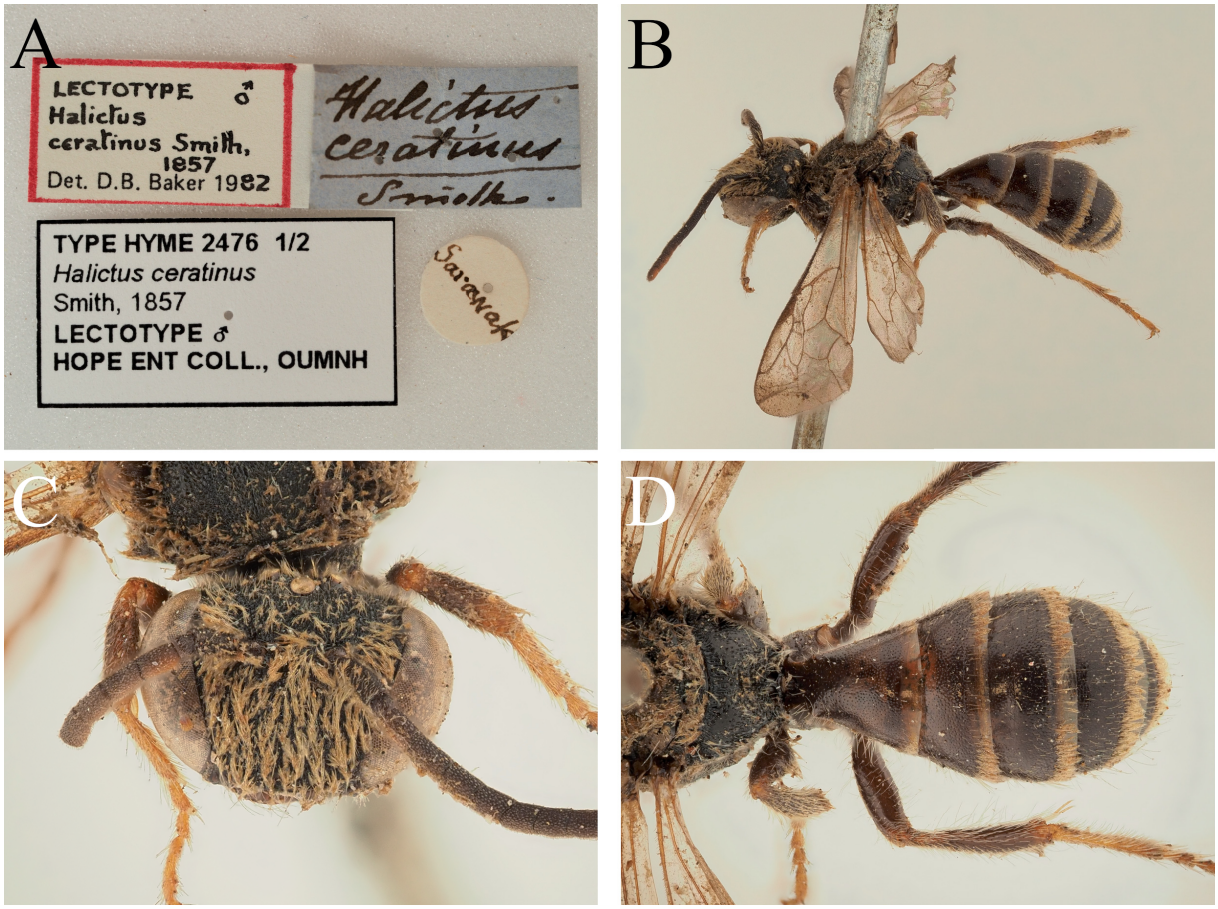

Fig. 1. *Halictus ceratinus* Smith, 1857, lectotype, ♂ (OUMNH, ENT-HYME2476-01). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

2. ***Halictus vagans*** Smith, 1857
Fig. 2

Halictus vagans Smith, 1857: 42, ♀.

Type material examined

Holotype

MALAYSIA • ♀; Sar. [Sarawak]; [29 Oct. 1854–10 Feb. 1856]; OUMNH, ENT-HYME0882.

Type locality

Borneo (Sarawak).

Notes

Baker (1993: 191) wrote the following:

> "A ♀ in the UMO type collection (Type Hym: 882 1 / 2), formerly standing over the label '*vagans* Sm. Born.' in Saunders' collection, labelled "SAR.' [white disc], '*Halictus vagans*. Smith' [blue paper, Smith] and 'Syn.: *Halictus cattulus* Vach. 1894 ♀ etc. det. Blüthgen 1929.' [Blüthgen's hand] may be regarded as the HOLOTYPE of this species and it has now been labelled accordingly. It has lost the greater part of the left flagellum: but is otherwise in fair condition".

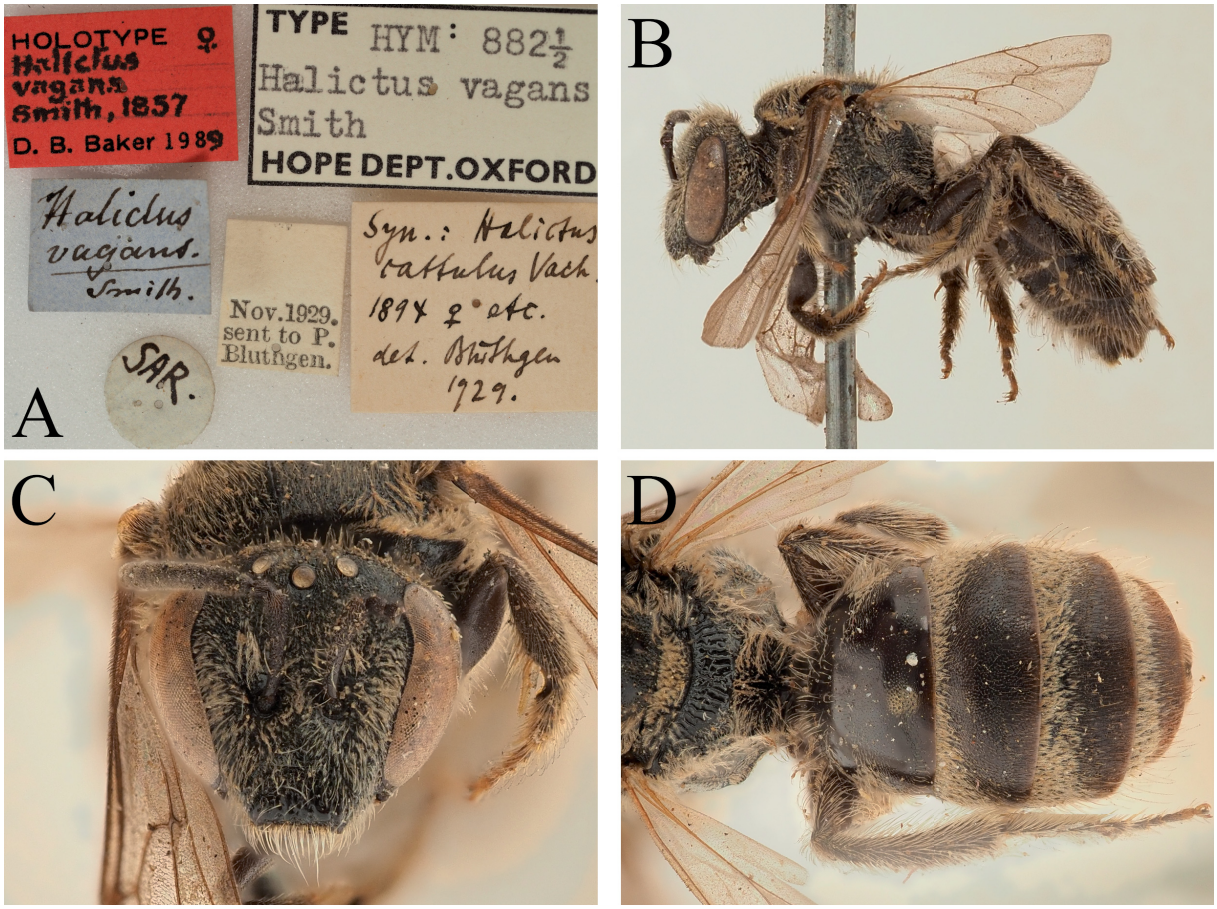

Fig. 2. *Halictus vagans* Smith, 1857, holotype, ♀ (OUMNH, ENT-HYME0882). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Current status

Lasioglossum (*Ctenonomia*) *vagans* (Smith, 1857) (Ascher & Pickering 2024; J. Gardner pers. com.).

Distribution

From the East Mediterranean to Papua New Guinea (Pauly 1986; Ascher & Pickering 2024).

3. ***Halictus basalis*** Smith, 1857
Fig. 3

Halictus basalis Smith, 1857: 43, ♂.

Type material examined

Holotype

SINGAPORE • ♂; Sing. 43a [Singapore]; [either 25 Sep.–17 Oct. 1854 or 10–17 Feb. 1856]; OUMNH, ENT-HYME2473.

Type locality

Singapore.

Notes

Baker (1993: 192) placed this species in combination with the genus *Lipotriches* and wrote the following:

> "The HOLOTYPE of *Halictus basalis* Smith, 1857 [not *Nomia basalis* Smith, 1875, a species of *Pseudapis*] is a ♂ in the UMO type collection labelled 'SING. 43a.' [white disc] and *'Halictus basalis* Smith' [blue paper, Smith].
>
> The LECTOTYPE of *Halictus ceratinus* Smith, 1857, by present designation, is a ♂ in the UMO type collection labelled 'Sarawak' [white disc] and *'Halictus ceratinus* Smith' [blue paper, Smith]. A second ♂ in the same collection, labelled 'SAR.' [white disc] and '*Halictus ceratinus* Smith' [blue paper, similar to label on lectotype but, from slight variations in script, not written at the same time] has been labelled as paralectotype (this specimen is in rather cleaner condition, but the head has at some time been re-attached and the mesosoma is distorted by the pinning). These ♂♂ are apparently conspecific with *basalis*, agreeing particularly in the armature of sternum 5, and probably represent a darker, Bornean form. While ample material of *basalis* from peninsular Malaysia is available, recent Bornean material is not, and the precise status of *ceratina* [this name has page precedence] remains to be decided".

Pauly (2009) examined both types, and synonymised *L. basalis* under *L. ceratina*, thus acting as first reviser.

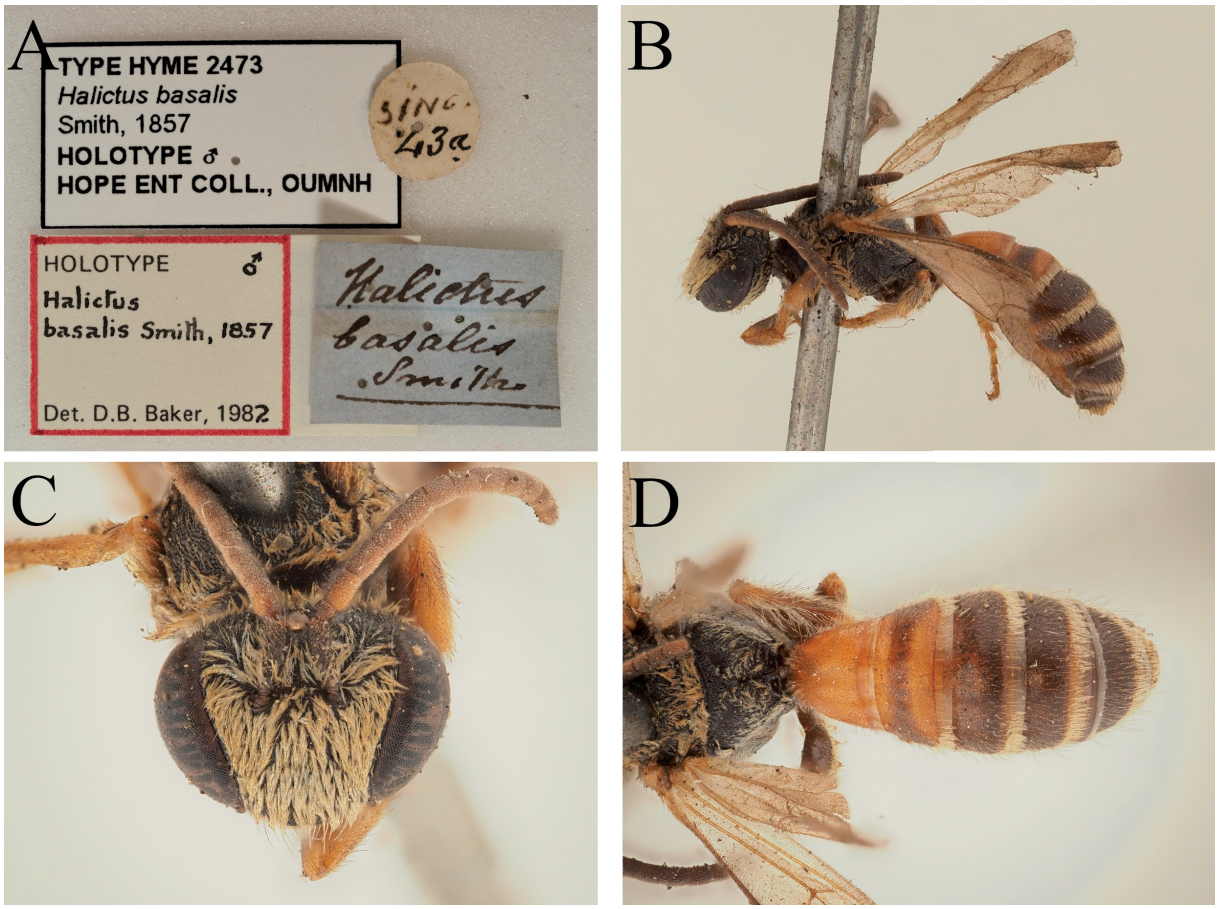

Fig. 3. *Halictus basalis* Smith, 1857 holotype, ♂ (OUMNH, ENT-HYME2473). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Current status

Lipotriches (*Lipotriches*) *ceratina* (Smith, 1857) (Pauly 2009).

Distribution

India, Nepal, Myanmar, Laos, Vietnam, China, Japan, Korean Peninsula, Taiwan, Thailand, Malaysia (Peninsula, Borneo), Singapore, Philippines, Indonesia (Kalimantan, Sumatra, Java, Sulawesi) (Pauly 2009; Ascher & Pickering 2024).

4. ***Nomia apicalis*** Smith, 1857

Nomia apicalis Smith, 1857: 43, ♂.

Type material examined

None.

Type locality

Singapore.

Notes

Placing *N. apicalis* in combination with the genus *Maculonomia* Wu, 1982, Baker (1993: 192) wrote the following:

> "A ♂ in the UMO type collection, labelled 'SING.' and 'SING. 69' [on either side of white disc (the '69' does not indicate a date: a number of Wallace's Malayan bees were similarly serially numbered) and *'Nomia apicalis* Smith' [blue paper] is the HOLOTYPE of this species. [*Melanomia* Pauly, 1991, and *Terminomia* Baker MS, in Coll., are synonyms of *Maculonomia* Wu, 1982.]".

The holotype specimen is currently on loan (since 2016), so no photographs are provided.

Current status

Maculonomia apicalis (Smith, 1857) (Pauly 2009).

Distribution

China to Indonesia (Kalimantan, Java), including Singapore (Pauly 2009; Ascher *et al*. 2022). A revision of this genus is required due to its taxonomic complexity, ongoing process of species description, and multiple species that are described from only one sex (e.g., Majumder *et al*. 2025; Tran *et al*. 2025).

5. ***Nomia iridescens*** Smith, 1857
Fig. 4

Nomia iridescens Smith, 1857: 43–44, ♀.

Type material examined

Lectotype

MALAYSIA • ♀; Mal. 75 [Malacca]; [13 Jul.–25 Sep. 1854]; OUMNH, ENT-HYME2767 (lectotype indicated by Baker 1993, de facto lectotype designated by Pauly 2009).

Type locality

Malacca, India. Fixed as Malacca (Malaysia) by lectotype designation.

Notes

Baker (1993: 193) wrote the following:

> "There are three supposed types:-
>
> NHM: ♀, '*iridescens* ♀' [Westwood's hand], B.M. Type Hym. 17 a 1614 (antennae and legs more or less broken, metasoma lost beyond segment 1).
> UMO (in type collection):-
> ♂, 'Mal' [blue disc, = Malacca] : this is a ♂ of *Curvinomia fulvata* (F., 1804), ♀, 'MAL. 75.' [white disc; cf. note under 5.9-41 and '*Nomia iridescens* Westw. MSS.' [blue paper].
>
> Although the species was known to Smith, as he believed, in both sexes (1853: 89), he described only the ♀. The UMO ♂ has therefore been labelled as of no type status [and, since Wallace did not visit Malacca until 1854, it could not in any event have been one of the specimens that Smith saw prior to 1853].

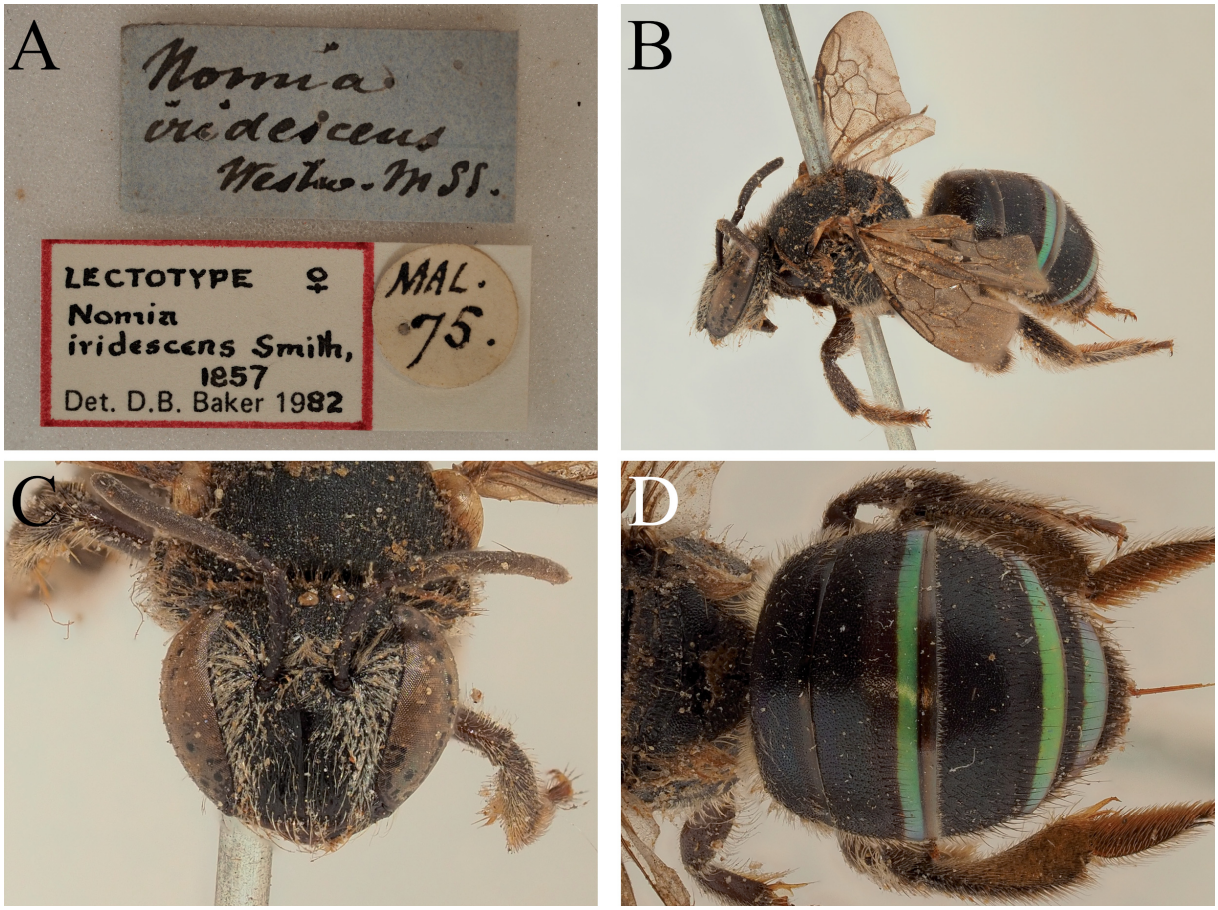

Fig. 4. *Nomia iridescens* Smith, 1857, lectotype, ♀ (OUMNH, ENT-HYME2767). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

> The NHM ♀, without any indication of locality, is probably one of the [Indian] specimens on which Westwood's MS name was based. It was no doubt before Smith when he described the species, adopting Westwood's MS name, and may be accepted as a syntype. The UMO ♀ may also be accepted as a syntype of *iridescens*, and this specimen is now designated as LECTOTYPE, in preference to the NHM ♀, on the grounds
> a) that the specimen is of known locality and provenance [Malacca (Wallace), ex W.W. Saunders' collection], and
> b) that it is in a better state of preservation (intact but for loss of L tarsus II).
> The NHM specimen has accordingly been labelled as a paralectotype.
>
> The two ♀♀ are probably conspecific but are not identical. The Malacca ♀ (lectotype) has the basal zone of the propodeum broader (nearly as broad as flagellum) and less sharply defined posteriorly, as in recent material from Singapore (P. Blakang Mati; Bukit Tingah) and Johore (G. Lambak; Kluang F.R.; Jason Bay). The NHM ♀ ['East India': Smith, 1853] has the basal zone of the propodeum narrow and more sharply marginate posteriorly, as in a recent ♀ from Perak (Ulu Piah). Available regional material is inadequate to permit assessment of the significance of these and other minor differences (e.g., the NHM and Perak ♀♀ have the long, erect setae of the metanotum pale, whereas in the Singapore, Johore and Malacca ♀♀ they are predominantly dark).
>
> [The ♂ described by Westwood in 1875 may be traced in NHM or in Westwood's collection in UMO: details given by Westwood indicate that this ♂ was at least a member of the *iridescens* group. His description does not apply to the UMO ♂ referred to above.]".

Pauly (2009: 159) noted Baker's lectotype, and therefore acted as the first publisher of this designation. We follow Baker's argument that the Malaccan specimen is the better choice of lectotype since it is of known providence compared to the NHMUK specimen.

Current status

Curvinomia iridescens (Smith, 1857) (Pauly 2009).

Distribution

India, Sri Lanka, Myanmar, China, Thailand, Cambodia, Laos, Malaysia (Peninsula, Borneo), Singapore, Philippines, Indonesia (Java) (Pauly 2009; Ascher & Pickering 2024).

6. ***Nomia elegans*** Smith, 1857
Fig. 5

Nomia elegans Smith, 1857: 44, ♀.

Type material examined

Holotype

MALAYSIA • ♀; Mal. 74 [Malacca]; [13 Jul.–25 Sep. 1854]; OUMNH, ENT-HYME2768.

Type locality

Malacca.

Notes

Baker (1993: 194) wrote the following:

> "A ♀ in the UMO type collection, labelled 'MAL. 74' [white disc] and '*Nomia elegans* Smith' [blue paper, Smith] is the HOLOTYPE of this species. A second ♀, in the main collection, labelled 'Mak' [Makassar], 'Celebes' [both on blue discs], '*N. elegans* Smith' [white paper] and 'Coll Smith 1879' is superficially similar but not conspecific. This specimen can have no type status and has been labelled accordingly.
>
> No *elegans* have been identified among recent extensive collections from peninsular Malaya (which did not, however, include any material from Malacca [Melaka]), but *Nomia borneana* Cameron, 1902 may prove to be conspecific".

Pauly (2009: 162) wrote that that the type material of *N. elegans* was "Lectotype ♀: [Sulawezi] Malacca ('MAL 74') (OUMNH), désigné par BAKER 1993: 194 (non examiné)", but this is a mixture of information for *Nomia concinna* Smith, 1860 and *N. elegans*. The specimen mentioned by Baker from Makassar may be conspecific with *Nomia concinna* Smith, 1860 (= *Maculonomia concinna*, see below), though it is probably not part of the type series of that latter species.

Current status

Maculonomia elegans (Smith, 1857) (Pauly 2009).

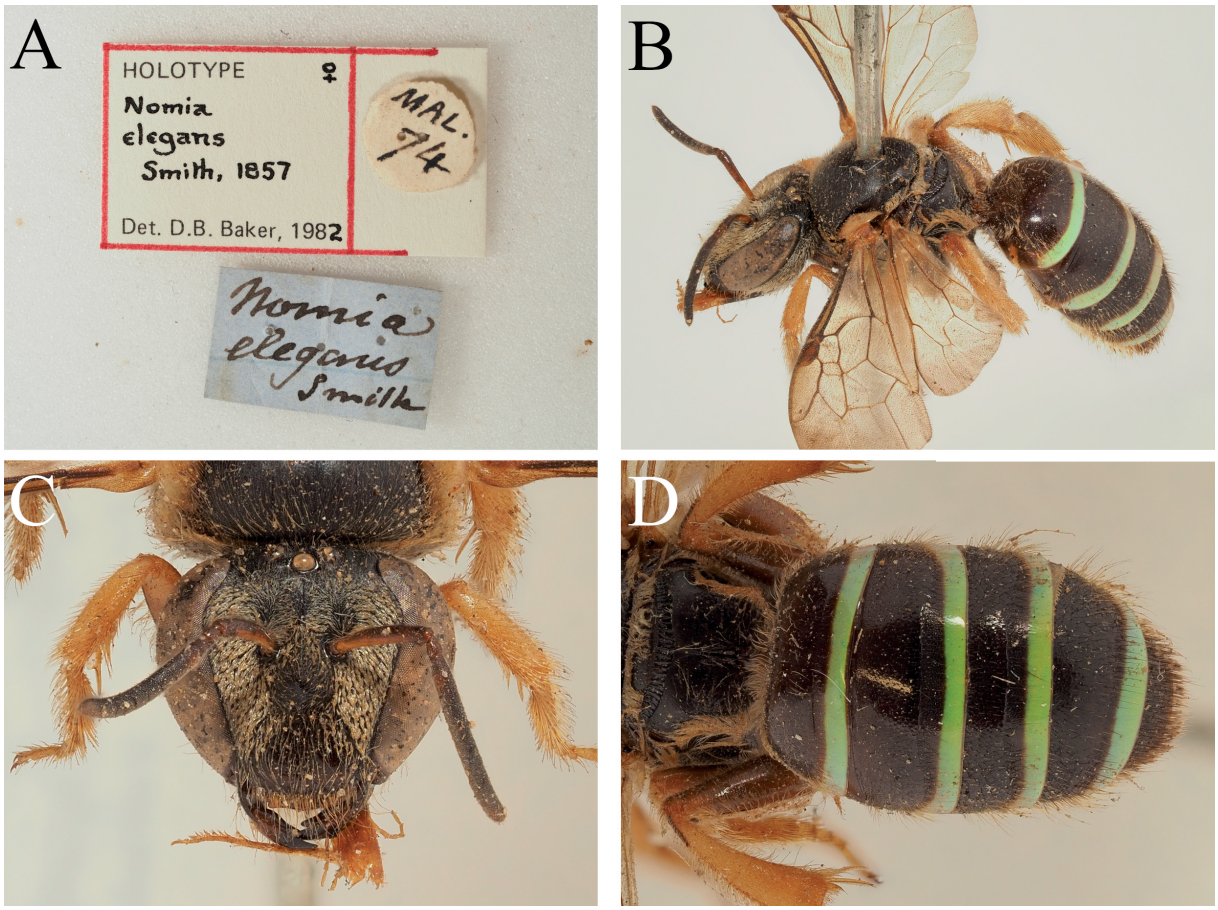

Fig. 5. *Nomia elegans* Smith, 1857, holotype, ♀ (OUMNH, ENT-HYME2768). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Distribution

Somewhat unclear due to the need for taxonomic revision of *Maculonomia*, but Malaysia (Peninsula, Borneo) and Indonesia (Pauly 2009).

7. ***Ctenoplectra chalybea*** Smith, 1857
Fig. 6

Ctenoplectra chalybea Smith, 1857: 45, ♀.

Type material examined

Holotype

MALAYSIA • ♀; M. Ophir 72 [Mount Ledang]; [13 Jul.–25 Sep. 1854]; OUMNH, ENT-HYME2459.

Other material examined (*Ctenoplectra australica*)

AUSTRALIA • ♀, holotype; Claudie R., N.Q. [North Queensland]; Nov. 1912–Feb. 1914; Dr Macgillivray leg.; NMV (examined by photograph).

PAPUA NEW GUINEA • 1 ♀; New Guinea; 8 Oct. 1898; L. Bíró leg.; T.J. Wood det.; MSNG.

Type locality

Malacca (Mount Ophir) [= Mount Ledang].

Notes

Baker (1993: 194) wrote the following:

> "A ♀ in the UMO type collection, labelled 'M. Ophir. 72' [white disc] and '*Ctenoplectra chalybea* [rule] Smith' [blue paper, Smith] is the HOLOTYPE of this species and it has now been labelled accordingly. A second specimen in the same collection, labelled 'Mak' [Makassar; blued disc] and '*Ctenoplectra chalybea* Smith' [blue paper, Smith] can have no type status and is not conspecific. [This specimen is referable neither to the Philippines species *vagans* Cockerell, 1904 (in which the ocelli are unusually small) nor to the N. Bornean representative of this group (in which the basal flagellar segments are of different proportions).] *Ctenoplectra apicalis*



Fig. 6. *Ctenoplecta chalybea* Smith, 1857, holotype, ♀ (OUMNH, ENT-HYME2459). **A**. Label information. **B**. Habitus, profile view.

> Smith, 1879 [HOLOTYPE ♂ B.M. Type Hym. 17 a 1840, Birmah $^{5}_{1}{}^{7}_{6}$: Mrs Waring], is possibly the ♂ of *chalybea* (the 'marginal bands' of the terga, described by Smith, were not natural, being an irregular encrustation, readily soluble in alcohol, probably the result of post-mortem decomposition)".

The female from Makassar is the basis of Smith's record (Smith 1860a: 91), with this species later described as *C. elsei* Engel, 2007 based on a manuscript name from Baker and NHMUK material (Engel 2007); it is endemic to the island of Sulawesi. *Ctenoplectra apicalis* was synonymised with *C. chalybea* by Sung *et al*. (2009). The "N. Bornean representative" mentioned by Baker was described as *C. sandakana* Sung, 2009 based on NHMUK material separated as distinct by Baker (Sung *et al*. 2009).

Finally, the records of *C. chalybea* reported from New Guinea by Friese (1909: 207) are considered to belong to *C. australica* Cockerell, 1926 who described the species from northern Queensland (Cockerell 1926: 513). The holotype is stored in the NMV collection (K. Walker pers. com.), and images of the type were examined online. A specimen collected by the Hungarian Lajos Bíró was found in the MSNG collection, matching both Cockerell's description and images of the holotype. The records of Friese from Erima and Stephansort in Austrolabe Bay and Simbang on the Gulf of Huon (probably around modern day Lae) collected by Bíró from eastern Papua New Guinea (hopefully still present in the Budapest museum) would therefore be referable to *C. australica* given the eastern range limit of *C. chalybea* in Peninsula Malaysia. The records of *C. chalybea* from Kalidupa Buton in this same work (Friese 1909: 208) certainly refer to *C. elsei*.

Current status

Ctenoplectra chalybea Smith, 1857.

Distribution

India, Bangladesh, Myanmar, Thailand, Vietnam, Malaysia (Peninsula), China, Taiwan (Sung *et al*. 2009; Anandhan *et al*. 2024; Ascher & Pickering 2024).

8. ***Megachile amputata*** Smith, 1857
Fig. 7

Megachile amputata Smith, 1857: 45–46, ♀.

Type material examined

Holotype

MALAYSIA • ♀; Sar. [Sarawak]; [29 Oct. 1854–10 Feb. 1856]; OUMNH, ENT-HYME2769.

Type locality

Borneo (Sarawak).

Notes

Baker (1993: 194) wrote the following:

> "A ♀ in the UMO type collection, labelled 'SAR.' [white disc] and '*Megachile amputata* Smith' [blue paper, Smith] is the HOLOTYPE of this species and it has now been labelled accordingly".

Baker also suggested *Megachile harrisoni* Cockerell, 1906 (described from Sumatra) and *Megachile sandacana* Cockerell, 1919 (described from Sandakan) as possible junior synonyms, and synonymised



Fig. 7. *Megachile amputata* Smith, 1857, holotype, ♀ (OUMNH, ENT-HYME2769). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Megachile pahangiella Cockerell, 1927 directly, writing: "*Megachile pahangiella* Cockerell, 1927: 543; ♀; Pahang. HOLOTYPE ♀ B.M. Type Hym. 17 a 2397 (examined). Syn. nov.".

Three of the synonyms have been provisionally accepted (Ascher & Pickering 2024), with the status of *M. sandacana* being considered uncertain (Gonzalez & Engel 2012). The type specimen of *M. pahangiella* is similar (photographs available on NHMUK data portal), but we currently consider it premature to synonymise them. An in-depth revision of subgenus *Lophanthedon* Gonzalez & Engel, 2012 is required.

Current status

Megachile (*Lophanthedon*) *amputata* Smith, 1857 (Ascher & Pickering 2024).

Distribution

Still requiring clarification, but probably India, Sri Lanka, Myanmar, Thailand, Malaysia (Peninsula, Borneo), Indonesia (?Sumatra) (Ascher & Pickering 2024).

9. ***Megachile tuberculata*** Smith, 1857
Fig. 8

Megachile tuberculata Smith, 1857: 46, ♀.

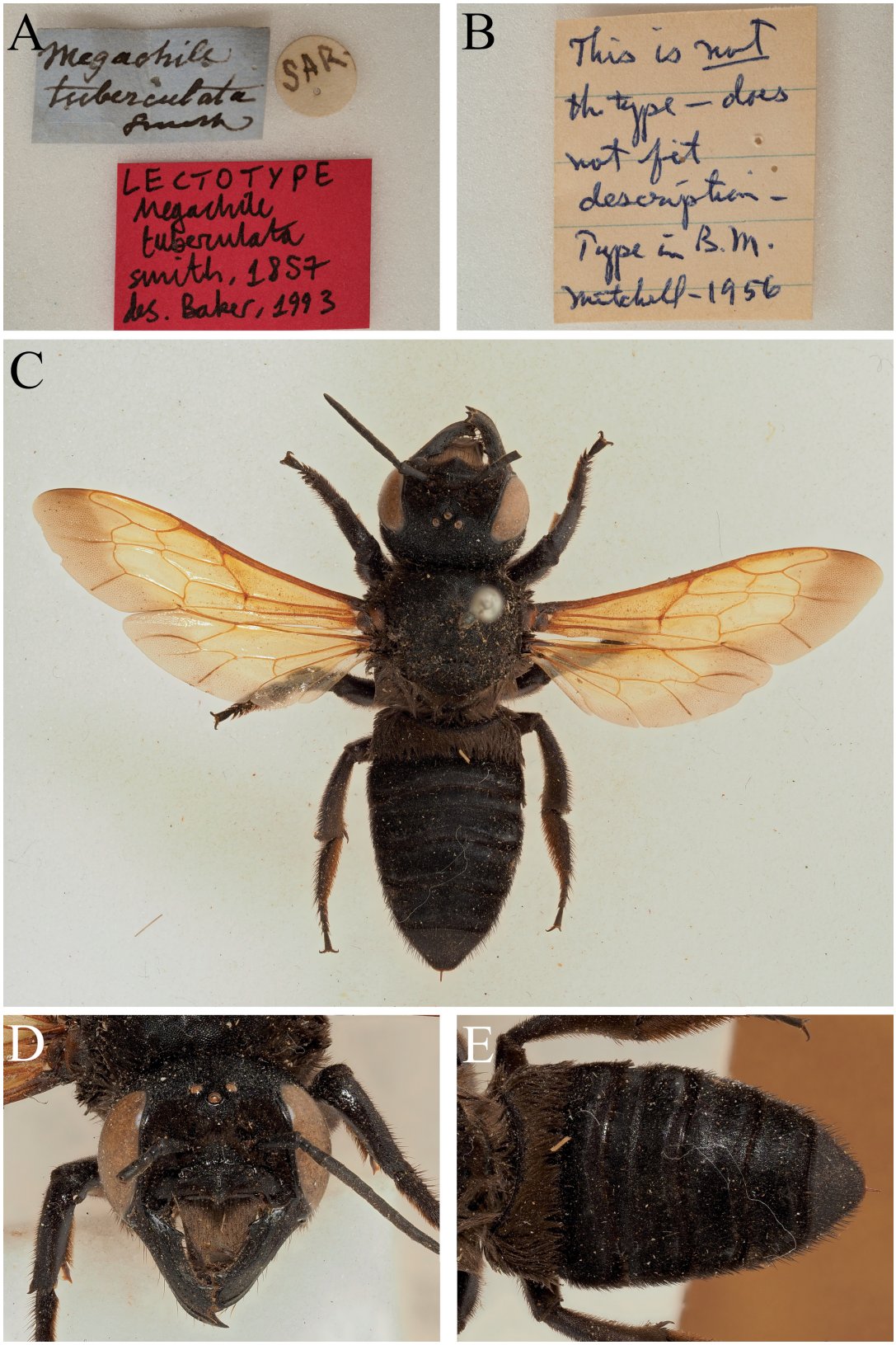

Fig. 8. *Megachile tuberculata* Smith, 1857, lectotype, ♀ (OUMNH, ENT-HYME2770). **A**. Label information part 1. **B**. Label information part 2. **C**. Habitus, dorsal view. **D**. Head, frontal view. **E**. Metasoma, dorsal view.

Type material examined

MALAYSIA • 1 ♀; Sar. [Sarawak]; [29 Oct. 1854–10 Feb. 1856]; OUMNH, ENT-HYME2770 (lectotype indicated by Baker 1993, de facto lectotype by present designation).

Other material examined

INDONESIA • 1 ♂; Mentawai, Siberut N; 3 Apr. 2005; S. Jakl leg.; S. Risch det.; SRC • 4 ♀♀; Kalimantan, Kembang Djangut; 30 Sep.–24 Nov. 1956; A.M.R. Wegner leg.; S. Risch det.; RMNH • 1 ♀; Kalimantan, Nunukan; 1–31 Dec. 1953; R. Heurig leg.; S. Risch det.; RMNH • 1 ♀; Kalimantan, Samarinda, Muara Kaman; 1–30 Nov. 1950; A.M.R. Wegner leg.; S. Risch det.; RMNH • 1 ♀; Kalimantan, Tabang, Bongen River; 24 Nov. 1956; A.M.R. Wegner leg.; S. Risch det.; RMNH • 1 ♀; Kalimantan, Balikpapan, Moan River; 1–30 Nov. 1950; M.S. Walsh leg.; S. Risch det.; RMNH • 2 ♀♀; Sumatra, Medan; 6 Mar. 1939; v.d. Laan leg.; S. Risch det.; RMNH • 1 ♂; Sumatra, SE-Küste, Laut Tador; 90 m a.s.l.; 28 Mar. 1958; R. Straatman leg.; S. Risch det.; RMNH • 1 ♂; Sumatra, P. Weh, Sabang; 25 Sep. 1938; M.A. Lieftinck leg.; S. Risch det.; RMNH • 3 ♂♂, 4 ♀♀; Sumatra, Oosthaven [Bandar Lampung]; 29 Mar. 1937; J.v.d. Vecht leg.; S. Risch det.; RMNH • 2 ♀♀; Banka, Soengerliat [Sunga Liat]; 22 Mar. 1931; J.v.d. Vecht leg.; S. Risch det.; RMNH • 1 ♀; Mentawai Islands, Siberut; 15 Sep. 1924; H.H. Karny leg.; S. Risch det.; RMNH • 2 ♀♀; W Java, Mt Pannggerango, Tjisaroen z. [Cisarua]; 6 Jun. 1948; M.A. Lieftinck leg.; S. Risch det.; RMNH • 1 ♂; W Java, Gunung Megamendoeng; 19 Mar. 1919; M.A. Lieftinck leg.; S. Risch det.; RMNH • 1 ♀; W Java, Bogor, Mimanggu; 22 Mar. 1956; Hamann leg.; S. Risch det.; RMNH • 1 ♂; Java, Bogor; 16 Nov. 1952; J.v.d. Vecht leg.; S. Risch det.; RMNH • 1 ♀; Java, Buitenzorg; 14 Apr. 1940; M.A. Lieftinck leg.; S. Risch det.; RMNH • 1 ♀; C Java, res. Kedoe Mt Tetamojo, Pagergoenoeng; 1000 m a.s.l.; 30 Oct. 1939; M.A. Lieftinck leg.; S. Risch det.; RMNH.

MALAYSIA • 3 ♀♀; Sabah, Road Ranau-Telupid; 11 Feb. 2010; S. Risch leg.; S. Risch det.; SRC • 1 ♀; Sabah, Road Kota Marudu-Serinsim; 3 Apr. 1999; P. Hartmann leg.; S. Risch det.; SRC • 1 ♀; Sabah, 60 km W Lahad Datu, Danum Valley field Centre; 150 m a.s.l.; 20 Oct. 1987; A.M.R. Wegner leg.; S. Risch det.; RMNH • 1 ♀; Penang Island, Feringgi Batu; 28 Feb. 1963; M.A. Lieftinck leg.; S. Risch det.; RMNH.

THAILAND • 1 ♀; Koh Samui, Mae Nam; 7–16 Feb. 2006; S. Risch leg.; S. Risch det.; SRC • 1 ♀; Pattaya, 150 km SE Bangkok; A.C.J. Buroers leg.; S. Risch det.; RMNH.

Type locality

Borneo (Sarawak).

Notes

In the material examined, we give here only specimens matching the yellow-winged form, i.e., *M. tuberculata* s. str. We treat *Megachile clotho* Smith, 1860 as a junior synonym, see Section 58, and examined specimens displaying black wings (i.e., *M. clotho*) are listed under that species.

Baker (1993: 195) wrote the following:

> "Two ♀♀ of this taxon, both from Saunders' collection, are present in the UMO type collection. One, labelled 'Java', confused with *Chalicodoma* (*Eumegachilana*) *monticolum* (Smith, 1853), can have no type status and has been so labelled. The second, labelled 'SAR.' [white disc] and '*Megachile tuberculata* Smith' [blue paper, Smith]. bears also a note making the extraordinary statement: 'This is not the type - does not fit description - Type in B.M. Mitchell - 1956'. The specimen in fact agrees exactly in every detail with Smith's description, and, further (*vide*

> introduction to this section, 5.9.5, with footnote 3, and comment under 5.9-5), since Smith was specifically describing material in W.W. Saunders' collection, the type was primarily to be sought in that collection, given that syntypes might be found elsewhere (*scil*., in Smith's own and the B.M. collections). [It may be noted here that a wider dispersal of original series is generally unlikely: Wallace appears rarely, if ever, to have taken more than a very few specimens of any species of bee (a common experience for nonspecialist collectors in Malesia). Any specimens remaining in Stevens' hands after Saunders', Smith's and the B.M.'s purchases would have been few in number and, since, in general, purchasers would have provided their own labels (cf. 5.9.4), usually limited to localities, and probably now unrecognizable.] In the present instance, a syntype similarly labelled 'SAR.' does exist in NHM (B.M. Type Hym. 17 a 2840), but preference in the selection of a lectotype must be accorded the Saunders/UMO specimen. The latter is now formally designated as LECTOTYPE of *Megachile tuberculata* Smith, 1857, and has been labelled accordingly; the NHM specimen has been labelled as a paralectotype [22 Sep 84]".

The OUMNH specimen indicated by Baker was not labelled as the lectotype; this has now been rectified, and we formally publish this designation. The OUMNH specimen is favoured as it bears one of Smith's blue handwritten labels. The NHMUK was equally not labelled by Baker as a paralectotype, but it may be considered as such.

Current status

Megachile (*Callomegachile*) *tuberculata* Smith, 1857 (Ascher & Pickering 2024).

Distribution

India, Bhutan, Thailand, Malaysia (Peninsula, Borneo), Singapore, Indonesia (Sumatra, Java, Sulawesi, North Maluku, Maluku, Papua s. lat.), Philippines, Papua New Guinea (Baltazar 1966; Baker 1993; Ascher *et al*. 2022; Ascher & Pickering 2024; current study). This includes *Megachile clotho* Smith, 1860 as a junior synonym, see Section 58.

10 ***Megachile architecta*** Smith, 1857
Fig. 9

Megachile architecta Smith, 1857: 46, ♀.

Type material examined

Holotype

MALAYSIA • ♀; Sar. [Sarawak]; [29 Oct. 1854 – 10 Feb. 1856]; OUMNH, ENT-HYME2771.

Type locality

Borneo (Sarawak).

Notes

Baker (1993: 195) wrote the following:

> "A ♀ in the UMO type collection, labelled 'SAR.' [white disc] and '*Megachile architectus* [sic] Smith.' [blue paper, Smith] is the HOLOTYPE of this species and it has now been labelled accordingly. Modern material from SABAH [Jesselton, 25 iii 1967 (C.G. Roche)] agrees well with the type. The species occurs also in peninsular Malaya [Perak, Larut Hills, 4000-4500 ft, ii 1905 (R. Shelford)]".

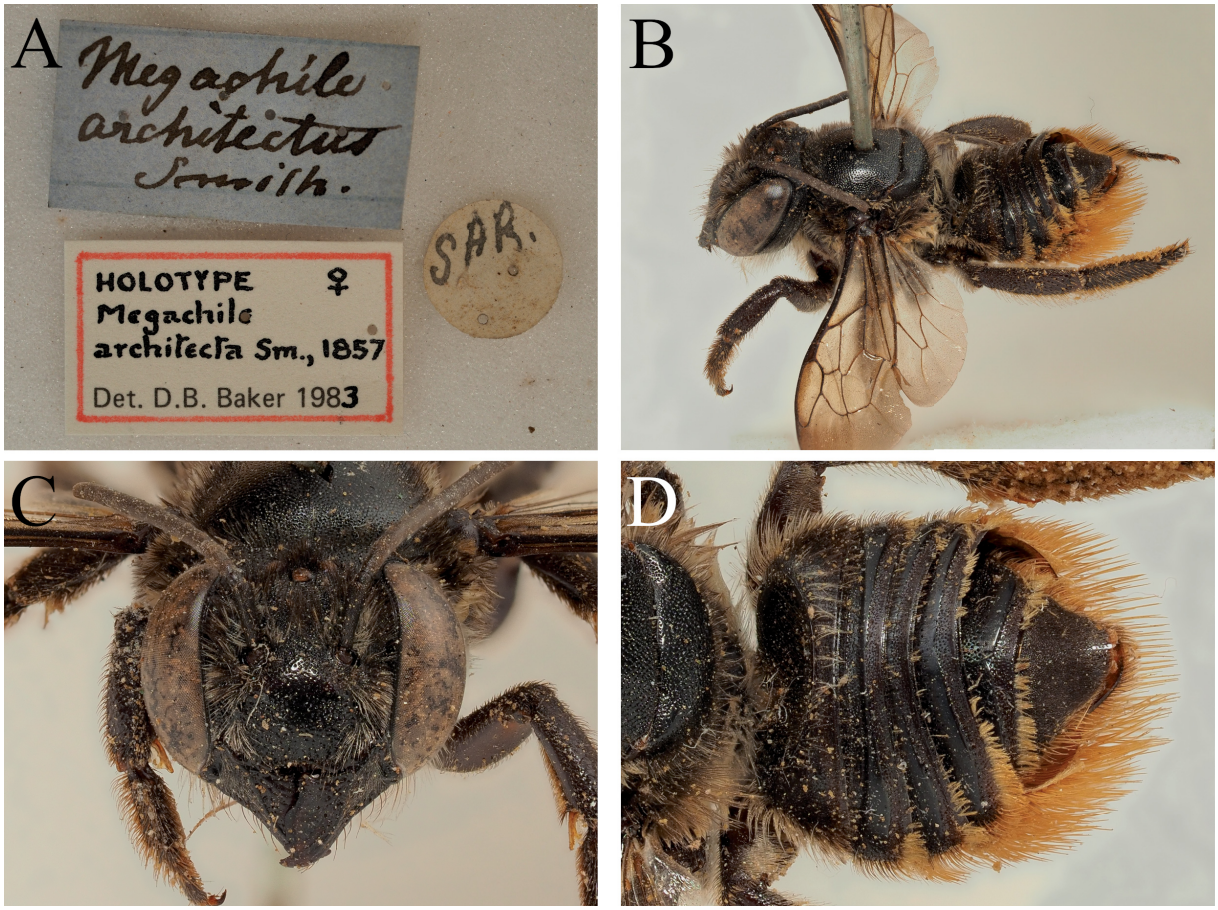

Fig. 9. *Megachile architecta* Smith, 1857, holotype, ♀ (OUMNH, ENT-HYME2771). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Current status

Megachile (*Aethomegachile*) *architecta* Smith, 1857. Ascher & Pickering (2024) list this species within the subgenus *Amegachile* Friese, 1909, but we believe that it is better placed within the subgenus *Aethomegachile* Engel & Baker, 2006 due to the structure of the mandibles.

Distribution

Malaysia (Borneo) (Ascher & Pickering 2024), possibly also Peninsula Malaya based on Baker's comments. A revision of material is required.

11. ***Megachile luctuosa*** Smith, 1857
Fig. 10

Megachile luctuosa Smith, 1857: 46–47, ♀.

Type material examined

Holotype

SINGAPORE • ♀; Sing [Singapore]; [either 25 Sep.–17 Oct. 1854 or 10–17 Feb. 1856]; OUMNH, ENT-HYME2772.

Type locality

Singapore.

Notes

Baker (1993: 195) wrote the following:

> "A ♀ labelled 'Sing', '*Megachile conjuncta*, Sm. G. Meade-Waldo det.' and 'not type !' [recent label], found standing over the drawer labels '*luctuosa*. Sm Sing.' and 'said to be *conjuncta* Sm. G. Meade-Waldo det.' in Saunders' collection material in UMO, is, despite the labelling, in all probability Smith's type of *luctuosa*. There is no reason to suppose it to be other than a Wallace specimen; it is from Smith's indicated locality; it stood over Smith's drawer label '*luctuosa*' in his arrangement of Saunders' collection, from which it was described; it agrees with Smith's description; and there are no other specimens now present in Saunders' material that satisfy these requirements - nor is there any reason to suppose that any may have been lost, The specimen has accordingly been labelled as the HOLOTYPE of *Megachile luctuosa* Smith, 1857. Meade-Waldo was, however, correct in synonymizing this nominal species with *conjuncta* Smith (and may have been responsible for the loss of Smith's determination label). The two descriptions, while differing in detail, are compatible, and *conjuncta* is a common Singapore insect".

Current status

Megachile (*Aethomegachile*) *conjuncta* Smith, 1853 (Ascher & Pickering 2024).

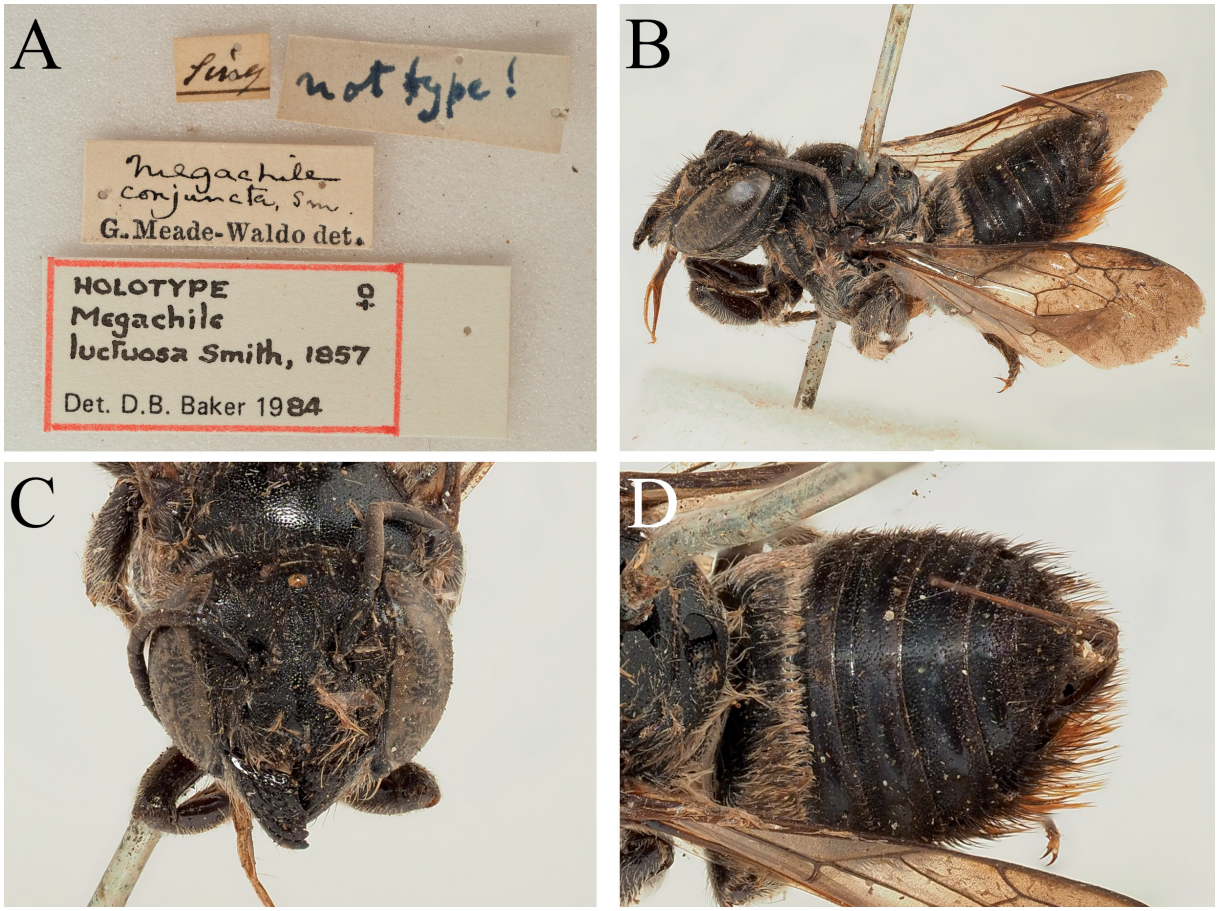

Fig. 10. *Megachile luctuosa* Smith, 1857, holotype, ♀ (OUMNH, ENT-HYME2772). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Distribution

From Pakistan and China across Southeast Asia to Indonesia (Sumatra, Java, Sulawesi) (Ascher & Pickering 2024).

12. ***Megachile rotundiceps*** Smith, 1857
Fig. 11

Megachile rotundiceps Smith, 1857: 47, ♀.

Type material examined

Holotype

MALAYSIA • ♀; Mt Ophir 68 [Mount Ledang]; [13 Jul.–25 Sep. 1854]; OUMNH, ENT-HYME2773.

Type locality

Malacca (Mount Ophir) [= Mount Ledang].

Notes

Baker (1993: 196) wrote the following:

> "Two ♀♀ standing as *rotundiceps* in the UMO type collection are labelled:-

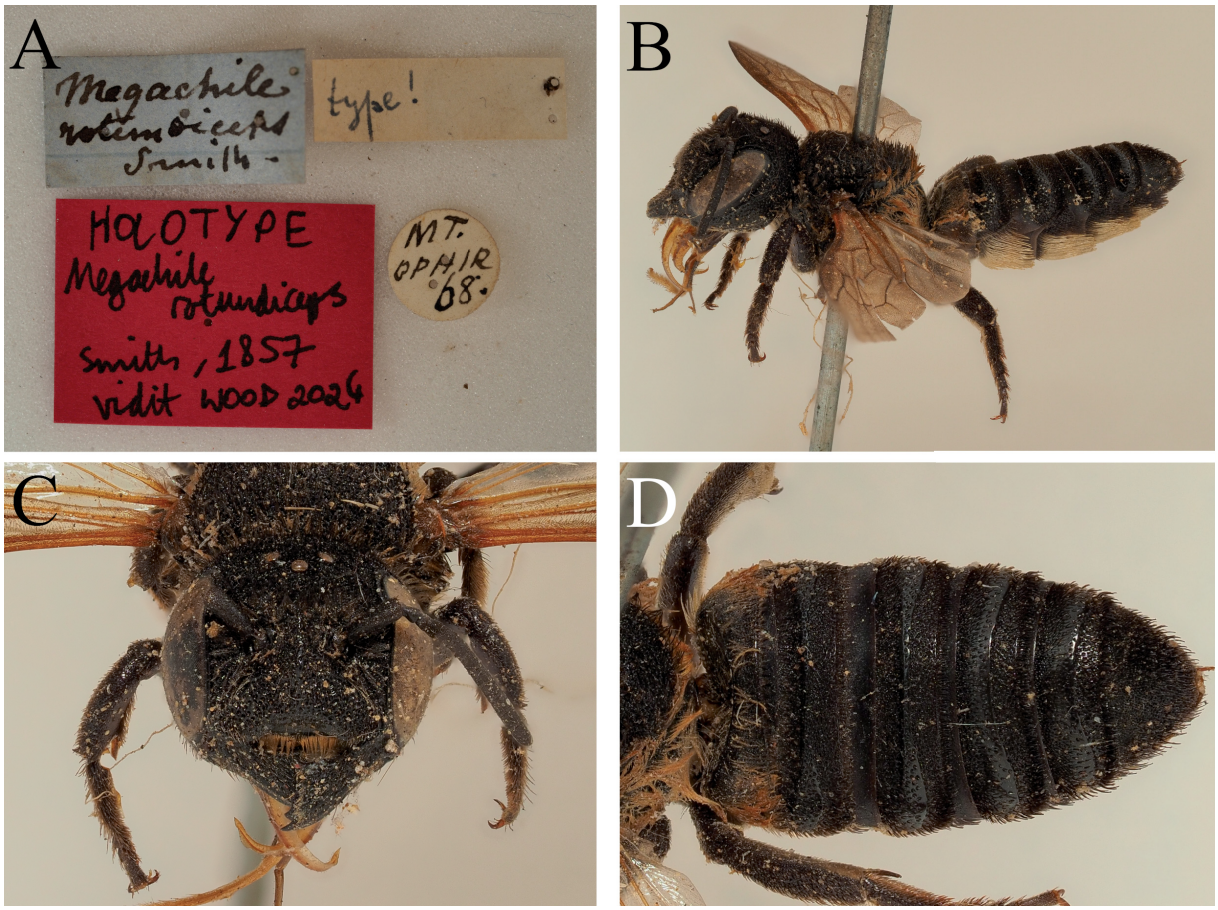

Fig. 11. *Megachile rotundiceps* Smith, 1857, holotype, ♀ (OUMNH, ENT-HYME2773). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

a) 'MT. OPHIR 68', '*Megachile rotundiceps* Smith ♀' [blue paper] and 'type' [Mitchell],
b) 'SING. 67' and 'different species' [Mitchell].

The ♀ (a) is the HOLOTYPE of *rotundiceps* and it has now been labelled accordingly. The Singapore ♀, (b), which is clearly not conspecific, has been labelled as of no type status. Modern material from Selangor (Kuala Sleh, 23 iii 1947 (H.T, Pagden, 0810), 'at sweat on shirt') agrees well with the type".

The specimen indicated by Baker was not labelled as holotype; this has now been rectified.

Current status

Megachile (*Callomegachile*) *rotundiceps* Smith, 1857 (Ascher & Pickering 2024).

Distribution

Malaysia (Peninsula) (Smith 1857; Ascher & Pickering 2024). A revision of material is required, as it seems unlikely that this species has such a narrow distribution and lack of additional records.

13. ***Ceratina flavopicta*** Smith, 1857
Fig. 12

Ceratina flavopicta Smith, 1857: 47, ♂.



Fig. 12. *Ceratina flavopicta* Smith, 1857 holotype, ♂ (OUMNH, ENT-HYME2774). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Type material examined

Holotype

MALAYSIA • ♂; Sar. [Sarawak]; [29 Oct. 1854–10 Feb. 1856]; OUMNH, ENT-HYME2774.

Type locality

Borneo (Sarawak).

Notes

Baker (1993: 196) wrote the following:

> "A ♂ in the UMO type collection, labelled 'SAR.' [white disc] and '*Ceratina flavopicta* Smith' [blue paper, Smith], is the HOLOTYPE of this species and it has now been labelled accordingly.
>
> Van der Vecht recognized tentatively three subspecies, but, apart from the type, saw only one specimen of nominotypical *flavopicta*, a ♂ from Sandakan in USNM. A ♂ from Kanowit, 20 vi 1971 (C.G. Roche, 11983) agrees well with the type. Of *f. xanthura* Cockerell, 1919, described from Penang [type not traced], van der Vecht saw a topotypical ♂ and ♀ (also in USNM, collected by C.F. Baker). Further, recent, topotypical material includes a ♂ from Batu Ferringhi [iii 1982 (Baker)] and a ♀ from the same locality [catchment area, 19 × 1963 (H,T, Pagden)]. Material is still insufficient for a decision on the validity of these forms [only of *f. lauta* van der Vecht, 1952, from Java and Bali, is an adequate series available)."

The specimen indicated by Baker was not labelled as the holotype; this has now been rectified.

Current status

Ceratina (*Lioceratina*) *flavopicta* Smith, 1857 (van der Vecht 1952; Ascher & Pickering 2024).

Distribution

Malaysia (Peninsula, Borneo) and Indonesia (Java, Bali) (van der Vecht 1952; Ascher & Pickering 2024).

14a. ***Xylocopa insularis*** Smith, 1857
Fig. 13

Bombus coeruleus Fabricius, 1804: 345, sex not stated [Indonesia: Java; RMNH, **neotype** by present designation].

Xylocopa insularis Smith, 1857: 48, ♂ [Malaysia: Borneo; OUMNH, **lectotype** by present designation] **syn. nov.**

Xylocopa bangkaënsis Friese, 1903: 206, ♀♂ [Indonesia: Bangka; NHMW, **lectotype** by present designation] **syn. nov.**

Type material examined

Neotype

INDONESIA • ♀; W Java, Udjungkulon [Ujung Kulon N.P.], Tjilamar; 1–31 Dec. 1958; A.M.R. Wegner leg.; T.J. Wood det.; RMNH, RMNH.INS.1715657 (neotype of *Bombus coeruleus*, by present designation).

Lectotype

INDONESIA • ♀; Asia Arch., Bangka; 1901; H. Kühn leg.; NHMW (lectotype of *Xylocopa bangkaensis*, by present designation).

Lectotype

MALAYSIA • ♂; Sar. [Sarawak]; [29 Oct. 1854–10 Feb. 1856]; OUMNH, ENT-HYME2775-01 (lectotype indicated by Lieftinck in 1958, de facto lectotype of *Xylocopa insularis*, by present designation).

Other material examined

CHINA • 1 ♀; S China, Hainan, Jianfenling N. Nature Res.; 980–1050 m a.s.l.; 13–14 Jul. 2013; C.v. Achterberg leg.; T.J. Wood det.; RMNH, RMNH.INS.1715652.

INDONESIA • 6 ♀♀; W Java, Udjungkulon [Ujung Kulon N.P.], Tjilamar; 1 Nov.–31 Dec. 1958; A.M.R. Wegner leg.; T.J. Wood det.; RMNH • 1 ♀; Sumatra, SE coast, Laut Tador; 29 Jan. 1949; R. Straatman leg.; T.J. Wood det.; RMNH • 1 ♀; Banca [Bangka]; v.d. Bossche leg.; T.J. Wood det.; RMNH • 1 ♀; Bangka Isl.; 14–19 Mar. 1955; J.v.d. Vecht leg.; T.J. Wood det.; RMNH, RMNH.INS.1715641 • 1 ♀; Bangka, Toboali; 18 Jun. 1930; J.v.d. Vecht leg.; T.J. Wood det.; RMNH, RMNH.INS.1715642 • 2 ♀♀; Banka, PK Pinang [Pangkalpinang]; 31 Oct. 1929; J.v.d. Vecht leg.; T.J. Wood det.; RMNH, RMNH.INS.1715643, RMNH.INS.1715644 • 1 ♀; Borneo Exp., G. Kenepai [Gunung Kenepai]; 21–31 Dec. 1893; Dr J. Büttikofer leg.; T.J. Wood det.; RMNH, RMNH.INS.1715627 • 1 ♀; Eil. Bunguran, Natuna; 1–31 May 1895; v. Yosfelt leg.; T.J. Wood det.; RMNH, RMNH.INS.1715645 • 1 ♀; Kalang [Sidikalang, Sumatra]; Hillebrand leg.; T.J. Wood det.; RMNH, RMNH.INS.1715622 • 3 ♂♂; W Java,

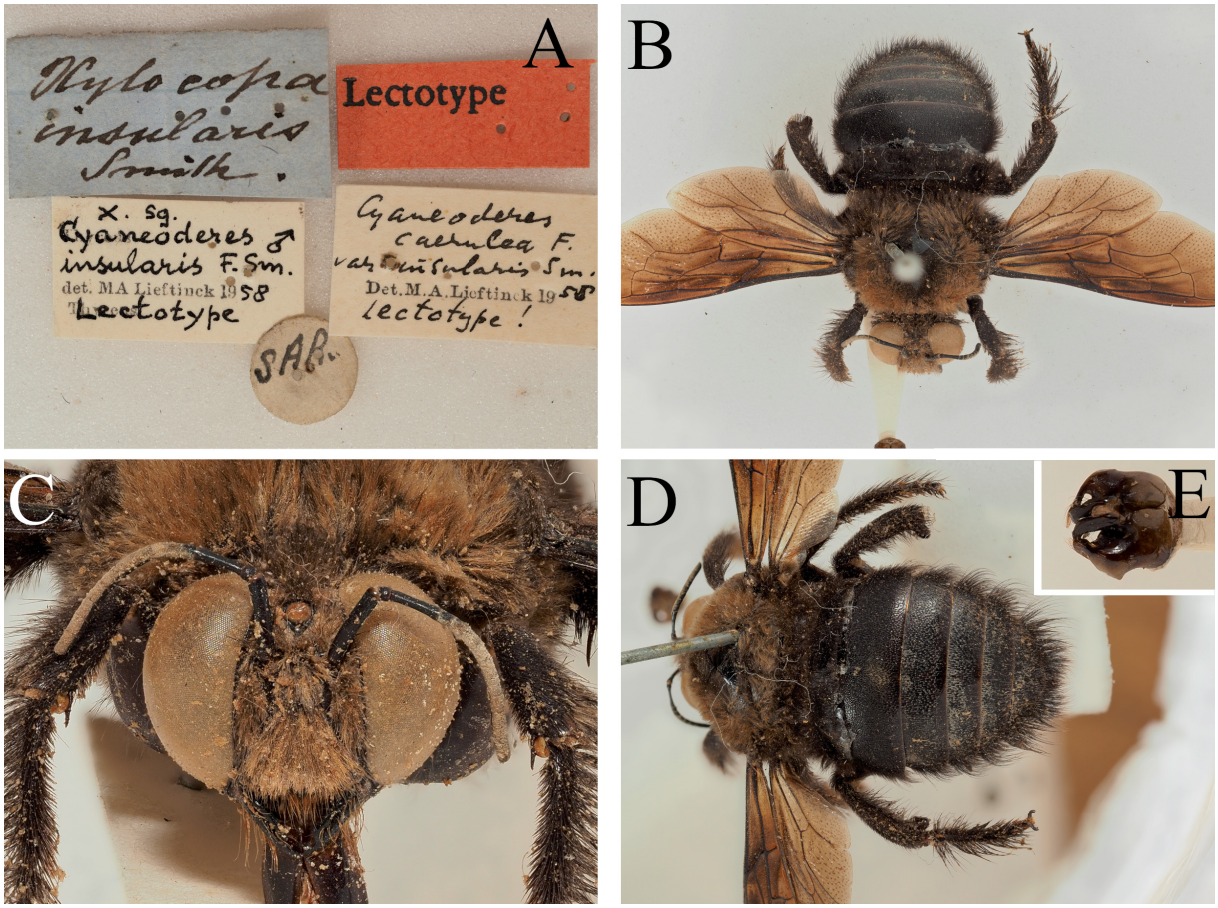

Fig. 13. *Xylocopa insularis* Smith, 1857 lectotype, ♂ (OUMNH, ENT-HYME2775-01). **A**. Label information. **B**. Habitus, dorsal view. **C**. Head, frontal view. **D**. Metasoma, dorsal view. **E**. Genital capsule, dorsolateral view.

Mt Panggerano [Pangrango], Tjisaroea Z. [Cisarua]; 1000 m a.s.l.; 3–4 Nov. 1941; M.A. Lieftinck leg.; M.A. Lieftinck det.; RMNH • 2 ♂♂; W Java, Buitenzorg [Bogor]; 250 m a.s.l.; 16 Apr. 1940; M.A. Lieftinck leg.; M.A. Lieftinck det.; RMNH, RMNH.INS.1715638, RMNH.INS.1715639 • 1 ♂; W Java, Buitenzorg, Bogor; 250 m a.s.l.; 1–31 Jan. 1954; M.A. Lieftinck leg.; M.A. Lieftinck det.; RMNH, RMNH.INS.1715637 • 1 ♀; Sipirok [remaining text illegible; Sumatra]; 1200 m a.s.l.; 20 Apr. 1996; R. Desmier de Chenon leg.; T.J. Wood det.; RMNH, RMNH.INS.1715650 • 1 ♀; Sumatra, Sipirok, Tapanuli; 19 Sep. 1992; Dr Diehl leg.; T.J. Wood det.; RMNH, RMNH.INS.1715651 • 1 ♀; E Borneo, Balikpapan, Mentawir River; 50 m a.s.l.; 1–31 Oct. 1950; A.M.R. Wegner leg.; T.J. Wood det.; RMNH, RMNH.INS.1715658.

UNCLEAR • 3 ♀♀; Borneo; 30 Apr. 1903; M.C. Piepers leg.; T.J. Wood det.; RMNH • 1 ♀; Borneo; Muller leg.; T.J. Wood det.; RMNH.

Type locality

Borneo (Sarawak).

Notes

Baker (1993: 196) wrote the following:

> "Two ♂♂ standing as *insularis* in the UMO type collection are labelled:-
>
> a) 'SAR.' [white disc], '*Xylocopa insularis* Smith' [blue paper, Smith], 'Lectotype' (printed, red), 'X. Sg, *Cyaneoderes insularis* F. Sm, ♂ det. M.A. Lieftinck 1958 Lectotype' and '*Cyaneoderes caerulea* [sic] F. var. *insularis* Sm. Det. M.A. Lieftinck 1958 Lectotype !'.
> b) 'SAR.' [white disc], '*Xylocopa insularis* Smith' [blue paper, Smith] and '*X.* (*Cyaneoderes*) *caeruleiformis* M.W, ♂ det. M.A, Lieftinck 1958'. [Maa, 1939: 94, gives *caeruleiformis* as a synonym of *coerulea*.]
>
> These ♂♂ may be regarded as syntypes of *insularis* and Lieftinck's choice of lectotype may be confirmed [designation not published ?: Hurd & Moure give no references for Lieftinck after 1957]. The lectotype is in fair condition, the distal segments of tarsi II and R tarsus III lost".

We agree with Baker's position that Lieftinck's lectotype designation is unpublished, and so we formally publish it here. Baker also listed *X. insularis* as a junior synonym of *X. caerulea* (Fabricius, 1804), but did not discuss this action or mark it with a "syn. nov.". Given the examination of the lectotype, it is necessary to discuss the status of *X. insularis* and its treatment in the literature. At the present time, *X. insularis* is treated as specifically distinct from *Xylocopa caerulea*, two taxa exist that differ consistently in size, and are treated as distinct in areas where they co-occur, such as Singapore (Mawdsley 2016; Ascher *et al*. 2022).

Although *X. caerulea* was nominally described from New Caledonia, a territory far to the east of its known distributional range (ending in Borneo and Java, e.g., see comments to this effect as early as Cockerell 1909), the use of this name in its current form and species concept is well established (e.g., Maa 1939; Hurd 1959; Mawdsley 2016). The type is considered lost (e.g., Maa 1939) and there is no record of its location in the catalogue of Fabrician types (Zimsen 1964: 415, entry 1076). It was not recovered during searches for Fabrician bee material from the Southeast Asian region (e.g., Lieftinck 1958), and no specimens are present in the Fabricius collection housed in Copenhagen based on modern searches (L. Vilhelmsen pers. com.). Given these circumstances, particularly the questionable geographic provenance of the specimen, there is zero benefit seen in overturning the current species concept at the present time.

Consequently, it is desirable to designate a neotype. In line with the conditions of article 75.3 (ICZN 1999), this neotype is needed to decisively settle the status of this name, and to decisively confirm it as the oldest name within the subgenus *Cyaneoderes* Ashmead, 1899, and senior to other names that have been described from the western part of the Malay Archipelago, thus preserving nomenclatural stability. The selected specimen (Fig. 14) is from the island of Java (West Java, Ujung Kulon), which is not close to the nominal terra typica of New Caledonia, but as this location does not fall within the geographic range occupied by the species to which this name has been applied, the reported terra typica is considered irrelevant. The selected specimen is a female; no sex was specified in the original description. This neotype selection allows the name *X. caerulea* to continue to be applied in its current manner. The neotype is deposited in the RMNH collection (unique reference number: RMNH.INS.1715657).

More pressingly, the recent revision of subgenus *Cyaneoderes* (Mawdsley 2016) has not resolved existing issues and has introduced new problems. Mawdsley considered five species to be valid within this subgenus, namely *X. abbotti* (Cockerell, 1909) described from Terong in Malaysia, *X. bangkaensis* Friese, 1903 described from Bangka Belitung Island next to Sumatra, *X. caerulea*, *X. insularis*, and *X. tumida* Friese, 1903 which was also described from Bangka Belitung Island. Mawdsley gives morphological criteria which other than size are related entirely to the colour and extent of the pubescence or the pigmentation of the wings (the latter more reliable for some groups of *Xylocopa*). He also states that males are only known for two of the five species (*X. caerulea* and *X. insularis*), but this is not the case for *X. bangkaensis* as Friese (1903: 206) described the species from three females and one male. Mawdsley

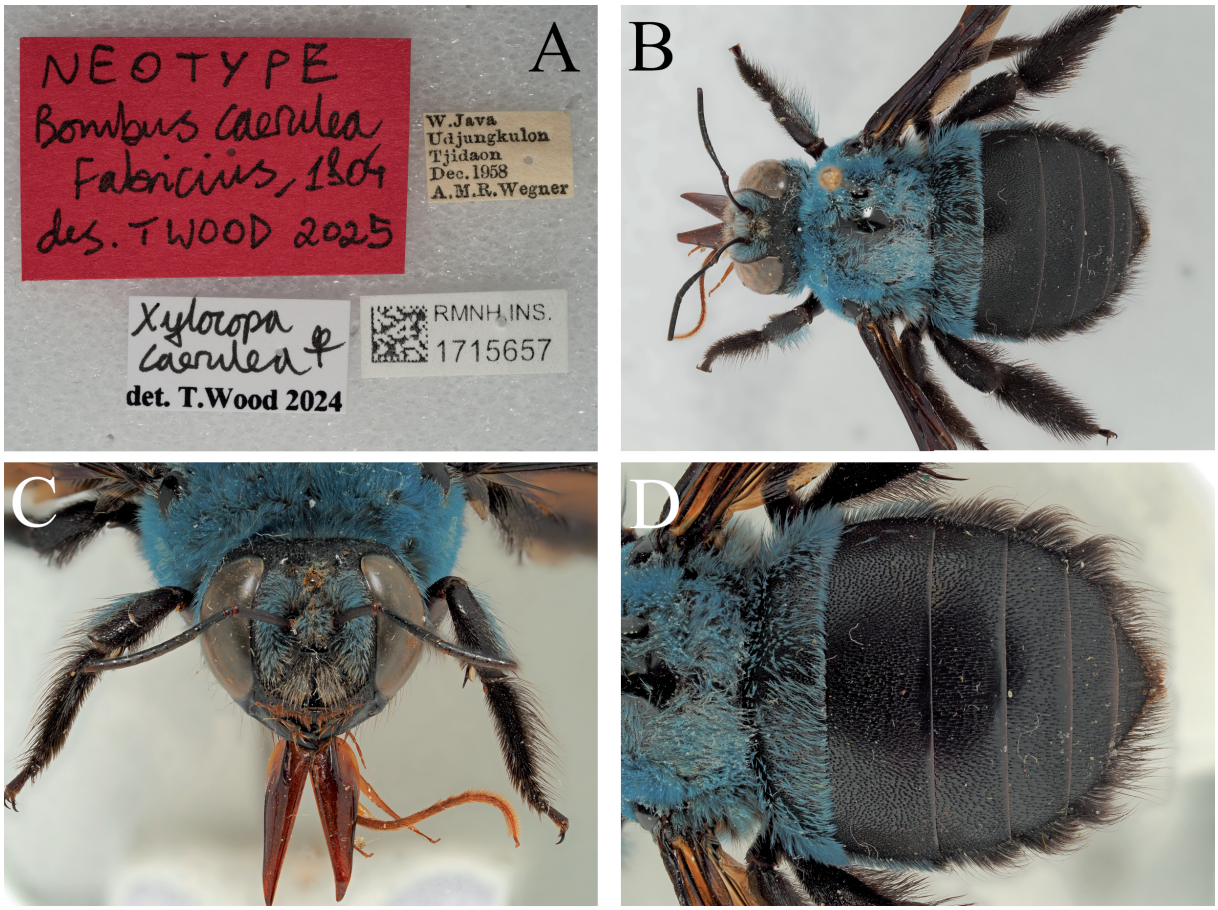

Fig. 14. *Bombus coeruleus* Fabricius, 1804, neotype, ♀ (RMNH, RMNH.INS.1715657) (= *Xylocopa caerulea*). **A**. Label information. **B**. Habitus, dorsal view. **C**. Face, frontal view. **D**. Metasoma, dorsal view.

(2016: 56) also refers to the holotype female of *X. bangkaensis* (without specifying the repository), but no holotype was indicated by Friese, and to our knowledge no lectotype has been designated. Moreover, Mawdsley repeats chresonomic lists (e.g., that of Maa 1939), without re-examining types; specifically he repeats the synonymy of:

1) *X. caeruleiformis* Meade-Waldo, 1914 described from Sarawak and synonymised with *X. caerulea* (Maa 1939), whereas an examination of the type (images now available from the NHMUK data portal) shows that due to the smaller body size, hyaline wings, and lateral fringes of T2–4 blue, under Mawdsley's (2016: table 1) criteria this taxon would be conspecific with *X. tumida*,
2) *Xylocopa caeruleiformis* var. *fusca* Meade-Waldo, 1916 described from Sarawak (images likewise available) and synoymised with *X. caerulea* by Maa (1939), but would meet *X. abbotti* under Mawdsley's criteria, and
3) *X. coerulea* var. *viridis* Meade-Waldo, 1916 described from Sarawak (images likewise available) and synoymised with *X. caerulea* by Maa (1939), this taxon being preoccupied by *X. viridis* Smith, 1854 and replaced by *X. meadewaldoi* Hurd, 1959; this taxon meeting *X. caerulea* under Mawdsley's criteria.

Given the names described from Sarawak (*X. insularis*, *X. caeruleiformis*, *X. caeruleiformis* var. *fusca*, and *X. meadewaldoi*), that under Mawdsley's criteria would fit four species, it is beneficial to clarify how many taxa are actually present on the island of Borneo and surroundings in order to have a robust chresonomic framework for *X. insularis*.

Examination of *Cyaneoderes* material in the RMNH collection (55 specimens, partim), including careful examination of males, examination of the lectotype of *X. insularis*, examination of type photographs, and careful reading of the description and diagnoses of species reveals that the five taxa of Mawdsley are just three taxa. These are a large-bodied species (20–28 mm in length) which shows a flattened clypeus with no longitudinal raised and shining ridge (Fig. 15A), a small-bodied species (15–19 mm in length) which shows a conspicuous raised, polished, and shining ridge on the clypeus (Fig. 15C, E), and a small-bodied species (15–19 mm in length) with a thin but distinctly raised longitudinal ridge on the clypeus (Fig. 15F). Whilst the name of the first taxon remains *X. caerulea*, the earliest available name for the smaller taxon with a raised and polished clypeal ridge is actually *X. tumida*.

Smith (1857: 48) described the male of *X. insularis* as measuring 11 lines in length, and with a line equalling $^{1}/_{12}{}^{th}$ of an inch, this equals 23 mm. We confirm that this measurement is accurate based on a modern measurement of the OUMNH lectotype specimen. At this size, it is impossible for the name *X. insularis* to be applied to one of the small-bodied species, as is the case in Mawdsley. It was also the case in the RMNH collection, where some small-bodied specimens were identified as *X. insularis* by P.D. Hurd (labels dated 1957). In contrast, Lieftinck identified small-bodied specimens as *X. caeruleiformis*, labels dated 1955, thus implying an avoidance of the concepts of Maa (1939). Importantly, the lectotype of *X. insularis* also shows a thick tuft of hair on the clypeus that obscures the underlying structure (Fig. 13C); this is typical of *X. caerulea* which shows a thick hair tuft here (Fig. 15B), in contrast to the male of *X. tumida* which has sparse hairs on the clypeus (Fig. 15D), allowing the raised and shining longitudinal ridge to be seen; such a ridge is absent on male *X. caerulea* when the thick hair tuft is either naturally abraded or actively removed by entomologists. The overall colouration and tergal extent of the body pubescence has no utility at all in separating the two species, as variation from brown, grey, green-grey, brown-blue, blue-green, and bright blue is possible. *Xylocopa insularis* is therefore formally synonymised with *X. caerulea* **syn. nov.**

The combination of body size, presence or absence of a raised, polished, and shining longitudinal midline on the clypeus (both sexes), the presence or absence of a thick obscuring hair tuft on the clypeus (males),

and the male genital capsule allow for consistent separation of *X. caerulea* and *X. tumida*. With these revised species concepts, it is beneficial to explicitly state why certain taxa belong to the small-bodied species with a raised shining clypeal midline.

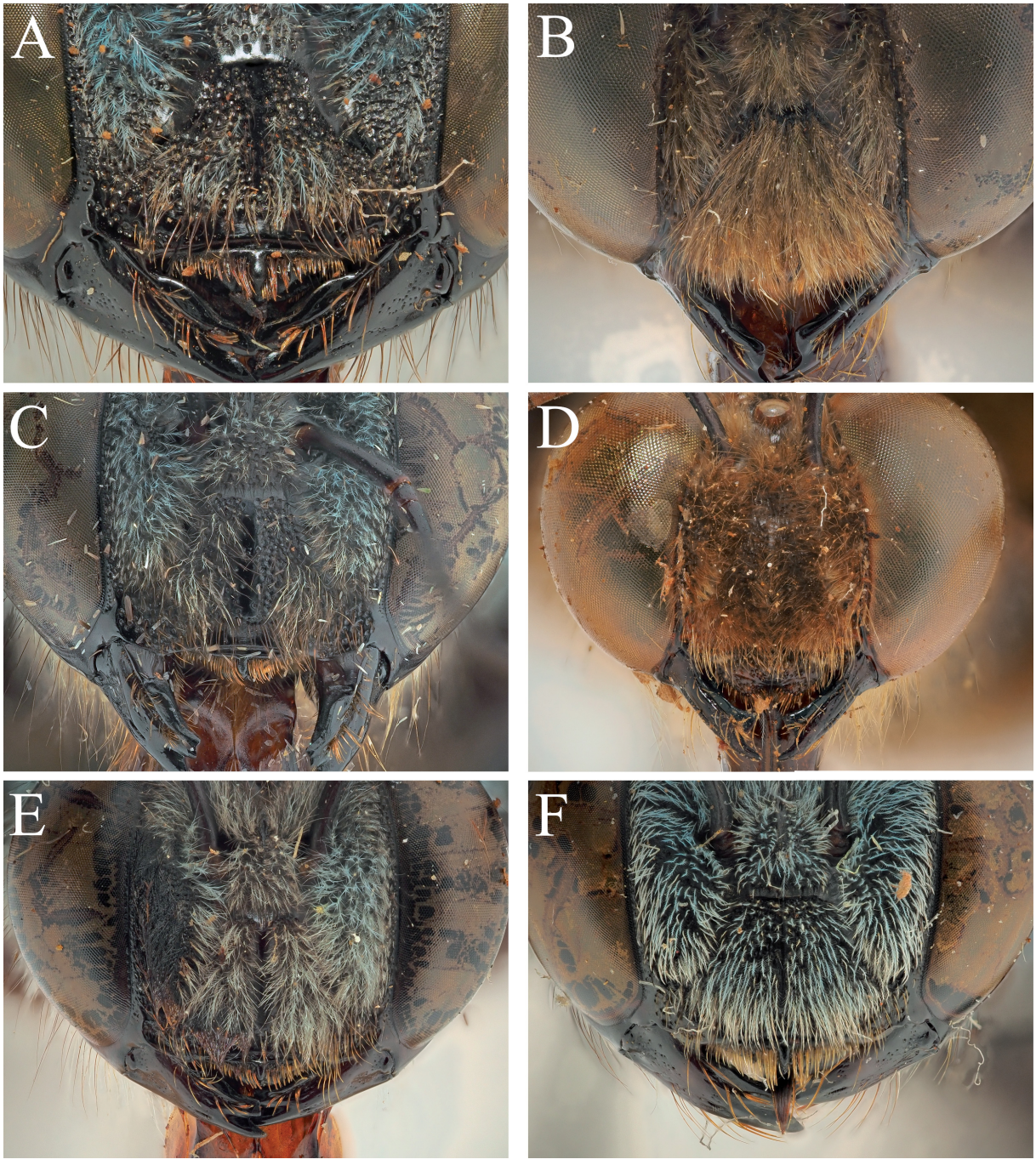

Fig. 15. A–B. *Xylocopa caerulea* (Fabricius, 1804), ♀♂ from Java (RMNH). **A**. Female face, frontal view. **B**. Male face, frontal view. **C–E**. *X. tumida* Friese, 1903. **C**. ♀ from Sumatra (RMNH), face, frontal view. **D**. ♂ from Borneo (RMNH), face, frontal view. **E**. ♀ from Borneo (RMNH), face, frontal view. **F**. *X. abbotti* (Cockerell, 1909), ♀ from Thailand (RMNH), face, frontal view.

Xylocopa tumida; Friese (1903: 205) clearly states the small body size (♀ 16–17 mm) and the presence of a raised shining longitudinal midline on the clypeus: "*Clypeus dichter ; dieser mit breiter, wulstig erhabener, glatter Mittelfläche*" [Clypeus denser ; this with broad, bulging, raised smooth median surface]. A single specimen remains in the NHMW collection (Fig. 16); since Friese described the species from two females, the remaining specimen is designated as the lectotype. The specimen is small bodied, as expected, and shows faded greyish pubescence on the head, mesosoma, and first tergal segment.

Xylocopa dormeyeri; Enderlein (1909: 204–205) clearly states the small body size (♀ 15–18 mm; ♂ 18–18 ½ mm) and the presence of a raised shining longitudinal midline on the clypeus: "*Clypeus mit breiter, medianer, kräftiger und poliert glatter Längswalst*" [Clypeus with broad, median, strong and polished smooth longitudinal ridge].

Xylocopa caeruleiformis; Meade-Waldo (1914: 454) clearly states the smaller body size (♀ 17–18 mm); this small size along with the raised shining longitudinal midline on the clypeus is clearly visible on the type photographs on the NHMUK data portal.

Xylocopa caeruleiformis var. *fusca*; Meade-Waldo (1916) does not provide a detailed description, but the small ♀ body length of 16 mm and the typical clypeus with raised shining longitudinal midline are clearly visible on the type photographs on the NHMUK data portal. It is simply a specimen showing entirely brown pubescence on the mesosoma. These synonymies are formalised below in Section 14b. The remaining taxa listed as synonymous with *X. caerulea* by Mawdsley (2016) remain junior synonyms of that species.

In the case of *Xylocopa abbotti*, Cockerell (1909: 415) clearly states the smaller body size (♀ smaller; anterior wing not over 16 mm long). Examination of the type photographs shows that there is a longitudinal carina present on the clypeus, but it is narrow and is not strongly polished. It is retained as a valid species with a more northernly distribution; see Section 14c.

Finally, van der Vecht (1953) considered *X. bangkaensis* to be a form of *X. caerulea* occurring on Bangka Belitung Island, placing the taxon in combination as *X. caerulea bangkaensis*. Reading of Friese's description in combination with an examination of the single female specimen remaining in the NHMW collection (Fig. 17) and examined material from Bangka Island (including the two females mentioned by van der Vecht 1953: 67 from Pangkalpinang on 31 October 1929) shows that *X. bangkaensis* is a large bodied species (♀ 23–24 mm; ♂ 26–27) that has the clypeus "*unbewehrt*" [unreinforced], in reference to the lack of a raised longitudinal midline. There are no structural differences between typical female *X. caerulea* and *X. bangkaensis*, and indeed specimens of *X. caerulea* with greyish or brownish pubescence can be found on the islands of Natuna and Borneo, respectively (RMNH). We therefore agree with van der Vecht but go further and argue that *X. bangkaensis* is simply a colour form, and does not merit subspecific status since it shows no consistent geographic range limit; it is formally synonymised with *X. caerulea* **syn. nov.** Although described from three females and a male, only one female could be found in the NHMW collection. This specimen was labelled with a red label as "Lectotypus Hurd '64 [1964]", but this designation was never published. We now formally publish this specimen as the lectotype.

Current status

Xylocopa (*Cyaneoderes*) *caerulea* (Fabricius, 1804) **syn. nov.**

Distribution

China (Yunnan, Guangxi, Hainan*, Guandong), Myanmar, Vietnam, Thailand, Cambodia, Malaysia (Peninsula, Borneo), Singapore, Indonesia (Sumatra, Bangka Belitung, Natuna, Java) (Mawdsley

2016 partim; Ascher *et al*. 2022; Ascher & Pickering 2024; present study). The listing from Sulawesi (Ascher & Pickering 2024) requires further investigation, as it was not considered part of the fauna of this island by van der Vecht (1953).

14b. ***Xylocopa tumida*** Friese, 1903
Fig. 16

Xylocopa tumida Friese, 1903: 205, ♀ [Indonesia: Bangka; NHMW, **lectotype** by present designation].
Cyaneoderes dormeyeri Enderlein, 1909: 204, ♀♂ [Indonesia & Singapore; repository unclear, originally deposited in the Stettiner Zoological Museum, now Szczecin, Poland, not examined] **syn. nov.**
Xylocopa caeruleiformis Meade-Waldo, 1914: 454, ♀♂ [Malaysia: Borneo, Sarawak; NHMUK, examined by photograph] **syn. nov.**
Xylocopa caeruleiformis var. *fusca* Meade-Waldo, 1916: 465, ♀ [Malaysia: Borneo, Sarawak; NHMUK, examined by photograph] **syn. nov.**

Type material examined

Lectotype
INDONESIA • ♀; Asia Arch., Banka Ins. [Bangka]; 1901; H. Kühn leg.; NHMW (lectotype of *Xylocopa tumida*, by present designation).

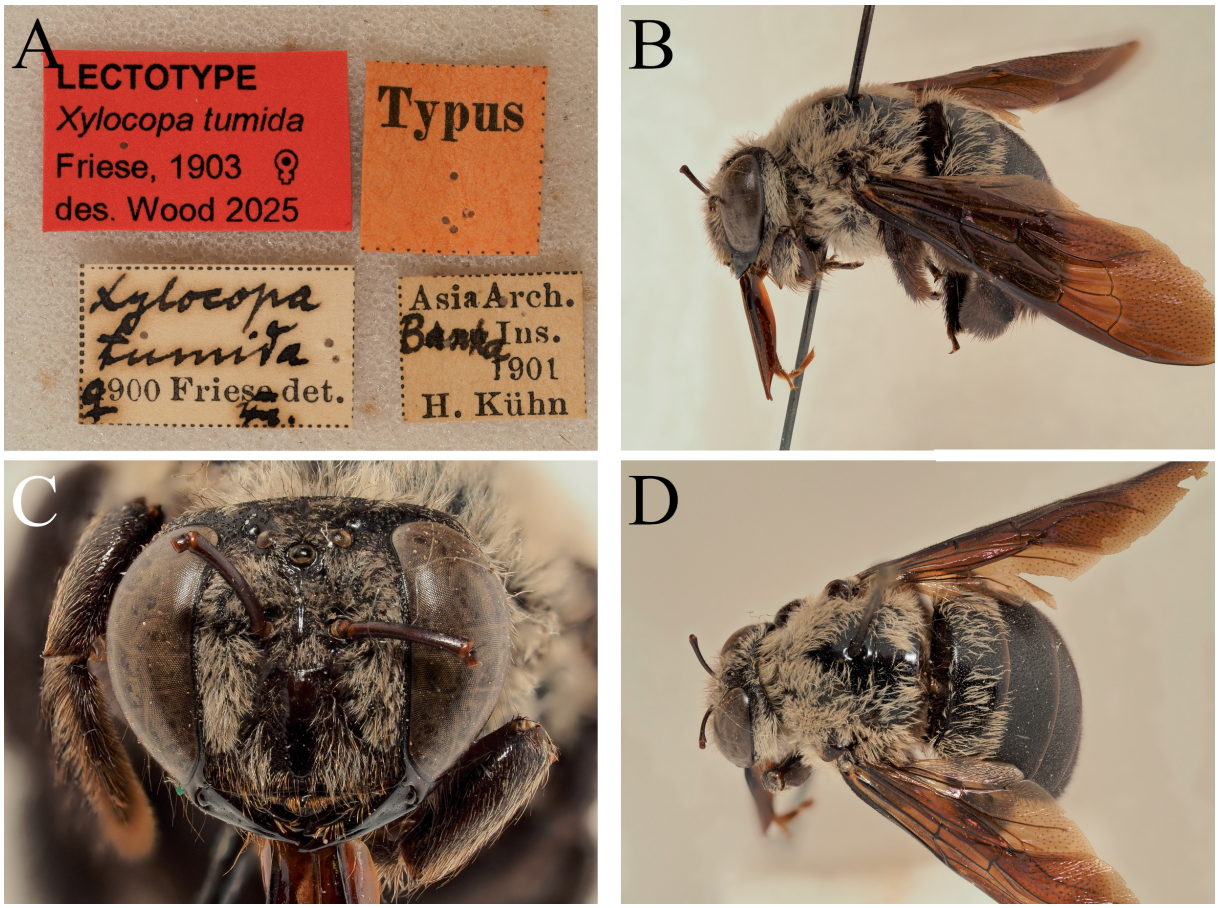

Fig. 16. *Xylocopa tumida* Friese, 1903, lectotype, ♀ (NHMW). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Habitus, dorsal view.

Holotypes

MALAYSIA • ♀; Mt Matang, Sarawak; 4 Feb. 1914; G.E. Bryant leg.; NHMUK, Type 17b, 161 (holotype of *Xylocopa caeruleiformis*) • ♀; Matang; 2 Mar. 1904; J.C. Moulton leg.; NHMUK, Type 17b, 160 (holotype of *Xylocopa caeruleiformis* var. *fusca*).

Other material examined

INDONESIA • 1 ♂, 2 ♀♀; Borneo Exp., G. Kenepai [Gunung Kenepai]; 21–31 Dec. 1893; Dr J. Büttikofer leg.; T.J. Wood det.; RMNH, RMNH.INS.1715624 • 1 ♂, 6 ♀♀; Borneo Exp., Nordseite Kenapai [Gunung Kenepai]; 22 Sep. 1894; M. Moret leg.; T.J. Wood det.; RMNH, RMNH.INS.1715620 • 1 ♀; Midden O. Borneo; 9 Sep. 1925; H.C. Siebers leg.; T.J. Wood det.; RMNH, RMNH.INS.1715634 • 1 ♂; Sumatra, Siboga [Sibolga]; 1–30 Apr. 1886; Modigliani leg.; T.J. Wood det.; RMNH (ex. coll. Genova), RMNH.INS.1715633 • 1 ♀; Bornéo occ., Pontianak; 1 Jan.–31 Dec. 1901; T.J. Wood det.; RMNH, RMNH.INS.1715668 • 1 ♀; [Sumatra] Martimbang Radio Station, road to Tarutung [Dolok Martimbang]; 24 Dec. 1995; Dr. Diehl leg.; T.J. Wood det.; RMNH, RMNH.INS.1715649 • 2 ♀♀; Sumatra; 1893; T.J. Wood det.; NHMW.

MALAYSIA • 1 ♂; Kuching [Sarawak]; 24 Feb. 1899; T.J. Wood det.; RMNH, RMNH.INS.1715630 • 1 ♂; Kuching [Sarawak]; 1 Mar. 1900; T.J. Wood det.; RMNH, RMNH.INS.1715629 • 1 ♀; Kuching [Sarawak]; 12 Feb. 1901; T.J. Wood det.; RMNH, RMNH.INS.1715628 • 1 ♀; Mt Kinabalu; 3000 ft a.s.l.; 20 Sep. 1913; T.J. Wood det.; RMNH, RMNH.INS.1715631.

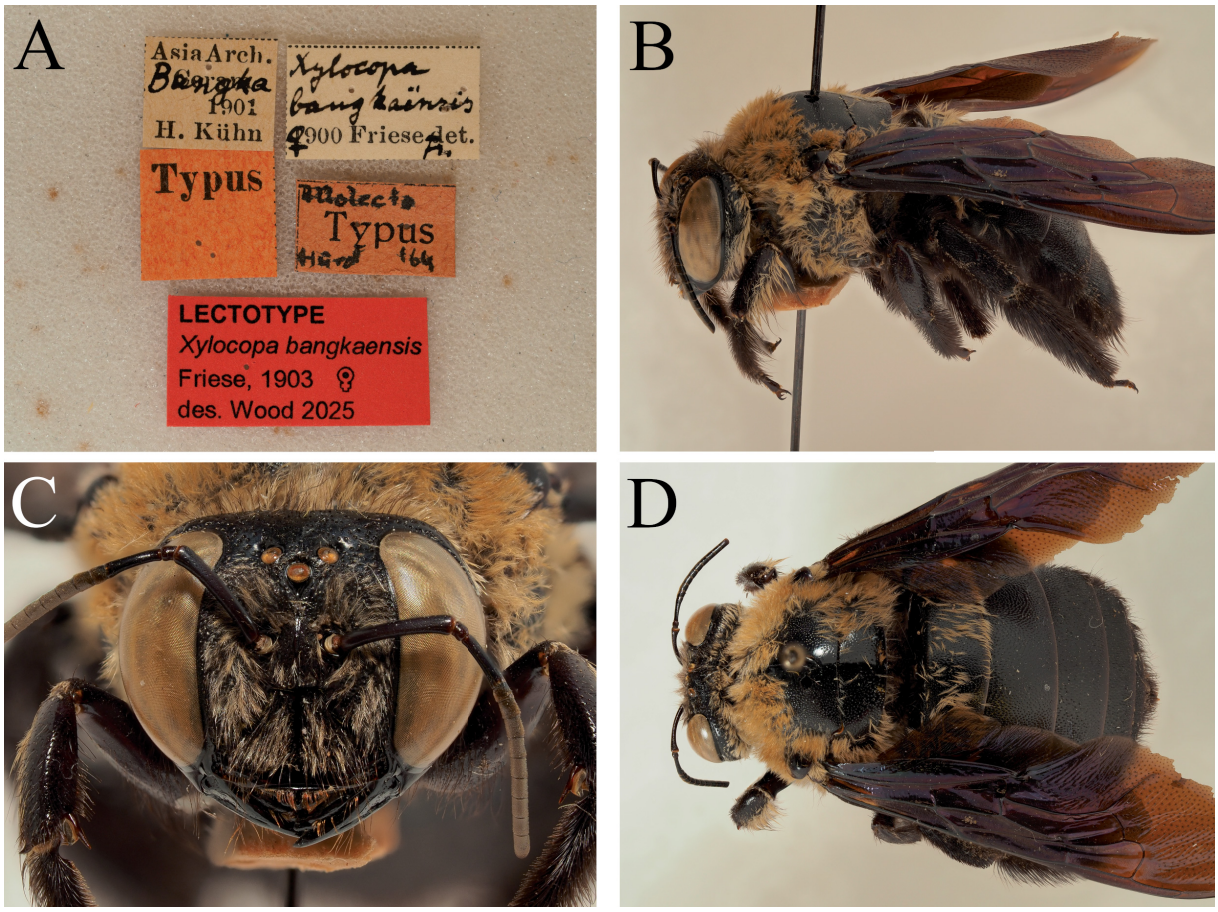

Fig. 17. *Xylocopa bangkaensis* Friese, 1903, lectotype, ♀ (NHMW). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Habitus, dorsal view.

SINGAPORE • 1 ♀; [C.F.] Baker leg.; det. *Xylocopa dormeyeri* by C.F. Baker; *Xylocopa tumida* by P.D. Hurd det. 1976; NHMW.

UNCLEAR • 2 ♀♀; Al.ng [unknown location]; 1–31 Oct. 1877; T.J. Wood det.; RMNH.

Current status

Xylocopa (*Cyaneoderes*) *tumida* Friese, 1903 (see Section 14a).

Distribution

Malaysia (?Peninsula, Borneo), Singapore, Indonesia (Sumatra, Nias, Bangka Belitung, Kalimantan) (Friese 1903; Enderlein 1909; Meade-Waldo 1914, 1916; Maa 1939 partim; Mawdsley 2016 partim as *X. tumida*, *X. abbotti*, and *X. insularis* sensu auctorum; Ascher *et al*. 2022 as *X. insularis* sensu auctorum; present study). Given its presence in Singapore, *X. tumida* is expected to be present in the southern part of peninsula Malaysia, but this should be confirmed with specimens.

14c. ***Xylocopa abbotti*** (Cockerell, 1909)

Mesotrichia abbotti Cockerell, 1909: 415, ♀ [Malaysia: Perak; USNM, examined by photograph.]

Type material examined

Syntype

MALAYSIA • ♀; Trong Lower Siam [Terong]; Dr W.L.A. Abbott leg.; USNM.

Other material examined

MYANMAR • 1 ♀; Tenasserim, Thanngyin Valley [Salween River]; 1–30 Jun. 1891; C.T. Bingham leg.; F. Maidl det.; NHMW • 1 ♀; Thamygin; 1–28 Feb. 1892; C.T. Bingham leg.; F. Maidl det.; NHMW.

THAILAND • 2 ♀♀; S., Banna [Ban Na], Nakhon; 108 m a.s.l.; 5–10 May 1958; T.C. Maa leg.; T.J. Wood det.; RMNH, RMNH.INS.1715675, RMNH.INS.1715676.

Current status

Xylocopa (*Cyaneoderes*) *abbotti* (Cockerell, 1909) (see Section 14a).

Distribution

China (Yunnan), Myanmar, Laos, Thailand, Malaysia (Peninsula) (Cockerell 1909; Mawdsley 2016; Ascher & Pickering 2024).

15. ***Anthophora insularis*** Smith, 1857
Fig. 18

Anthophora insularis Smith, 1857: 48–49, ♀.

Type material examined

Holotype

MALAYSIA • ♀; Sar. [Sarawak]; [29 Oct. 1854–10 Feb. 1856]; OUMNH, ENT-HYME2776.

Type locality

Borneo (Sarawak).

Notes

Baker (1993: 197) wrote the following:

> "A ♀ in the UMO type collection, labelled 'SAR.' [white disc] and '*Anthophora insularis* Smith' [Smith], is the HOLOTYPE of this species and it has now been labelled accordingly [specimen referred to by Lieftinck, 1956, as holotype, but not so labelled]. The type has lost the distal segments of tarsi L II and III and R III and the metasoma has been wetted; it is otherwise in good condition".

Lieftinck (1956a: 12) did indeed refer to the specimen as the holotype, and we agree with Baker's position. The specimen has now been labelled as the holotype.

Current status

Amegilla (*Glossamegilla*) *insularis* (Smith, 1857) (Lieftinck 1956a; Brooks 1988; Carion *et al*. 2025).

Distribution

Malaysia (Peninsula, Borneo), Singapore, and Indonesia (Sumatra, Bangka Belitung, Kalimantan, Anambas) (Lieftinck 1956a; Ascher *et al*. 2022; Carion *et al*. 2025).

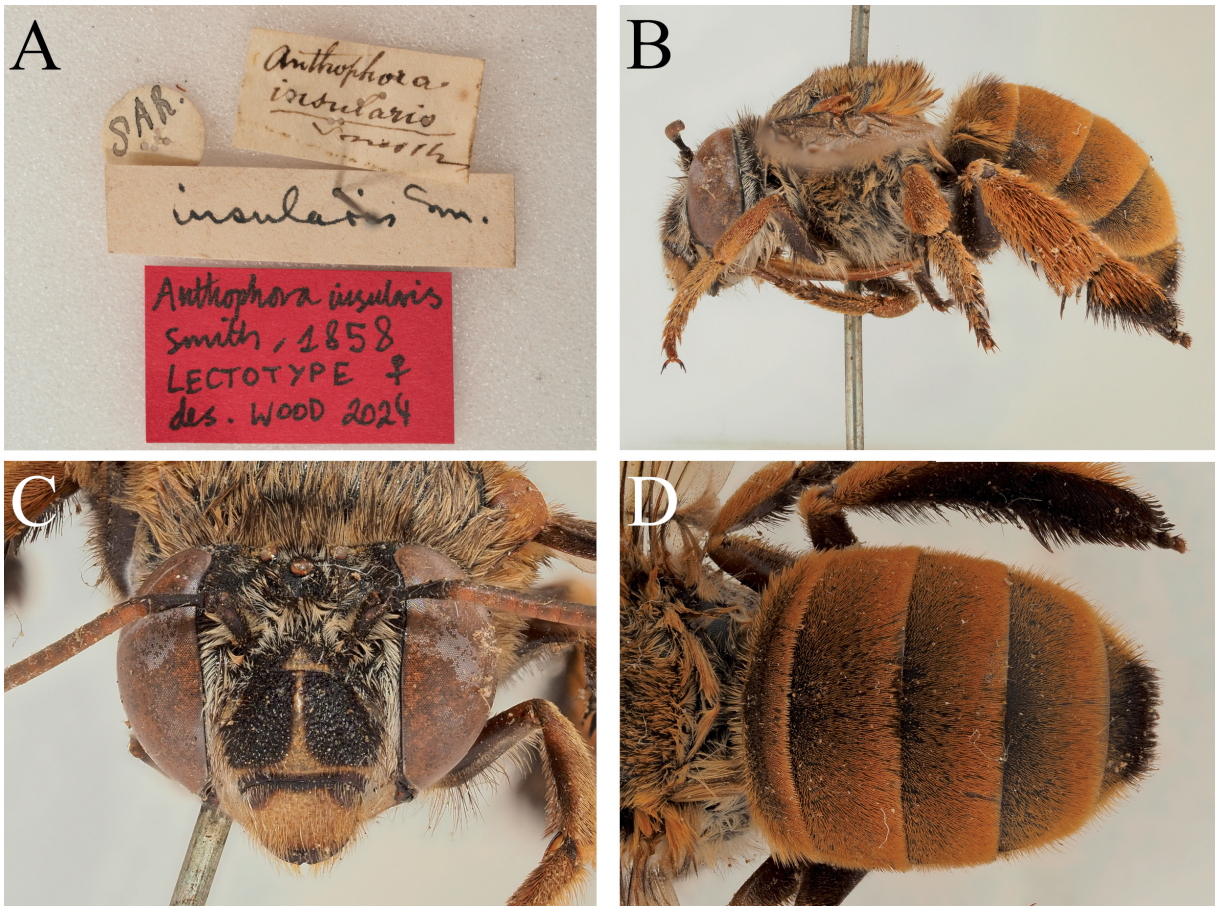

Fig. 18. *Anthophora insularis* Smith, 1857, holotype, ♀ (OUMNH, ENT-HYME2776). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

16. ***Apis andreniformis*** Smith, 1857
Fig. 19

Apis andreniformis Smith, 1857: 49, ♀.

Type material examined

Holotype
MALAYSIA • ♀; Sar. [Sarawak]; [29 Oct. 1854–10 Feb. 1856]; OUMNH, ENT-HYME2777.

Type locality

Borneo (Sarawak).

Notes

This species was not dealt with by Baker (1993). There is only a single specimen in the collection which is the holotype. There is now overwhelming evidence that *Apis andreniformis* is distinct from *Apis florea* Fabricius, 1787 (Wongsiri *et al*. 1990; Rattanawannee *et al*. 2007). The year of publication is frequently given as 1858 which is incorrect (e.g., Wongsiri *et al*. 1990, 1997; Rattanawannee *et al*. 2007). This may have arisen from Maa's (1953: 545) incorrect year listing of 1858, as well as Michener (1965). This is probably due to the complete release of Smith's entire paper pages 42–130, the second part of which was published in February 1858 (see Material and methods), whereas the part describing *Apis*



Fig. 19. *Apis andreniformis* Smith, 1857, holotype, ♀ (OUMNH, ENT-HYME2777). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

andreniformis (issue 6) was published in November 1857. Moreover, the species is sometimes reported with Smith's name in parentheses, indicating a change in genus (e.g., Wongsiri *et al*. 1990). However, Smith (1857) clearly describes the name *Apis andreniformis* on page 49, and so the correct formation is *Apis andreniformis* Smith, 1857. Michener (2007: 831) correctly gives the name with "Smith" lacking parenthesis, i.e., described using *Apis* in the original combination.

Current status

Apis andreniformis Smith, 1857.

Distribution

India, Bhutan, China, Myanmar, Laos, Vietnam, Thailand, Malaysia (Peninsula, Borneo), Singapore, Philippines (Palawan), Indonesia (Sumatra, Java, Kalimantan) (Hepburn & Radloff 2011).

17. ***Apis testacea*** Smith, 1857
Fig. 20

Apis testacea Smith, 1857: 49–50, ♀.

Type material examined

Lectotype

MALAYSIA • ♀; Sar [Sarawak]; [29 Oct. 1854–10 Feb. 1856]; OUMNH, ENT-HYME2778-01.

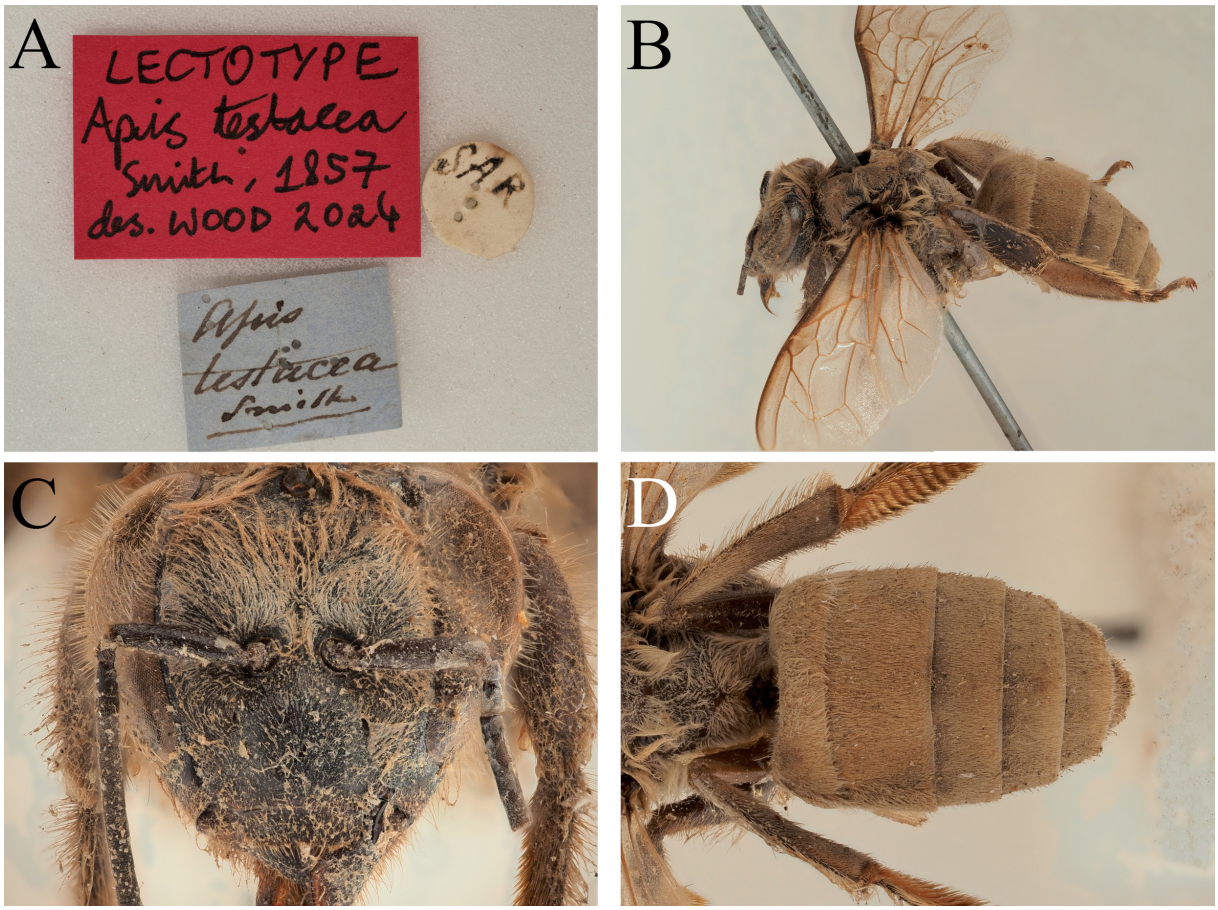

Fig. 20. *Apis testacea* Smith, 1857, lectotype, ♀ (OUMNH, ENT-HYME2778-01). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Paralectotype

MALAYSIA • 1 ♀; Sar [Sarawak]; [29 Oct. 1854–10 Feb. 1856]; OUMNH, ENT-HYME2778-02.

Type locality

Borneo [not specified, but de facto Sarawak].

Notes

This species was not dealt with by Baker (1993). There are two identical females in the OUMNH collection, both of which are labelled as coming from Sarawak. One of them is selected as the lectotype, by present designation. Maa (1953: 566) gave *A. testacea* as a synonym of *A. dorsata* Fabricius, 1793 using the incorrect publication year of 1858.

Current status

Apis dorsata Fabricius, 1793 (Maa 1953).

Distribution

Pakistan, India, Sri Lanka, Myanmar, China, Laos, Cambodia, Vietnam, Thailand, Malaysia (Peninsula, Borneo), Indonesia (Sumatra, Java, Kalimantan) (Ascher & Pickering 2024). This distribution is slightly unclear due to the inconsistent recognition of *Apis laboriosa* Smith, 1871 and *Apis binghami* Cockerell, 1906 (see text under Section 28. *Apis zonata*) as valid species in the literature (Kitnya *et al*. 2020, 2024).

18. ***Trigona ventralis*** Smith, 1857

Trigona ventralis Smith, 1857: 50, ♀.

Type material examined

Syntype

MALAYSIA • ♀; Borneo, Sar [Sarawak]; [29 Oct. 1854–10 Feb. 1856]; NHMUK, Type 17b, 1186 (examined by photograph).

Type locality

Borneo (Sarawak), Malacca (Mount Ophir).

Notes

This species was not dealt with by Baker (1993). There are no specimens of *T. ventralis* in the OUMNH collection. Rasmussen (2008: 12) states that the type is in the NHMUK as type 17b, 1186, and this is a specimen labelled as "Sar." and with a typical Smith label on blue paper. It bears the accession details of "purch. Stevens: B.M. 1857-36", indicating that it went directly to the museum and not to W.W. Saunders. As it bears a typical Smith type label, it is clearly a valid syntype, and could be designated as a lectotype to fix the terra typica as Sarawak rather than peninsula Malaysia.

Current status

Lepidotrigona ventralis (Smith, 1857) (Rasmussen 2008).

Distribution

India, Myanmar, Cambodia, Laos, Vietnam, Thailand, Malaysia (Peninsula, Borneo), Indonesia (Java, Sumatra), Brunei (Rasmussen 2008).

19. ***Trigona atripes*** Smith, 1857
Fig. 21

Trigona atripes Smith, 1857: 50, ♀.

Type material examined

Holotype
MALAYSIA • ♀; M. Ophir 76 [Mount Ledang]; [13 Jul.–25 Sep. 1854]; OUMNH, ENT-HYME2779.

Type locality

Malacca (Mount Ophir) [= Mount Ledang].

Notes

This species was not dealt with by Baker (1993). A single specimen was found in the type collection which has now been labelled as the holotype.

Current status

Tetragonula (*Tetragonilla*) *atripes* (Smith, 1857) (Engel *et al*. 2017).

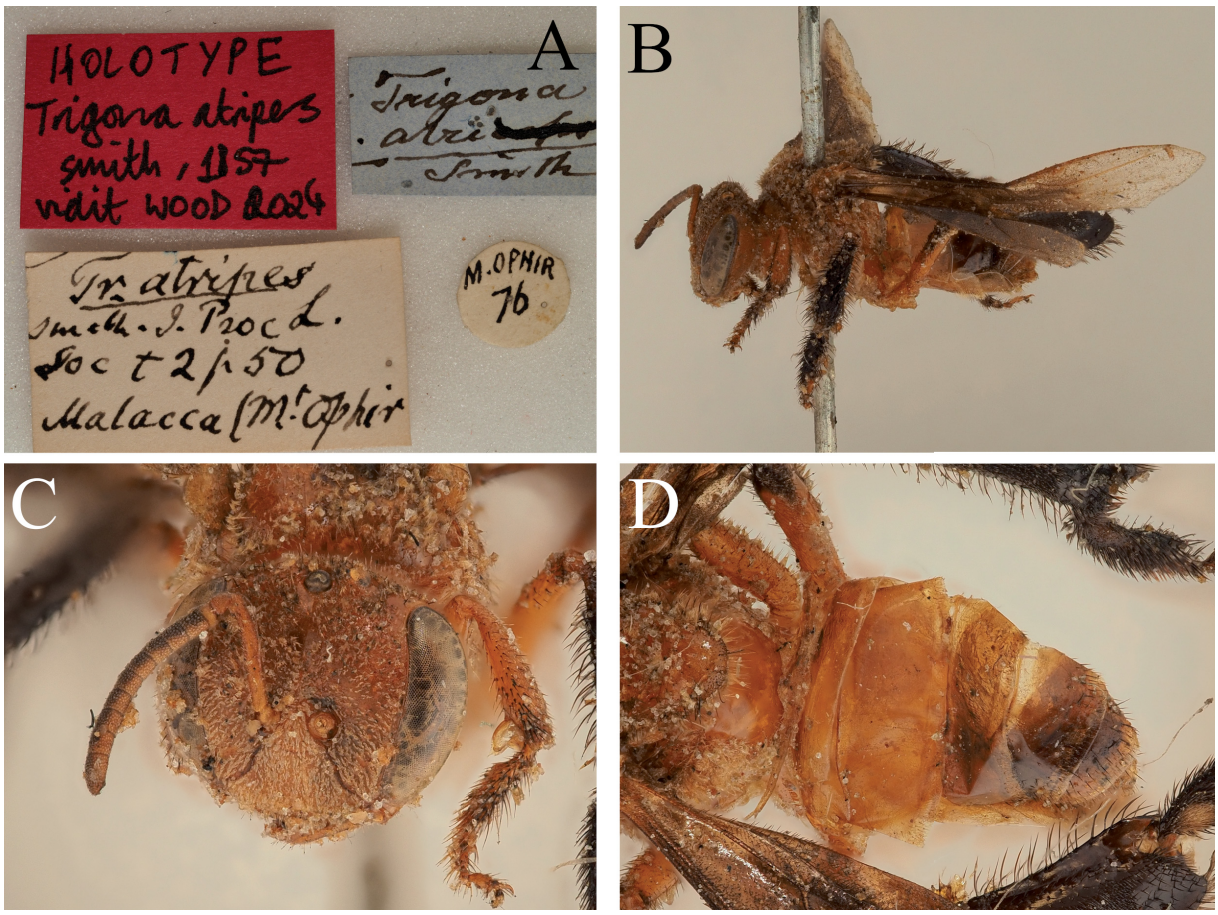

Fig. 21. *Trigona atripes* Smith, 1857, holotype, ♀ (OUMNH, ENT-HYME2779). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Distribution

Myanmar, Thailand, Malaysia (Peninsula, Borneo), Singapore, Indonesia (Sumatra, Kalimantan) (Rasmussen 2008; Ascher *et al*. 2022).

20. ***Trigona thoracica*** Smith, 1857

Trigona thoracica Smith, 1857: 50, ♀.

Type material examined

Possible syntype

MALAYSIA • ♀; Mal-ca [Malacca]; [13 Jul.–25 Sep. 1854]; NHMUK, Type 17b, 1181 (examined by photograph).

Type locality

Singapore.

Notes

This species was not dealt with by Baker (1993). There are no specimens of *T. thoracica* in the OUMNH collection. Rasmussen (2008: 12) states that the type is in the NHMUK as type 17b, 1181, and whilst available images show a specimen with a white disc label and Smith's handwriting on typical blue paper, the label indicates "Mal-ca", presumably Malacca rather than Singapore, the stated type locality. The specimen also bears an accession label reading "F. Sm. Coll. 79.22" and "type", indicating that it came from the personal collection of Smith. Its syntypic status is somewhat ambiguous, but can probably be accepted as valid.

Current status

Geniotrigona thoracica (Smith, 1857) (Rasmussen 2008).

Distribution

Cambodia, Myanmar, Thailand, Malaysia (Peninsula, Borneo), Singapore, Indonesia (Sumatra), Brunei (Rasmussen 2008; Ascher *et al*. 2022).

21. ***Trigona nitidiventris*** Smith, 1857

Fig. 22

Trigona nitidiventris Smith, 1857: 50–51, ♀.

Type material examined

Holotype

MALAYSIA • ♀; M. Ophir 79 [Mount Ledang]; [13 Jul.–25 Sep. 1854]; OUMNH, ENT-HYME2780.

Type locality

Malacca (Mount Ophir) [= Mount Ledang].

Notes

This species was not dealt with by Baker (1993). We found only a single specimen in the type collection, which was already labelled as the holotype.



Fig. 22. *Trigona nitidiventris* Smith, 1857, holotype, ♀ (OUMNH, ENT-HYME2780). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Current status

Lepidotrigona nitidiventris (Smith, 1857) (Rasmussen 2008).

Distribution

Thailand, Malaysia (Peninsula, Borneo), Brunei, Philippines, Indonesia (Sumatra, Kalimantan) (Rasmussen 2008).

22. ***Trigona laeviceps*** Smith, 1857

Fig. 23

Trigona laeviceps Smith, 1857: 51, ♀.

Type material examined

Possible holotype

SINGAPORE • ♀; Sing. 82 [Singapore]; [either 25 Sep.–17 Oct. 1854 or 10–17 Feb. 1856]; OUMNH, ENT-HYME2781.

Type locality

Singapore.

Notes

This species has a complicated taxonomic history. Baker (1993: 197–198) wrote the following:

> "Of two ♀♀ standing as *laeviceps* in the UMO type collection, one bears no labels and the other is labelled 'Aru' [white disc] and *'Tr. laeviceps* Smith. J.Pr.L Soc t 2, p 51 Singapore' [Westwood's hand]. The second, Aru [Wallace] specimen, doubtless the basis of Smith's record in 1869, cannot be regarded as a syntype of *laeviceps* and has been labelled as of no type status. The status of the label-less specimen is uncertain: it agrees with Smith's description, so far as that goes, but in the absence of a Wallace locality label or a Smith determination label it would be unwise to assume even that it was before Smith when *laeviceps* was described.
>
> Fortunately, a third ♀ found among other *Trigona* in another part of the type collection is authentic *laeviceps*. It is a Wallace specimen labelled 'SING. 82' [white disc] and *'Trigona laeviceps*. Smith' [blue paper, Smith], and it agrees with Smith's description. This specimen has now been labelled as the HOLOTYPE of *laeviceps*. It is not in clean condition, and is much broken, having lost the L flagellum, both legs II from the femur and R leg III from the trochanter. It is apparently a callow of *T. fuscobalteata* Cameron, 1908.
>
> Schwarz (1939: 111), assigning *laeviceps* as a doubtful synonym to *'iridipennis* variety *iridipennis'*, made no reference to examination of type material and noted (p. 108) that he was

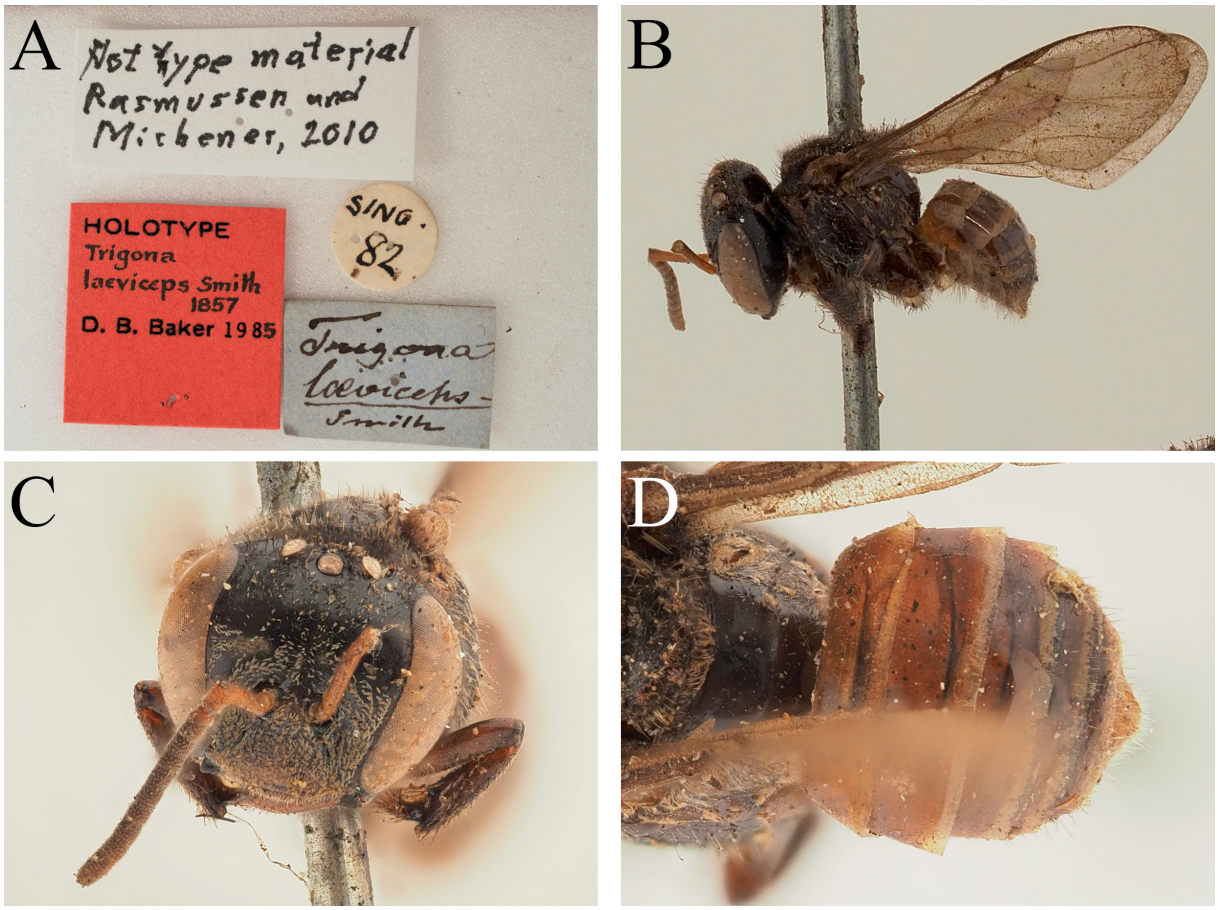

Fig. 23. *Trigona laeviceps* Smith, 1857, possible holotype, ♀ (OUMNH, ENT-HYME2781). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

> 'unable to trace structural differences in the workers of *fuscobalteata* and of *iridipennis'*. Maa (1961: 208) has: *'Trigona laeviceps* Smith, 1857 BM-178.1184 is from Mt. Ophir,...' but this is incorrect and the NHM specimen referred to is a FALSE TYPE. Sakagami (1978: 201) has: 'Moure ... mentioned that the specimens (of *iridipennis* sensu Schwarz] from Malaya are larger than those from India and proposed to use *T. laeviceps* (type locality, Mt. Ophir, S. Malaya) for the former. This proposition is followed in the present paper.'. This again is wrong, since Mt. Ophir was not the type locality".

We located the specimen highlighted by Baker, which has been subsequently labelled as of no type status, as argued by Rasmussen & Michener (2010) who designated a neotype in the NHMUK collection (Type 17b, 1184b). The use of the name *T. laeviceps* over time is somewhat tortuous (Rasmussen & Michener 2010; Engel *et al*. 2017; Ascher *et al.* 2022), and it is not our intention to invalidate the work of previous authors. We present here only the possible holotype specimen so that it is more easily available for revisionary workers dealing with this complex group.

Current status

Tetragonula (*Tetragonula*) *laeviceps* (Smith, 1857) (Rasmussen 2008; Rasmussen & Michener 2010; Engel *et al*. 2017; Ascher *et al*. 2022).

Distribution

Unclear due to the various species concepts that have been employed (Rasmussen 2008; Rasmussen & Michener 2010; Engel *et al*. 2017; Ascher *et al*. 2022).

23. ***Trigona apicalis*** Smith, 1857
Fig. 24

Trigona apicalis Smith, 1857: 51, ♀.

Type material examined

Lectotype

MALAYSIA • ♀; Sar. [Sarawak]; [29 Oct. 1854–10 Feb. 1856]; OUMNH, ENT-HYME2782-01.

Paralectotype

MALAYSIA • 1 ♀; Sar. [Sarawak]; [29 Oct. 1854–10 Feb. 1856]; OUMNH, ENT-HYME2782-02.

Other material examined

MALAYSIA • 1 ♀; Sark./Mouhot; OUMNH (of no type status).

Type locality

Borneo (Sarawak).

Notes

This species was not dealt with by Baker (1993). Rasmussen (2008: 51) indicates that the holotype is in the OUMNH collection, but we found three specimens standing in the type collection. Two bear typical Wallace labels indicating collection in Sarawak, and the third has a printed label, suggesting that it is not syntypic. The specimen bearing both a white disc and a determination label of *Trigona apicalis* written in Smith's hand is hereby designated as the lectotype.



Fig. 24. *Trigona apicalis* Smith, 1857, lectotype, ♀ (OUMNH, ENT-HYME2782-01). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Current status

Tetrigona apicalis (Smith, 1857) (Rasmussen 2008).

Distribution

Myanmar, Cambodia, Thailand, Malaysia (Peninsula, Borneo), Singapore, Indonesia (Kalimantan) (Rasmussen 2008; Ascher *et al*. 2022).

24. ***Trigona canifrons*** Smith, 1857

Fig. 25

Trigona canifrons Smith, 1857: 51, ♀.

Type material examined

Lectotype

MALAYSIA • ♀; Sar [Sarawak]; [29 Oct. 1854–10 Feb. 1856]; OUMNH, ENT-HYME2783.

Type locality

Borneo (Sarawak).

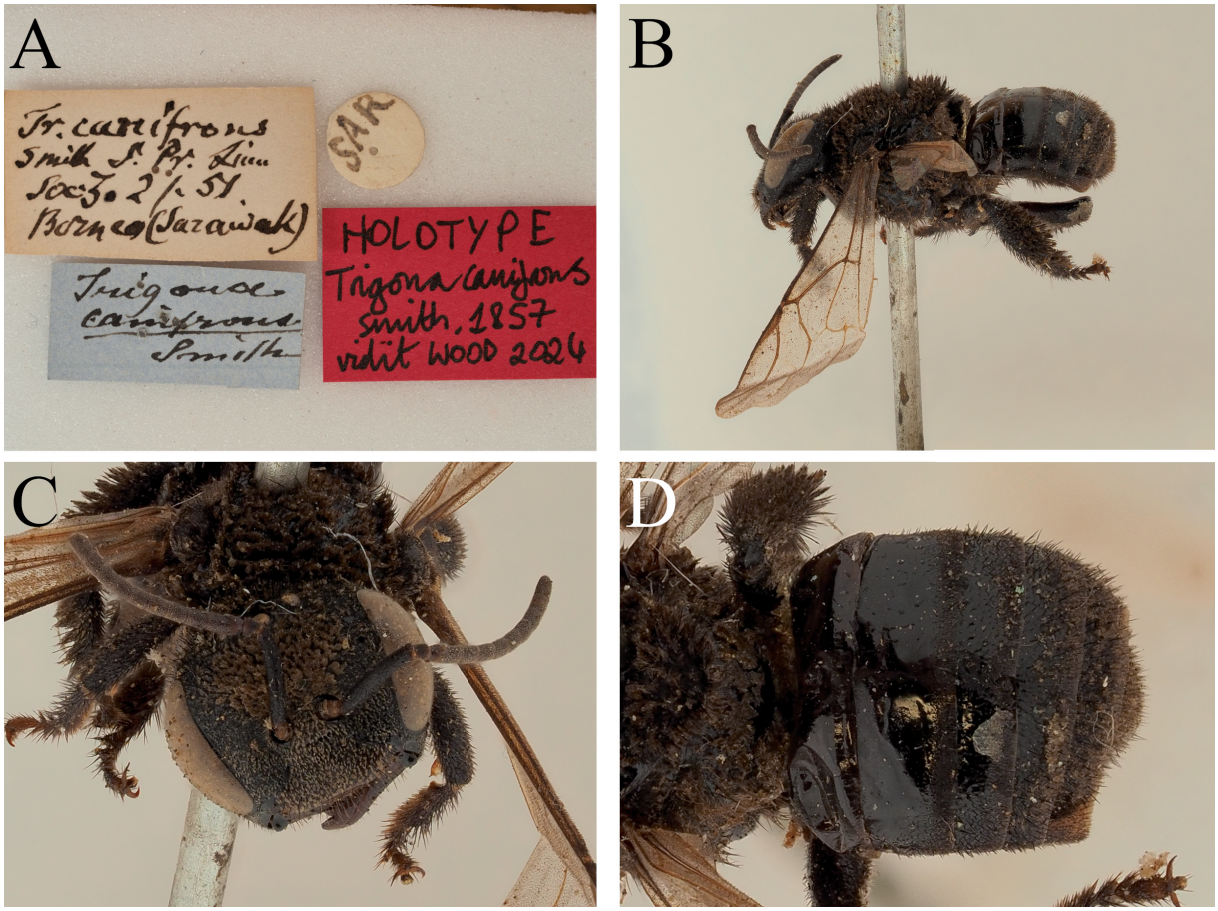

Fig. 25. *Trigona canifrons* Smith, 1857, lectotype, ♀ (OUMNH, ENT-HYME2783). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Notes

This species was not dealt with by Baker (1993). Only a single specimen could be found in the OUMNH type collection. Rasmussen (2008: 23) indicates that one syntype is present in the OUMNH and one in the NHMUK (Type 17b, 1183). The NHMUK specimen does appear to be a genuine syntype (purchased by Stevens, accession number 1856-14); for clarity, the OUMNH specimen is hereby designated as the lectotype following the criteria laid out in the methodology, and the NHMUK specimen can be treated as a paralectotype.

Current status

Lophotrigona canifrons (Smith, 1857) (Rasmussen 2008).

Distribution

Myanmar, Thailand, Malaysia (Peninsula, Borneo), Singapore, Indonesia (Sumatra, Kalimantan), Brunei (Rasmussen 2008; Ascher *et al*. 2022).

25. ***Trigona collina*** Smith, 1857
Fig. 26

Trigona collina Smith, 1857: 51–52, ♀.

Type material examined

Holotype

MALAYSIA • ♀; M. Ophir 78 [Mount Ledang]; [13 Jul.–25 Sep. 1854]; OUMNH, ENT-HYME2784.

Type locality

Malacca (Mount Ophir) [= Mount Ledang].

Notes

This species was not dealt with by Baker (1993). Rasmussen (2008: 29) indicates that the type is in the OUMNH collection, and indeed we found only a single specimen. Although it is in poor condition, we have labelled it as the holotype.

Current status

Tetragonula (*Tetragonilla*) *collina* (Smith, 1857) (Engel *et al*. 2017).

Distribution

Myanmar, Thailand, Laos, Cambodia, Vietnam, Malaysia (Peninsula, Borneo), Indonesia (Sumatra) (Rasmussen 2008).

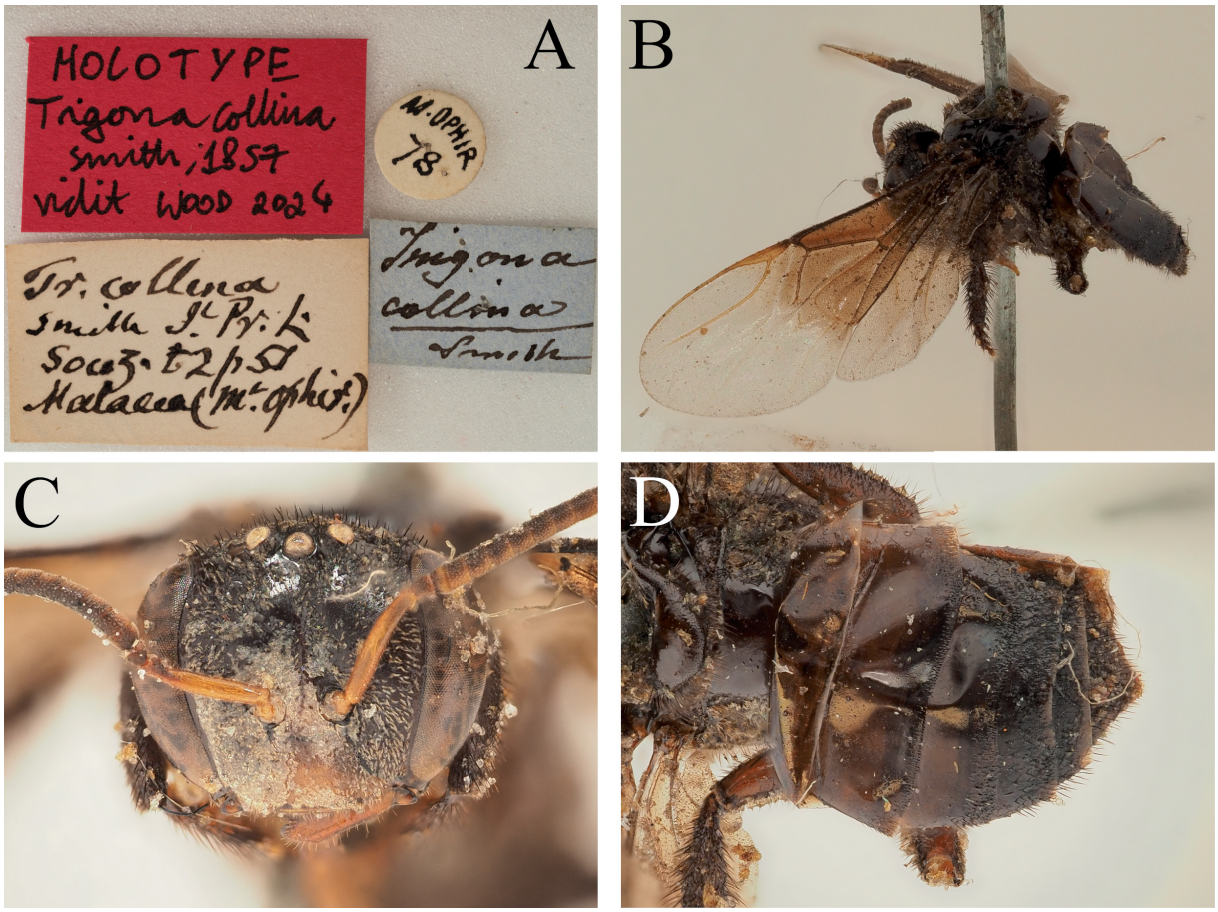

Fig. 26. *Trigona collina* Smith, 1857, holotype, ♀ (OUMNH, ENT-HYME2784). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

26. ***Trigona fimbriata*** Smith, 1857
Fig. 27

Trigona fimbriata Smith, 1857: 52, ♀.

Type material examined

Holotype
SINGAPORE • ♀; Sing. [Singapore]; [either 25 Sep.–17 Oct. 1854 or 10–17 Feb. 1856]; OUMNH, ENT-HYME2785.

Type locality

Singapore.

Notes

This species was not dealt with by Baker (1993). Rasmussen (2008: 16) indicates that the type is in the NHMUK as type 17b, 1182. This specimen is labelled as "Type" with a white disc label reading "Mal-ca" [Malacca]. This is another Stevens purchase, accessioned in 1855. The specimen is further labelled as "Lectotype Det. J.S. Moure 1957". The specimen bears no label by Smith, and so there is no indication that it was ever examined by him. As the terra typica is Singapore and the OUMNH specimen (a



Fig. 27. *Trigona fimbriata* Smith, 1857, holotype, ♀ (OUMNH, ENT-HYME2785). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

singleton) is labelled as Singapore, it is reasonable to treat it as the holotype and the NHMUK specimen is an invalid lectotype and of no type status.

Current status

Homotrigona fimbriata (Smith, 1857) (Rasmussen 2008).

Distribution

Thailand, Laos, Cambodia, Vietnam, Malaysia (Peninsula, Borneo), Singapore, Indonesia (Sumatra) (Rasmussen 2008; Ascher *et al*. 2022).

Species described by Smith (1858a) from Sulawesi

27. ***Sphecodes insularis*** Smith, 1858
Fig. 28

Sphecodes insularis Smith, 1858a: 5, ♂.

Type material examined

Holotype

INDONESIA • ♂; Mak. [Makassar, Sulawesi]; [2 Sep.–18 Dec. 1856]; OUMNH, ENT-HYME2786.

Type locality

Celebes [= Sulawesi].

Notes

Baker (1993: 199) wrote the following:

> "The HOLOTYPE of *Sphecodes insularis* is a ♂ in the UMO type collection labelled 'Mak.' [on white disc: = CELEBES: Makasar district, Sep-Dec 1856 (Wallace)] and '*Sphecodes insularis* Smith' [Smith's hand; blue paper]. The head is detached and has been glued on card (obscuring details of the preoccipital ridge); the left fore-wing is lost and the apex of the right fore-wing torn off; as to the legs, R II is lost after the basitarsus, R III after the tibia, and L III after the 2nd tarsal segment.

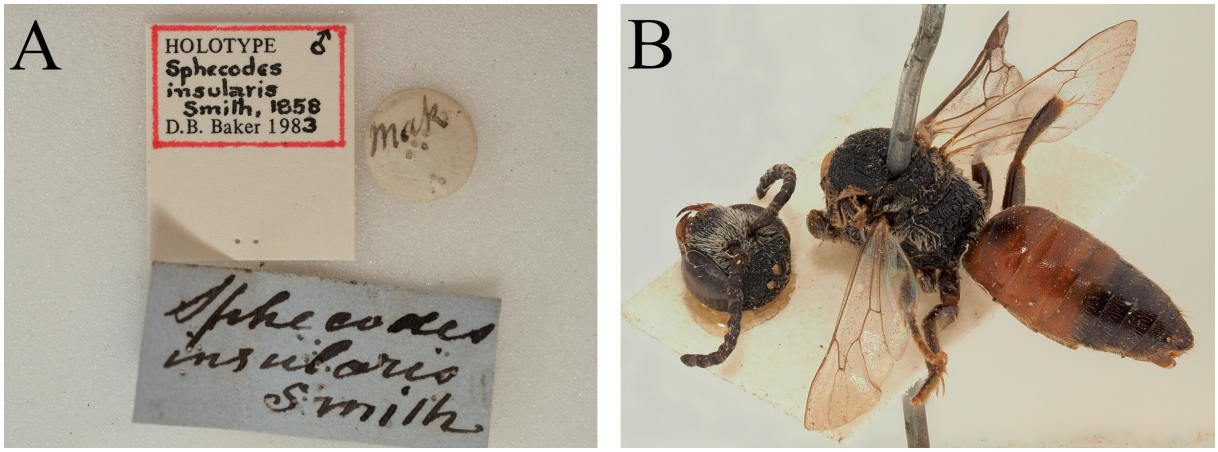

Fig. 28. *Sphecodes insularis* Smith, 1858, holotype, ♂ (OUMNH, ENT-HYME2786). **A**. Label information. **B**. Habitus, dorsolateral view.

> Mandible edentate; hair tracts of flagellar segments semi-circular, extending to half length of segments; mesoscutum coarsely, densely, irregularly punctate; propodeum coarsely rugose, basal are not clearly defined; marginal area of T1 punctate, less densely so than disc, of T2-4 sharply defined and impunctate; genitalia largely exposed, gonocoxites not sulcate; hamuli 7; length c. 7 mm".

Sphecodes insularis is a poorly studied species, and further work is required to characterise it in the wider context of Southeast Asian *Sphecodes* due to the current shortage of available specimens, and the need to more extensively and precisely associate sexes (Astafurova *et al*. 2020).

Current status

Sphecodes insularis Smith, 1858 (Astafurova *et al*. 2020).

Distribution

Indonesia (Sulawesi) (Smith 1858a; Astafurova *et al*. 2020; Ascher & Pickering 2024).

28. ***Nomia punctata*** Smith, 1858
Fig. 29

Nomia punctata Smith, 1858a: 5, ♂.

Type material examined

Holotype

INDONESIA • ♂; Mak. [Makassar, Sulawesi]; [2 Sep.–18 Dec. 1856]; OUMNH, ENT-HYME2787.

Type locality

Celebes [= Sulawesi].

Notes

Baker (1993: 199) wrote the following:

> "A ♂ labelled 'Mak.' [blue disc], '*Nomia punctata*. Smith.' [blue rect. label] and 'Holotype C.D. Michener in Litt. 13 VIII 1965', standing as *punctatum* in the UMO type collection is, as recognized by Michener, the HOLOTYPE of this species. The mesosoma has been broken apart in pinning, tarsus R II is lost, and the genitalia have been crudely extracted and embedded in glue, but the type is otherwise intact and in good condition".

Baker treated the species in the combination *Lasioglossum punctatum* (Smith, 1858), and we agree that it is the holotype. Separately, Michener (1965: 241) and Walker (1986: 152–153) treated *Halictus punctatus* Smith, 1879 (described from Australia) as *Homalictus punctatus* (Smith), with Walker synonymising *Halictus punctatus* var. *exlautus* Cockerell, 1905 under *Homalictus punctatus*. After describing this variety, Cockerell (1922: 662) later believed that *Halictus punctatus* was preoccupied by *Nomia punctata* Smith, 1858, and that the name *exlautus* should be applied as the senior name for the Australian taxon, the type specimen of the "variety" representing only individual variation. The placement of Smith's taxon from Sulawesi and Smith's taxon from Australia into the genus *Lasioglossum* Curtis, 1833 definitively renders the Australian taxon as a junior secondary homonym; the Australian taxon is rightly referred to as *Lasioglossum* (*Homalictus*) *exlautum* (Cockerell, 1905) (J. Gardner pers. com.).

Current status

Lasioglossum (*Homalictus*) *punctatum* (Smith, 1858) (J. Gardner pers. com.). Not included within the genus *Homalictus* by Pauly (1980) in his revision of the Indonesian members of this group.

Distribution

Indonesia (Sulawesi) (Smith 1858a; Ascher & Pickering 2024).



Fig. 29. *Nomia punctata* Smith, 1858, holotype, ♂ (OUMNH, ENT-HYME2787). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Propodeum, dorsal view. **E**. Metasoma, dorsal view. **F**. Genital capsule, dorsal view.

29. ***Nomia flavipes*** Smith, 1858
Fig. 30

Nomia flavipes Smith, 1858a: 5, ♀.

Type material examined

Holotype

INDONESIA • ♀; Mak. [Makassar, Sulawesi]; [2 Sep.–18 Dec. 1856]; OUMNH, ENT-HYME2788.

Type locality

Celebes [= Sulawesi].

Notes

Baker (1993: 200) wrote the following:

> "A ♀ labelled 'Mak.' [blue disc] and '*Nomia flavipes* Smith' [blue rectangular label] standing as *flavipes* in the UMO type collection is the HOLOTYPE of this species and it has now been labelled accordingly. The type is much broken and has been crudely 'repaired'; some detached leg segments adhere to the data label".

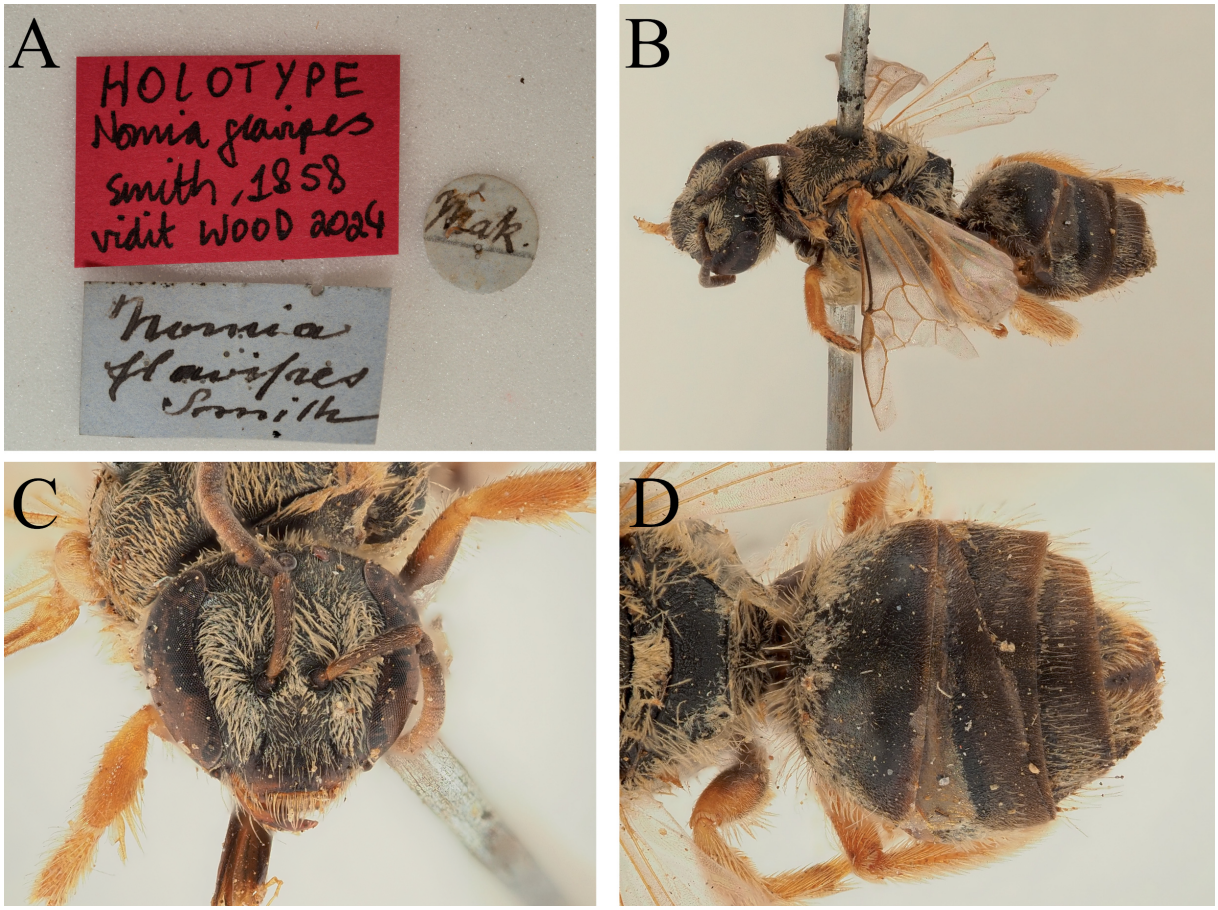

Fig. 30. *Nomia flavipes* Smith, 1858, holotype, ♀ (OUMNH, ENT-HYME2788). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

The specimen was not labelled as holotype; this has now been rectified. Baker treated the name *L. flavipes* as senior to *L. deliense* (Strand, 1910), which was described from Sumatra as *Halictus deliensis* (Strand 1910: 188). The nomenclatural status of *flavipes* is complex. The specimen itself belongs to the genus *Lasioglossum* (*Ctenonomia*), and as such would nominally have precedence over the currently used name *L. deliense*. However, Cockerell (1922: 662) considered *flavipes* Smith to be in the genus *Halictus* Latreille, 1804 and hence a junior secondary homonym of *Halictus flavipes* (Fabricius, 1787). The replacement name *Halictus latebralis* Cockerell, 1922 was proposed. Blüthgen (1926: 537–538) listed both *Halictus flavipes* (Smith) and *Halictus latebralis* Cockerell under *Halictus deliense* Strand. Blüthgen (1926) also dated the publication year of *Halictus deliense* as "1909 (1910)", whereas Baker (1993) dated it as 1910.

Under ICZN (1999) Article 59.3, even though *flavipes* Smith is not currently considered to be part of the genus *Halictus*, a junior secondary homonym replaced before 1961 is permanently invalid unless the substitute name is not in use and the relevant taxa are no longer considered congeneric. As *L. deliense* is in use (e.g., Blüthgen 1926; Ascher *et al*. 2022), it should be maintained as the valid name.

Current status

Lasioglossum (*Ctenonomia*) *deliense* (Strand, 1910) (Blüthgen 1926; Ascher & Pickering 2024; J. Gardner pers. com.).

Distribution

India (Sikkim), Malaysia (Peninsula), Singapore, Indonesia (Sumatra, Java, Kalimantan, Sulawesi), Philippines (Blüthgen 1926; Ascher *et al*. 2022; Ascher & Pickering 2024).

30. ***Nomia formosa*** Smith, 1858
Fig. 31

Nomia formosa Smith, 1858a: 5–6, ♀♂.

Type material examined

Lectotype

INDONESIA • ♀; Mak. [Makassar, Sulawesi]; [2 Sep.–18 Dec. 1856]; OUMNH, ENT-HYME2789-01 (lectotype indicated by Baker 1993, de facto lectotype designated by Pauly 2009).

Paralectotype

INDONESIA • 1 ♂; Mak. [Makassar, Sulawesi]; [2 Sep.–18 Dec. 1856]; OUMNH, ENT-HYME2789-02.

Type locality

Not explicitly stated by Smith, but Celebes [= Sulawesi].

Notes

Baker (1993: 200) wrote the following:

> "Smith described *formosa* from an unspecified number of specimens of both sexes from 'Celebes' [Makasar district]. He later (1860: 132) recorded it from Bachian and Malacca, noting: 'The male of this species is distinguished by having two acute spines on the postscutellum'. Here he was obviously confusing it with a species of *Hoplonomia*, later (1875: 58) described, from an unspecified number of specimens of both sexes, from 'Celebes; Java; Morty Island', as *quadridentata* [see 5.32-11].

Of four specimens standing as *formosa* under Smith's arrangement of Saunders' collection, in UMO, one ♂ and one ♀ with Wallace's label 'Mak.' [white disc] and Smith's label (♀ only) '*Nomia formosa* [rule] Smith' are *Curvinomia*, but differ from Smith's description in that the tergal fasciae are now yellow (traces of blue on posterior terga in ♂: these fasciae are, however, as seen in long series of other *Curvinomia*, liable to postmortem change), and in that the apex of tibia III is not now pale testaceous (again probably due to ageing).

Two ♂♂, one with Wallace's label 'Mak.' and Smith's label '*Nomia formosa* Smith' (virtually identical with his label on the ♀ and probably contemporary), the other 'This species is erroneously given as the ♂. of *N. formosa* in insects of Batchian [i.e., Smith, 1860 [rule] New sp.' [unrecognized hand], are *Hoplonomia quadridentata* (Smith), *q.v.*

Smith's ♀ has now been labelled as LECTOTYPE of *formosa*. Of the two ♂ syntypes with Wallace's label 'Mak.', that conspecific with this ♀ has been labelled as paralectotype, the *Hoplonomia* as a misidentified syntype, of *formosa*. The *Hoplonomia* ♂ without data, of uncertain origin, has been labelled as of no type status".

Pauly (2009: 159) noted Baker's lectotype, and therefore acted as the first publisher of this designation.

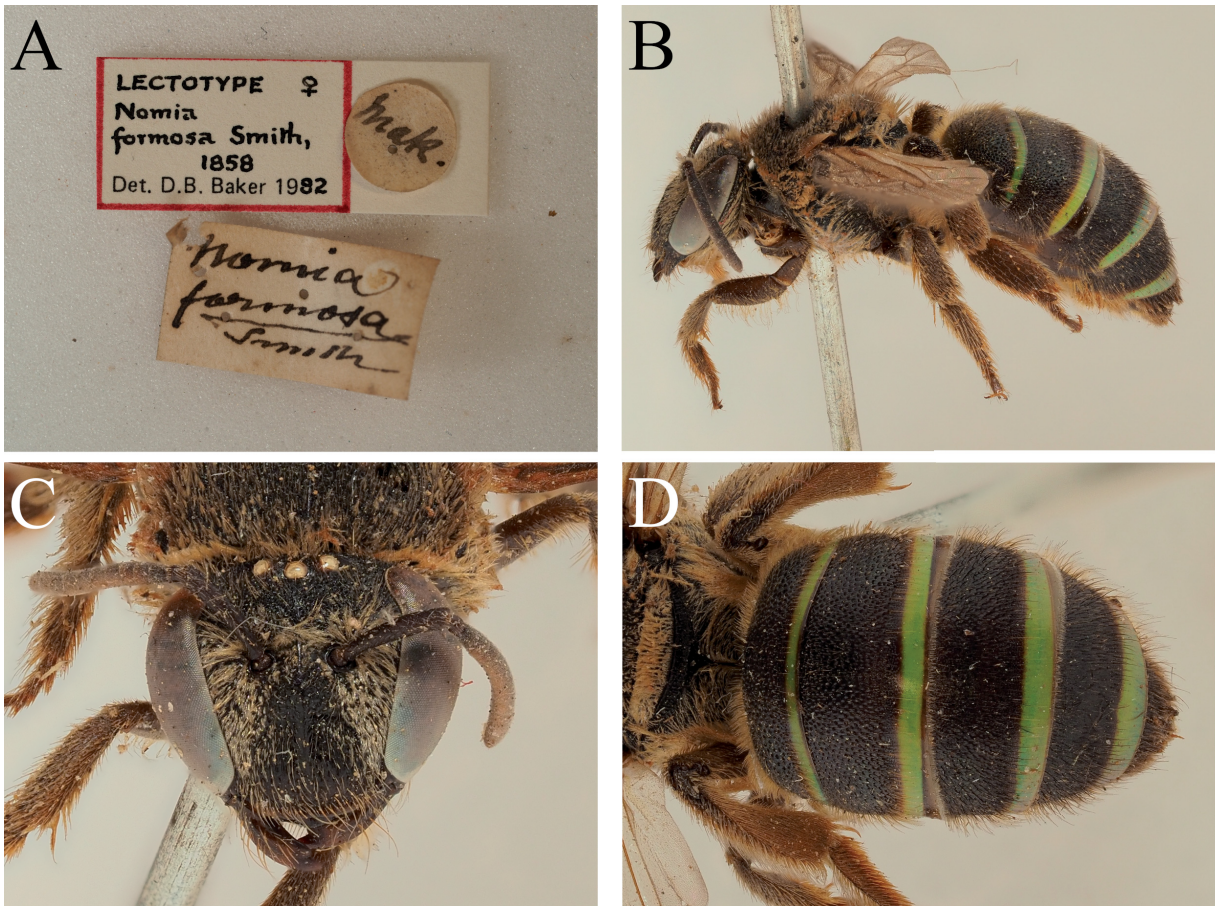

Fig. 31. *Nomia formosa* Smith, 1858, lectotype, ♀ (OUMNH, ENT-HYME2789-01). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Current status

Curvinomia formosa (Smith, 1858) (Pauly 2009).

Distribution

Indonesia (Sulawesi) (Pauly 2009).

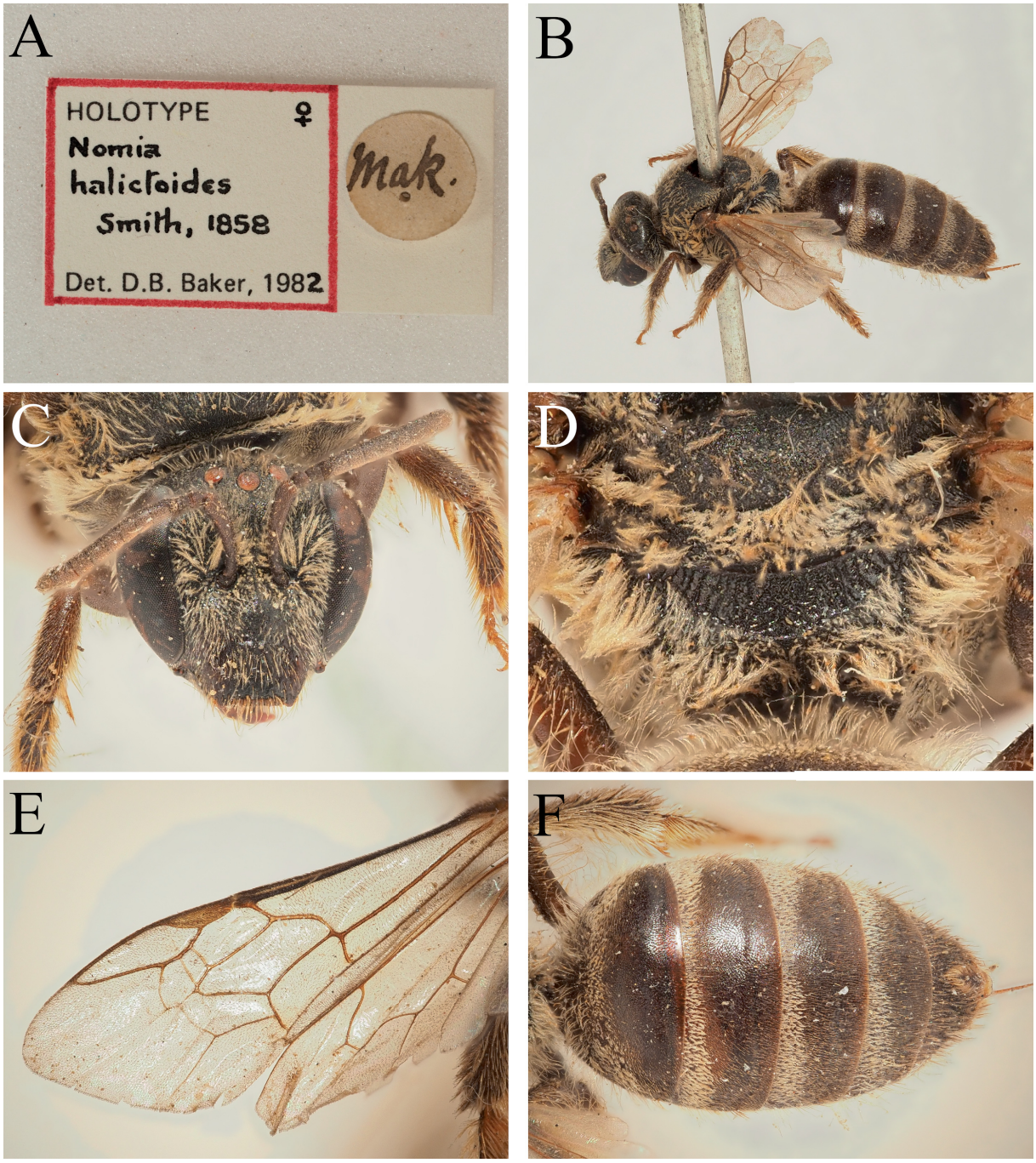

Fig. 32. *Nomia halictoides* Smith, 1858, holotype, ♀ (OUMNH, ENT-HYME2790). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Propodeum, dorsal view. **E**. Left forewing, dorsal view. **F**. Metasoma, dorsal view.

31. ***Nomia halictoides*** Smith, 1858
Fig. 32

Nomia halictoides Smith, 1858a: 6, ♀.

Type material examined

Holotype
INDONESIA • ♀; Mak. [Makassar, Sulawesi]; [2 Sep.–18 Dec. 1856]; OUMNH, ENT-HYME2790.

Type locality

Celebes [= Sulawesi].

Notes

Baker (1993: 200–201) wrote the following:

> "Two apparently conspecific ♀♀ in the UMO type collection were labelled (a) 'Mak' [white disc], (b) 'Bac' [Bachian; white disc], '*Nomia halictoides* Smith' [white paper], and 'Nov. 1929. sent to P. Bluthgen'. The Makasar ♀ has now been labelled as HOLOTYPE of *halictoides*, the Bachian ♀, obviously the source of Smith's 1860 record, as of no type status".

Current status

Lasioglossum (*Ctenonomia*) *halictoides* (Ascher & Pickering 2024; J. Gardner pers. com.).

Distribution

Malaysia (Peninsula, Borneo), Singapore, Indonesia (Sumatra, Java, Sulawesi, Bacan), Taiwan, Philippines, Papua New Guinea (Smith 1858a, 1860b; Pauly 1986; Ascher *et al*. 2022; Ascher & Pickering 2024).

32. ***Megachile incisa*** Smith, 1858
Fig. 33

Megachile incisa Smith, 1858a: 6, ♂.

Type material examined

Holotype
INDONESIA • ♂; Mak. [Makassar, Sulawesi]; [2 Sep.–18 Dec. 1856]; OUMNH, ENT-HYME2791.

Type locality

Celebes [= Sulawesi].

Notes

Baker (1993: 201) wrote the following:

> "A ♂ in the UMO type collection, labelled 'Mak.' [white disc] and '*Megachile incisa*. ♂. Smith' [white rectangular label] is the HOLOTYPE of this species. The type is intact and in fair condition".

We agree with Baker's assessment.

Current status

Megachile (*Callomegachile*) *incisa* Smith, 1858 (Ascher & Pickering 2024).

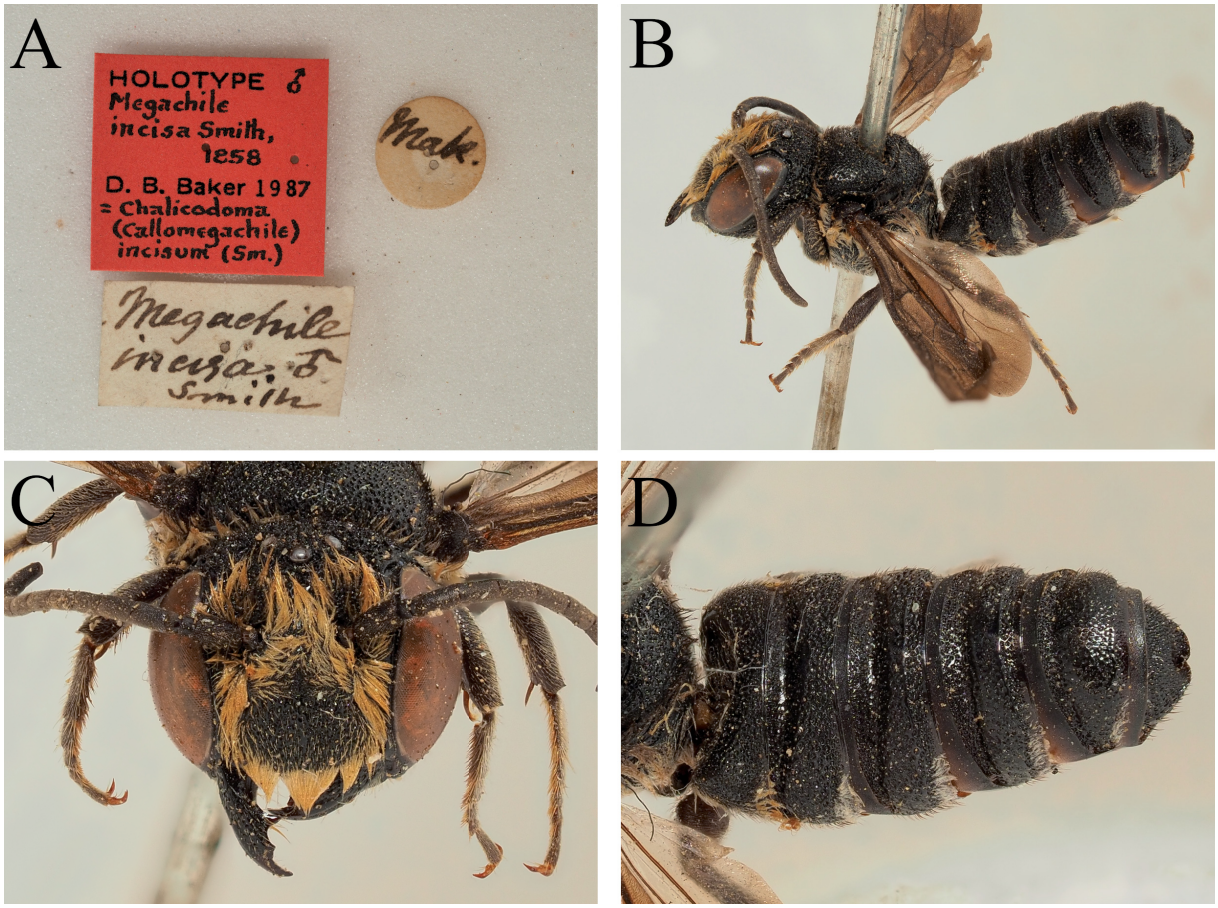

Fig. 33. *Megachile incisa* Smith, 1858 holotype, ♂ (OUMNH, ENT-HYME2791). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Distribution

Indonesia (Sulawesi) (Smith 1858a; Ascher & Pickering 2024).

33. ***Megachile fulvifrons*** Smith, 1858
Fig. 34

Megachile fulvifrons Smith, 1858a: 6–7, ♀♂.

Type material examined

Lectotype

INDONESIA • ♂; Mak. [Makassar, Sulawesi]; [2 Sep.–18 Dec. 1856]; OUMNH, ENT-HYME2792-01 (lectotype indicated by Baker 1993, de facto lectotype by present designation)

Paralectotype

INDONESIA • 1 ♀; Mak. [Makassar, Sulawesi]; [2 Sep.–18 Dec. 1856]; OUMNH, ENT-HYME2792-02.

Type locality

Celebes [= Sulawesi].

Notes

Baker (1993: 201) wrote the following:

> "A ♂ and a ♀ in the UMO type collection, both labelled 'MAK' [blue disc] [Makasar district, Sep-Dec 1856 (Wallace)], are syntypes of *fulvifrons*. Although the ♀ was described first, and although the ♂ is in comparatively poor condition, the latter (dissected and figured) is now designated as LECTOTYPE: ♀♀ in the difficult group to which *fulvifrons* belongs (including *gadara* Cameron, 1903, *rufovittata* Cockerell, 1911, *siamensis* Cockerell, 1927, and numerous undescribed species) are not always readily determined with certainty, while the ♂♂ generally present immediately diagnostic characters. Published synonymies in this group are unreliable".

As Baker's lectotype was never published, we formally publish it here following his reasoning that males can be determined with greater confidence than females, and hence this lectotype designation has greater utility.

Current status

Megachile (*Aethomegachile*) *fulvifrons* Smith, 1858. Ascher & Pickering (2024) list this species as incertae sedis, but we believe it is better placed in the subgenus *Aethomegachile*. In Southeast Asia, the majority of the medium-sized true leaf-cutters belong to this subgenus, with the situation becoming more complex to the north (China) and west (India). Males can be identified, apart from characters of



Fig. 34. *Megachile fulvifrons* Smith, 1858, lectotype, ♂ (OUMNH, ENT-HYME2792-01). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

the genital capsule, by the external character of the structure of S6 which has a vertical surface clearly visible with a median notch (triangular or semicircular). In males of the other groups this surface seen from below is narrow (*Eutricharaea* Thomson, 1872) or hardly visible (*Paracella* Michener, 1997). The mandibles also have no basal projection. The other species mentioned by Baker (1993) in this context also belong to *Aethomegachile*, and a revision of Southeast Asian species is required.

Distribution

Unclear due to the requirement for a revision of this group. Possibly Indonesia (Sulawesi, Ambon, Buru) and Timor-Leste (Smith 1858a, 1863; Ascher & Pickering 2024).

34. ***Megachile terminalis*** Smith, 1858
Fig. 35

Megachile terminalis Smith, 1858a: 7, ♀.

Type material examined

Holotype

INDONESIA • ♀; Mak [Makassar, Sulawesi]; [2 Sep.–18 Dec. 1856]; OUMNH, ENT-HYME2793.

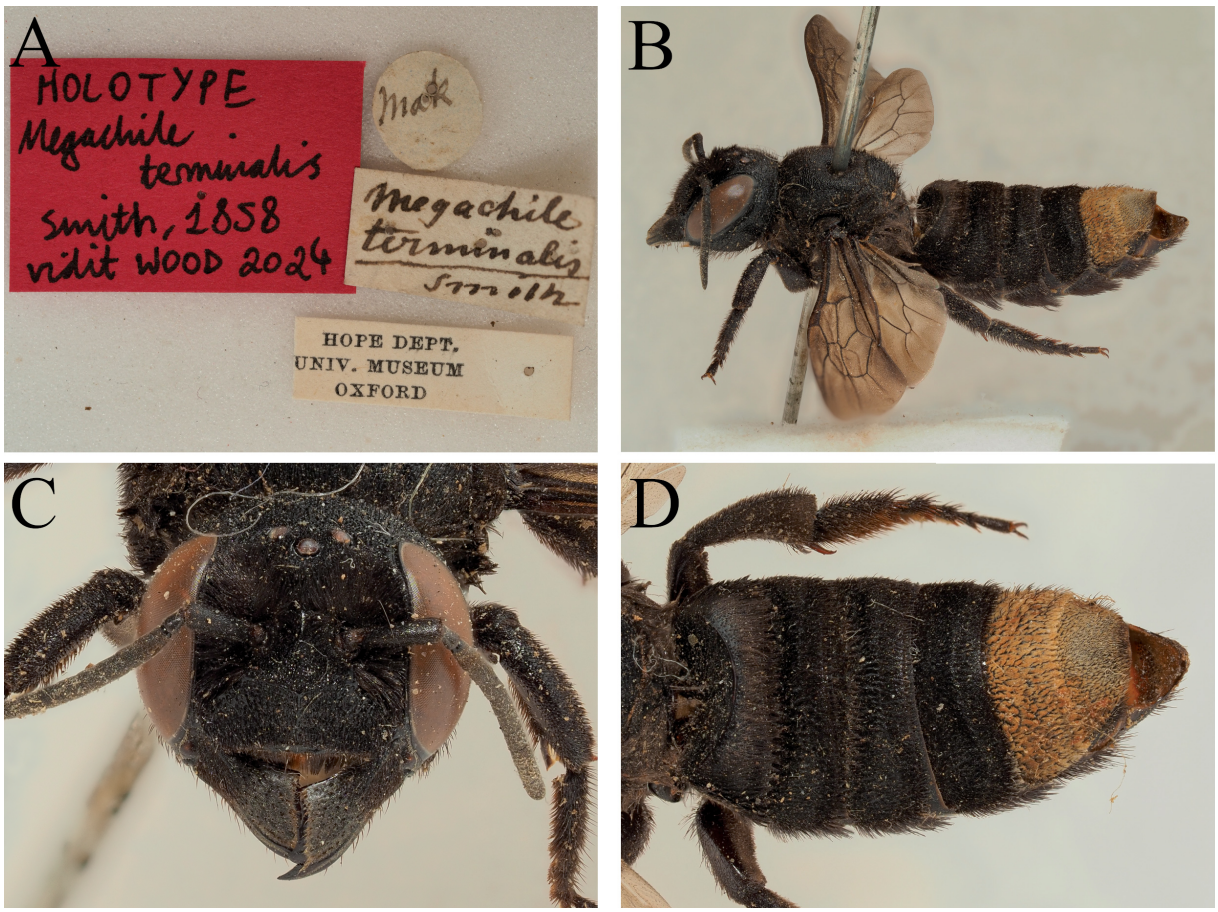

Fig. 35. *Megachile terminalis* Smith, 1858, holotype, ♀ (OUMNH, ENT-HYME2793). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Type locality

Celebes [= Sulawesi].

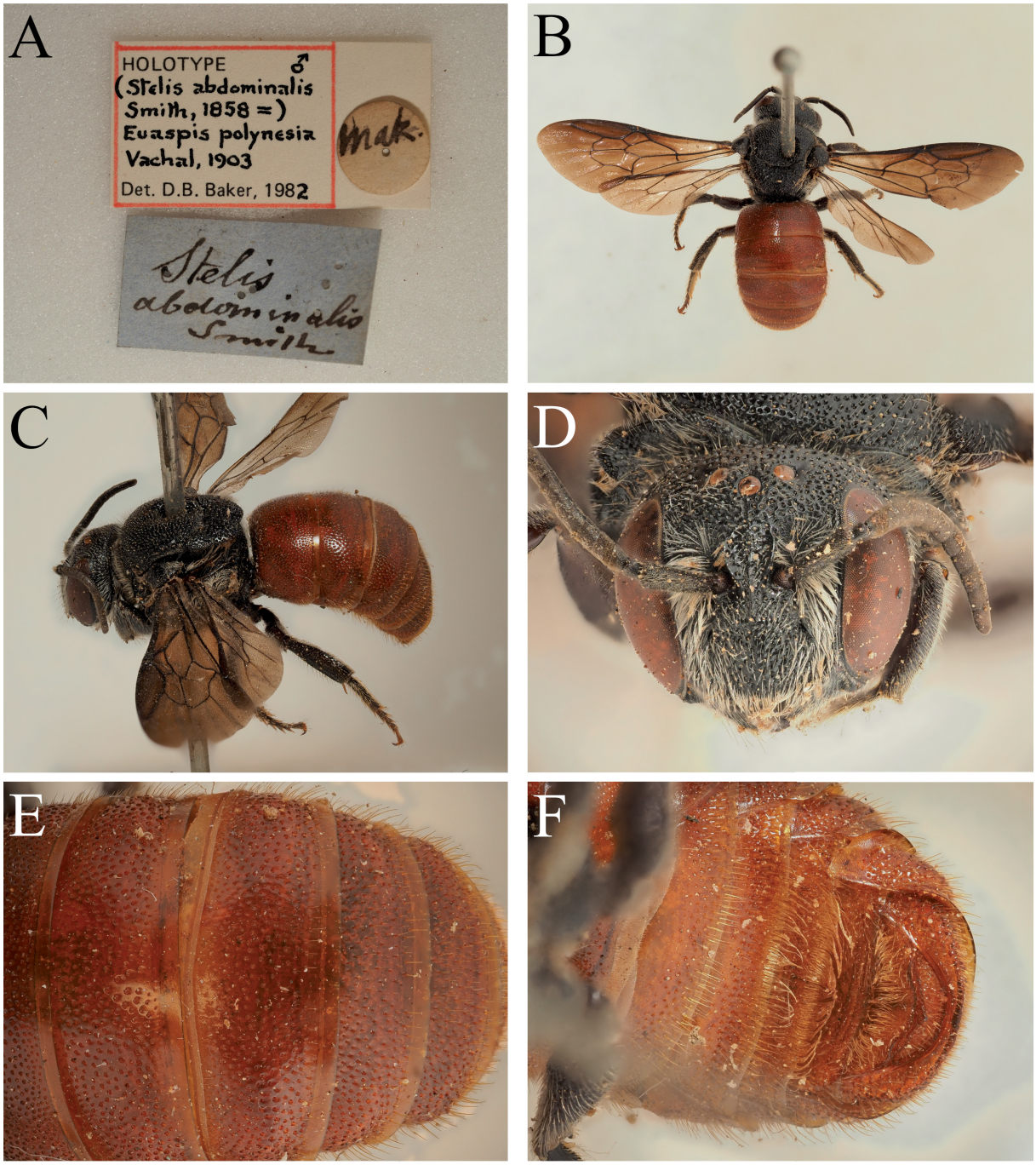

Fig. 36. *Stelis abdominalis* Smith, 1858, holotype, ♂ (OUMNH, ENT-HYME2794). **A**. Label information. **B**. Habitus, dorsal view. **C**. Habitus, profile view. **D**. Head, frontal view. **E**. Metasoma, dorsal view. **F**. Metasoma, ventral view.

Notes

Baker (1993: 201) wrote the following:

> "A ♀ in the UMO type collection, labelled 'Mak' [white disc] and '*Megachile terminalis* Smith' [white rectangular label] is the HOLOTYPE of this species and it has now been labelled accordingly. The type is intact but for the loss of the apical segments of R tarsus I".

The specimen was not labelled as holotype; this has now been rectified. Baker also synonymised *Megachile albocaudata* Friese, 1903 with *M. terminalis*, this being accepted onto the global bee checklist (Ascher & Pickering 2024). The former species was described from Kalidupa-Buton [= Kaledupa Island] which is just to the south-east of Sulawesi. We have examined the type of *M. albocaudata*, and agree with this synonymy, and we formally synonymise *M. albocaudata* under *M. terminalis* **syn. nov.**

Current status

Megachile (*Callomegachile*) *terminalis* Smith, 1858 (Ascher & Pickering 2024).

Distribution

Indonesia (Sulawesi) (Smith 1858a; Ascher & Pickering 2024).

35. ***Stelis abdominalis*** Smith, 1858
Fig. 36

Stelis abdominalis Smith, 1858a: 7, ♂.

Type material examined

Holotype

INDONESIA • ♂; Mak. [Makassar, Sulawesi]; [2 Sep.–18 Dec. 1856]; OUMNH, ENT-HYME2794.

Type locality

Celebes [= Sulawesi].

Notes

This species was dealt with by Baker (1993) and then more extensively and formally by Baker (1995).

Current status

Euaspis polynesia Vachal, 1903, replacement name for *S. abdominalis* Smith which is a junior secondary homonym of *Thynnus abdominalis* Fabricius, 1793 = *Euaspis abdominalis* (Fabricius) which was described from Ethiopia (Baker 1995).

Distribution

Nepal, Myanmar, Thailand, Laos, Vietnam, China, Taiwan, Malaysia, Singapore, Indonesia, Philippines (Baker 1995).

36. ***Coelioxys fulvifrons*** Smith, 1858
Fig. 37

Coelioxys fulvifrons Smith, 1858a: 7–8, ♂.

Type material examined

Holotype

INDONESIA • ♂; Mak [Makassar, Sulawesi]; [2 Sep.–18 Dec. 1856]; OUMNH, ENT-HYME2795.

Type locality

Celebes [= Sulawesi].

Notes

Baker (1993: 202) wrote the following:

> "A ♂ found in the UMO general collection, ex Saunders' collection, labelled 'Mak.' [blue disc] and *Coelioxys fulvifrons*. Smith' [blue paper], is the hitherto unrecognized HOLOTYPE of this species, and it has now been labelled accordingly. Unfortunately, the metasoma, from segment 2, is lost, but the type is otherwise intact".



Fig. 37. *Coelioxys fulvifrons* Smith, 1858, holotype, ♂ (OUMNH, ENT-HYME2795). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Current status

Coelioxys (*Torridapis*) *fulvifrons* Smith, 1858 (Ascher & Pickering 2024).

Distribution

Indonesia (Sulawesi) (Smith 1858a; Ascher & Pickering 2024).

37. ***Xylocopa nobilis*** Smith, 1858
Fig. 38

Xylocopa nobilis Smith, 1858a: 8, ♀.

Type material examined

Holotype

INDONESIA • ♀; Mak. [Makassar, Sulawesi]; [2 Sep.–18 Dec. 1856]; OUMNH, ENT-HYME2796.

Type locality

Celebes [= Sulawesi].



Fig. 38. *Xylocopa nobilis* Smith, 1858, holotype, ♀ (OUMNH, ENT-HYME2796). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Notes

Baker (1993: 202–203) wrote the following:

> "Three ♀♀ standing as *nobilis* in the UMO type collection were labelled:
> 1. 'Men.' [white disc] and '*Xylocopa nobilis*. Smith' [blue paper].
> 2. 'Mak.' [blue disc] and '*Xylocopa nobilis*. Smith' [white paper].
> 3. 'Celebes' [white disc].
>
> Van der Vecht (1953: 60) states 'Smith's type is a female from Makassar', presumably referring to no. 2. This specimen is in fact to be interpreted as the HOLOTYPE. As to no. 1, this is a Wallace specimen, but Wallace did not visit Menado until 1859, and it could not, therefore, be a syntype: it has now been labelled as of no type status. As to no. 3, this specimen is of uncertain origin. It may be a Wallace specimen [but see under *Euaspis polynesia*, 5.10-9: it appears that all specimens taken by Wallace on his first visit to Celebes were labelled 'Mak.'] or it may be a Pfeiffer specimen that was acquired by Saunders. It has been labelled as of uncertain status.
>
> The holotype is intact and in fair condition. It belongs to a colour form other than that represented by ♀♀ 1 and 3 (*cf. volatilis*, 5.10-6)".

Baker did not state that he labelled the holotype, but in any case it lacked a distinguishing label; this has now been rectified.

Current status

Xylocopa (*Maiella*) *nobilis* Smith, 1858 (Ascher & Pickering 2024).

Distribution

Indonesia (Sulawesi, Sula Islands) (van der Vecht 1953). Ascher & Pickering (2024) list also North Maluku and Maluku; the source of these records is not stated, but may be from works such as Maidl (1912) who cited the species from Ambon Island. Van der Vecht (1953: 59) cautions against any records from east of the Sula islands without confirmation.

38. ***Apis zonata*** Smith, 1858
Fig. 39

Apis zonata Smith, 1858a: 8–9, ♀.

Type material examined

Lectotype

INDONESIA • ♀; Mak. [Makassar, Sulawesi]; [2 Sep.–18 Dec. 1856]; OUMNH, ENT-HYME2797-01 (lectotype indicated by Baker 1993, de facto lectotype by present designation).

Paralectotype

INDONESIA • 1 ♀; Celebes [Sulawesi]; [2 Sep.–18 Dec. 1856]; OUMNH, ENT-HYME2797-02.

Type locality

Celebes [= Sulawesi], Philippine Islands. Fixed as Sulawesi based on current lectotype designation.

Notes

Baker (1993: 203) wrote the following:

"Four ♀♀ standing as *zonata* in the UMO type collection were labelled:-

1. 'Celebes' [white rectangular label, not regular Wallace label] and *'Apis zonata* Smith' [white rectangular label].
2. 'Mak.' [white disc] and *'Apis zonata* Smith' [white rectangular label].
3. Two specimens, 'Celebes Pfeiffer'.

Smith's *zonata* was composite, comprising two allopatric insular forms, *binghami* Cockerell, 1906, from Celebes, and *breviligula* Maa, 1953, from the Philippines, both members of the *dorsata*-complex (*dorsata* F., 1793).

While Smith's catalogues of the Hymenoptera collected by Wallace in the Malay Archipelago were based primarily on the material in W.W, Saunders' collection, he would no doubt have taken into account other material obtained by other collectors. In considering possible syntypic series, it is therefore difficult to exclude specimens unless it can be shown that they could not have been available at the date of description or that thay [sic] could not have come from the type locality. In the present instance, the Pfeiffer specimens could have been in Saunders' collection before Smith's manuscript was prepared (the British Museum had purchased Pfeiffer specimens from Menado in 1855), or they could have been later additions determined, but not labelled, by Smith when later he arranged Saunders' collection: owing to the uncertainty, the specimens have been



Fig. 39. *Apis zonata* Smith, 1858, lectotype, ♀ (OUMNH, ENT-HYME2797-01). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

> labelled simply as possible syntypes. The 'Celebes' specimen (1) is also of uncertain date and locality, but is accepted as a syntype because, although the data label is not a regular Wallace label, Smith's determination label came (from fragments of writing on the reverse) from the same piece of paper as that on specimen (2). Specimen (2) is now designated as the LECTOTYPE of *zonata*, since it unequivocally comes from the same locality as the other taxa described in the paper. The type has lost L tarsus I; it was in fresh condition when collected, but has been wetted".

The name *A. binghami* is due to the fact that *A. zonata* Smith is a junior primary homonym of *Apis zonata* Linnaeus, 1758, a species now placed in the genus *Amegilla* Friese, 1897 (Baker 1996). Cockerell (1906: 166) provided the replacement name noting that Smith's name was a junior primary homonym of *Apis zonata* Gravenhorst, 1807, not noting the even earlier use by Linnaeus.

The taxonomic status of *A. binghami* continues to be controversial. Kitnya *et al*. (2024) provided a summary, covering the extreme ends of the treatments of the *dorsata*-group from four species (Maa 1953) to one species (Alexander 1991; Engel 1999). A new consensus appears to be emerging to treat *A. binghami* as a distinct species (Kitnya *et al*. 2024), but despite the extensive work on the genus *Apis*, no-one (except for Baker) actually seems to have examined Smith's type; we hereby designate the specimen indicated by Baker as the lectotype to fix the terra typica as Sulawesi. The specimen was not labelled by Baker, so we hereby label it as such.

Current status

Apis binghami Cockerell, 1906.

Distribution

Sulawesi and nearby islands (as *A. b. binghami*) and the Philippines (as *A. b. breviligula*) (Kitnya *et al*. 2024).

Species described by Smith (1859) from the Kai and Aru islands

39. ***Prosopis malachisis*** Smith, 1859
Fig. 40

Prosopis malachisis Smith, 1859: 132, ♀.

Type material examined

Holotype

INDONESIA • ♀; Ké [Kai]; [1–6 Jan. 1857]; OUMNH, ENT-HYME2798.

Type locality

Key Island [= Kai].

Notes

Baker (1993: 204) wrote the following:

> "A ♀ in the UMO type collection, labelled 'Ke' [white disc] and '*Prosopis malachisis* Smith' is the HOLOTYPE of this species and it has now been labelled accordingly. The type lacks leg L I and the apical tarsal segments of legs R I and R II.
>
> Hirashima (1978: 112) redescribed the ♀ from a specimen from Key in the University of Kansas [he apparently did not see the UMO specimen, and gave (p. 114) 'Type depository: British



Fig. 40. *Prosopis malachisis* Smith, 1859, holotype, ♀ (OUMNH, ENT-HYME2798). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

> Museum (Natural History), London'] and described the supposed ♀ from a specimen from Amboina in the Smithsonian Institution".

The specimen indicated by Baker was not labelled as holotype; this has now been rectified. Hirashima's comment is surprising, because he visited the OUMNH collection in 1967 (Hirashima 1980: 114).

Current status

Palaeorhiza (*Palaeorhiza*) *malachisis* Smith, 1859 (Hirashima 1978).

Distribution

Indonesia (Maluku: Kai, Ambon) (Smith 1859; Michener 1965; Hirashima 1978).

40. ***Nomia cincta*** Smith, 1859
Fig. 41

Nomia cincta Smith, 1859: 132–133, ♀.

Type material examined

Lectotype

INDONESIA • ♀; Ké [Kai]; [1–6 Jan. 1857]; OUMNH, ENT-HYME2799 (lectotype indicated by Baker 1993, de facto lectotype by present designation).

Paralectotype

INDONESIA • 1 ♀; Ké [Kai]; [1–6 Jan. 1857]; NHMUK.

Other material examined

INDONESIA • 1 ♀; Asia Arch., Key Ins. [Kai]; 1900; H. Kühn leg.; H. Friese det.; NHMW • 1 ♀; Ins. Aru; [undated, but pre-1916 due to Ritsema handwriting]; Rosenbey leg.; T.J. Wood det.; RMNH, RMNH.INS.1714061 • 1 ♂, 1 ♀; Key Ins. [Kai]; H. Kühn leg.; T.J. Wood det.; RMNH, RMNH.INS.1714043.

Type locality

Key Island [= Kai].

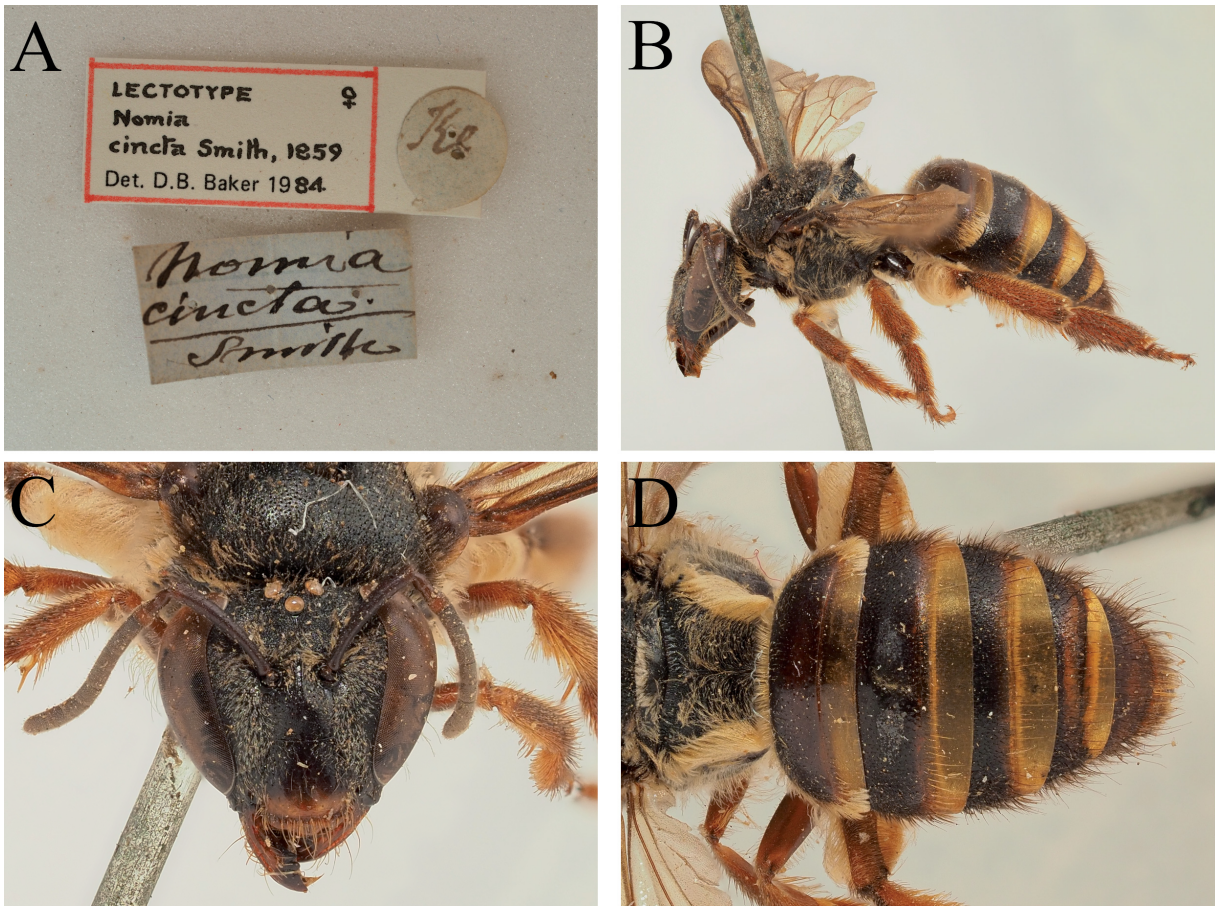

Fig. 41. *Nomia cincta* Smith, 1859, lectotype, ♀ (OUMNH, ENT-HYME2799). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Notes

Baker (1993: 204–205) wrote the following:

> "Three ♀♀ standing as *cincta* in the UMO type collection are labelled:-
> a) Ké [white disc] and '*Nomia cincta*. Smith' [blue paper].
> b) 'Bac.' [white disc] and '*Nomia cincta*. Smith'.
> c) 'Aru' [blue disc].
>
> Two ♀♀ standing as *cincta* in NHM are labelled:-
> d) 'Ké [white disc, similar to that of (a)] and '*cincta*. Sm. Key Isl.' [blue paper].
> e) 'Key I.' [blue disc], '*Nomia cincta*. Smith', and 'Smith coll. pres. By Mrs. Farren White. 99-303' [B.M. printed label]. This is B.M. Type Hym. 17 a 2839: False type.
>
> The Batchian and Aru specimens, (b) and (c), cannot be regarded as syntypes and have been labelled as of no type status. They represent two very distinct species, neither of which is conspecific with the Ke females. As to the three Ke females, (a) and (d) may be regarded as syntypes, (e) less certainly so: the data label is in a different script and otherwise different from Wallace's usual label for Ke insects, and Smith's determination label is in a style different from those of specimens (a) and (d) [similar to the labels of, e.g., specimens (e)-(g) of *Nomia dentata* Smith, also from Smith's personal collection]. Notwithstanding the B.M. labelling of specimen (e), specimen (a) is now designated as LECTOTYPE of *cincta* (Smith was expressly describing material in W.W. Saunders' collection) and it has been labelled accordingly. It is in good condition and intact but for the loss of the last two segments of tarsus R III. The syntype (d), no doubt a duplicate retained by Smith, has been labelled as a paralectotype: it is in bad condition, much broken and the metasoma lost, and it is not certain that it is conspecific with the lectotype. The NHM false type has been labelled as a possible syntype; it is conspecific with the lectotype".

Pauly (2009: 206) indicated that material was in the NHMUK based on Baker (1993), but this is more like to actually refer to Michener (1965: 161) who gave this institution as the type repository. Given the mixed nature of the material, we formally designate the specimen indicated by Baker as the lectotype to decisively fix the name on Kai Island based on the OUMNH specimen. NHMUK specimen (d) can be considered as a paralectotype.

Current status

Mellitidia cincta (Smith, 1859) (Michener 1965; Pauly 2009).

Distribution

Indonesia (Maluku: Kai, Aru) (Smith 1859).

41. ***Nomia longicornis*** Smith, 1859
Fig. 42

Nomia longicornis Smith, 1859: 133, ♂.

Type material examined

Holotype

INDONESIA • ♂; Aru; [8 Jan.–2 Jul. 1857]; OUMNH, ENT-HYME2800.

Type locality

Aru.

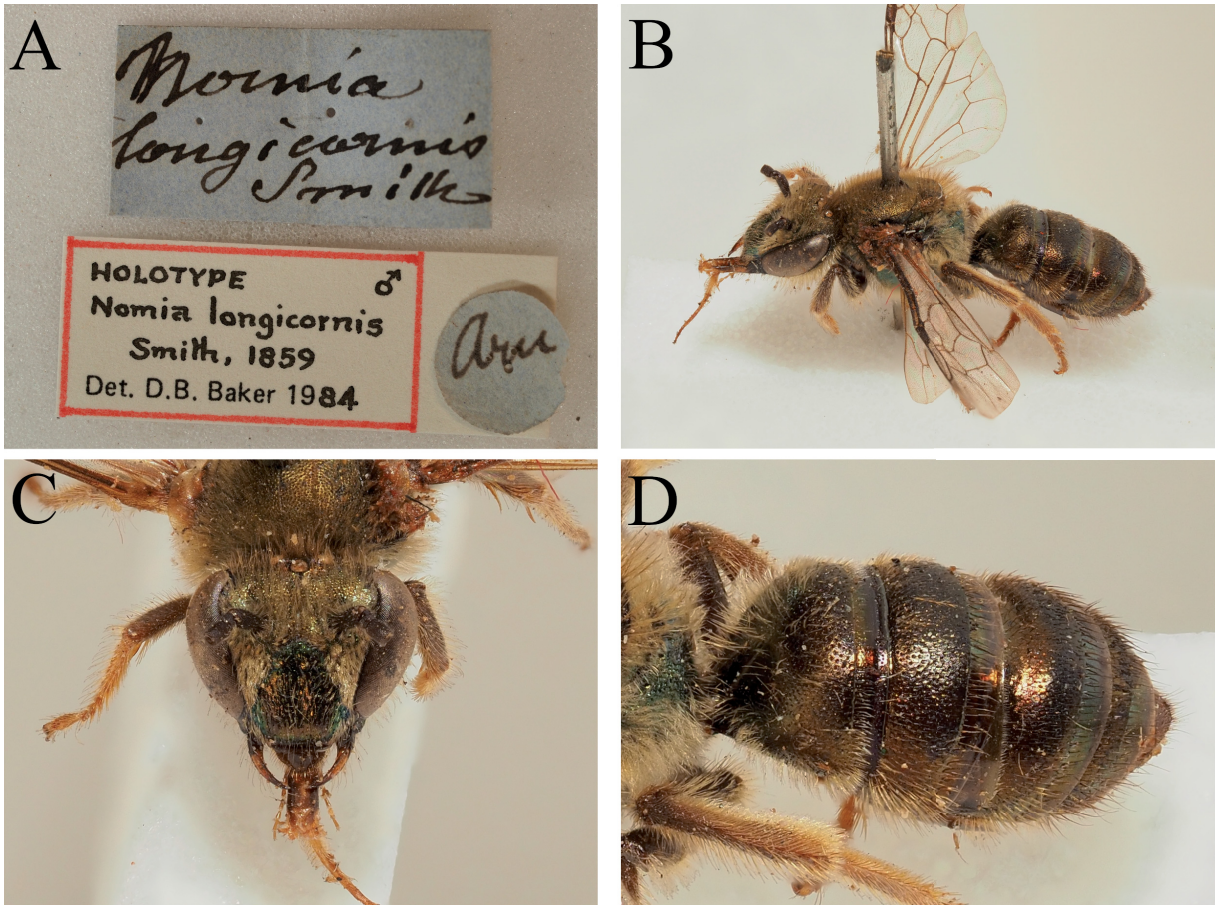

Fig. 42. *Nomia longicornis* Smith, 1859, holotype, ♂ (OUMNH, ENT-HYME2800). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Notes

Baker (1993: 205) wrote the following:

> "A ♂ in the UMO type collection, labelled 'Aru' [blue disc] and *'Nomia longicornis* Smith' [blue paper], is the HOLOTYPE of this species and it has now been labelled accordingly. It lacks all but the three basal segments of each antenna, and the apical segments of tarsus L I, but is otherwise in good condition.
>
> *N. cincta* [modern author's note: it is clear that Baker meant to write *N. longicornis* here] was provisionally assigned by Michener (1965: 161) to *Nomia* (*Mellitidia*) but this placement requires confirmation: the species differs appreciably, in its general habitus and in structural and sculptural characters from such species as *cincta* Smith and *dentata* Smith. The type is quite strongly, not slightly, *pace* Michener *l.c.*, metallic and in the fore-wing cell submarginal 3 ≈ 1: in other species examined 3 is conspicuously longer than 1 (≈ 1 + 2), belying the statement in Michener's key to subfamilies (p. 152) of the Halictidae".

We can only state that this group of species requires a modern revision; *Nomia longicornis* is included in the key of Hirashima (1967) who did not examine the type or deal with the taxon in any detail.

Current status

Mellitidia longicornis (Smith, 1859) (Michener 1965; Hirashima 1967; Pauly 2009).

Distribution

Indonesia (Maluku: Aru) (Smith 1859; Ascher & Pickering 2024).

42. ***Nomia dentata*** Smith, 1859
Fig. 43

Nomia dentata Smith, 1859: 133, ♀♂.

Type material examined

Lectotype

INDONESIA • ♀; Aru; [8 Jan.–2 Jul. 1857]; OUMNH, ENT-HYME2801-01 (lectotype indicated by Baker 1993, de facto lectotype designated by Pauly 2009)

Paralectotypes

INDONESIA • 1 ♂; Aru; [8 Jan.–2 Jul. 1857]; OUMNH, ENT-HYME2801-02 • 1 ♂, 1 ♀; Aru; [8 Jan.–2 Jul. 1857]; NHMUK.

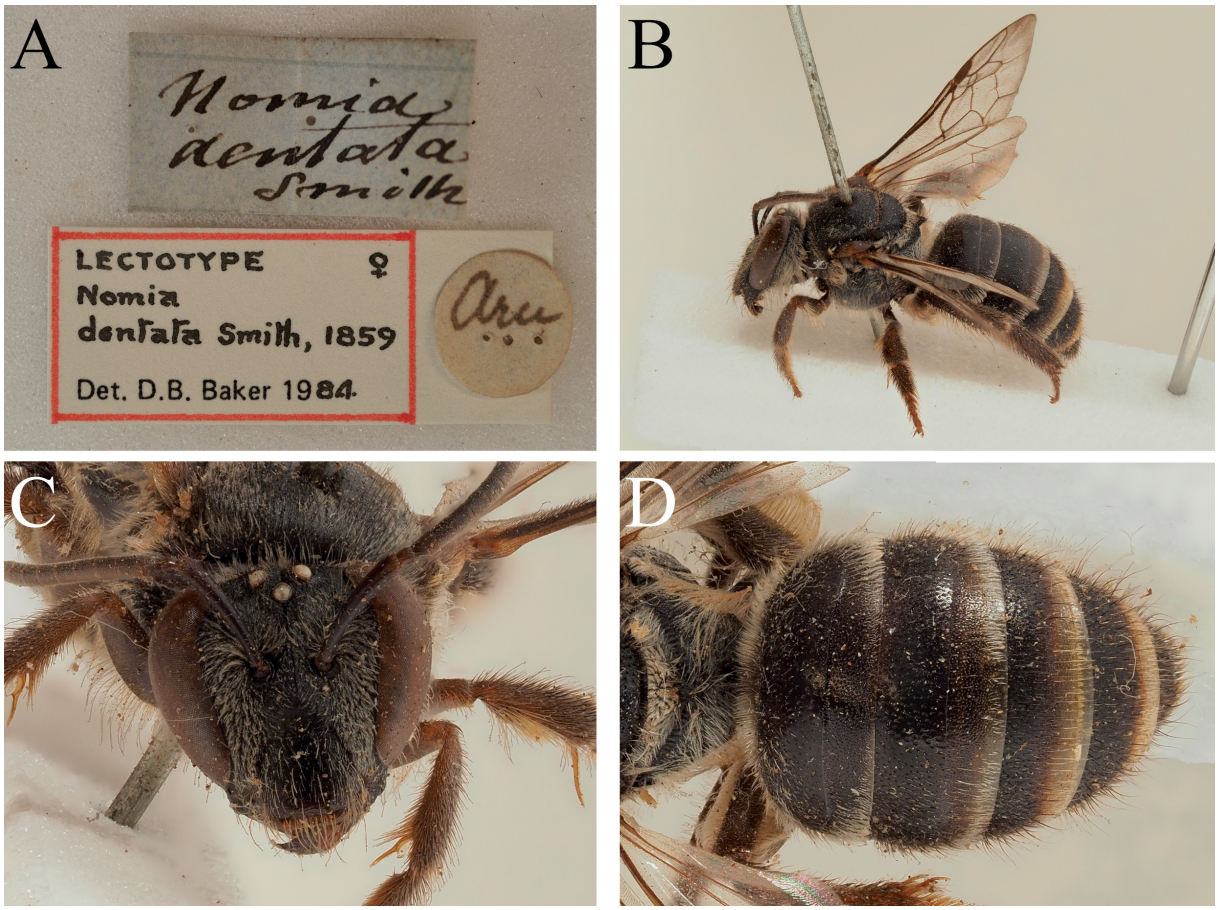

Fig. 43. *Nomia dentata* Smith, 1859, lectotype, ♀ (OUMNH, ENT-HYME2801-01). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Type locality

Aru.

Notes

Baker (1993: 205–206) wrote the following:

> "Four specimens standing as *dentata* in the UMO type collection are labelled:-
> a) ♀, 'Aru' [white disc] and '*Nomia dentata* Smith' [blue paper].
> b) ♂, 'Aru' [white disc] and '*Nomia dentata* Smith' [blue paper].
> c) ♀, 'M.' [white disc: Mysol] and '*Nomia dentata* Smith.' [blue paper].
> d) ♂, 'Wag.' [white disc: Waigiou] and '*Nomia dentata*. Smith' [blue paper].
>
> Five specimens standing as *dentata* in NHM are labelled:-
> e) ♀, 'Dory' [white disc] } all also '*Nomia dentata* Smith'
> f) ♀, 'New Guinea' [white disc] } and 'Smith coll. pres. by Mrs.
> g) ♀, 'Mysol' [white disc] } Farren White. 99-303.'
> h) ♀, 'Aru' [repeated on both sides of white disc], 'Nomia dentata Sm. Type det. Michener 1960', and 'This should have been designated as Lectotype in Michener: 1965 and labelled as such. It is not unique. det. C.R. Vardy, 1969'. This is B.M. Type Hym. 17 a 2836: false type.
> j) ♂, 'Aru, ♂'' [white disc] and *'dentata*. ♂. Aru.' [blue paper].
>
> The Mysol, Waigiou, Dory and New Guinea: specimens, (c) to (g), cannot be regarded as syntypes and have been labelled as of no type status: quite apart from the fact that they are not from the type locality for *dentata*, Allen did not collect on Mysol until mid-1860, Wallace in Waigiou until July 1860, or Allen in New Guinea (at Sorong) until early 1861. The Mysol ♀ (g) is probably *dentata*; the Mysol ♀ (c) and the New Guinea and Dory ♀♀, (f) and (e), are probably not *dentata*: these three specimens are in poor condition, The Waigiou ♂ (d), which is headless, is probably not *dentata* and is not conspecific with either of the Aru ♂♂, (b) and (j); it is possibly to be associated with the New Guinea and Dory ♀♀.
>
> As to the four Aru specimens, (a), (b) and (h), which have typical Wallace labels, and doubtfully (j), which has a larger label in a slightly different script, these may all be accepted as syntypes of *dentata*. The two ♀♀, (a) and (h), are apparently conspecific. Notwithstanding Michener's labelling of specimen (h) as 'Type' (presumably 'lectotype' was intended, but, in any event, as Vardy noted, this labelling was not confirmed by publication), specimen (a) is now designated as the LECTOTYPE of *dentata* (since Smith was expressly describing material in W.W. Saunders' collection) and it has been labelled accordingly. It is in good condition but lacks the last two segments of tarsus R II and the distitarsus of R III.
>
> The NHM ♀, (h), has been labelled as a paralectotype. It is in poor condition. The two ♂♂, (b) and (j), represent two clearly distinct species. On the bases of structural and sculptural correspondences, the NHM ♂ (j) would appear to be the ♂ of *dentata*. Notwithstanding the reservation expressed above concerning the syntype status os [author note: sic] specimen (j), both (b) and (j) have been labelled as syntypes of *dentata*, (b) of course with the qualification that it is not conspecific with the putative ♂ of that species. The actual identity of specimen (b), and the identities of specimens (c) to (f), are irrelevant to present purposes; further, any revision of *Mellitidia* would demand the availability of substantially more material than is immediately available".

Pauly (2009: 206) noted Baker's lectotype, and therefore acted as the first publisher of this designation.

Current status

Mellitidia australis (Guérin-Méneville, 1831) (Wood & Bossert 2025).

Distribution

Indonesia (Maluku: Aru, Southwest Papua, West Papua, Papua) (Smith 1859; Ascher & Pickering 2024; Wood & Bossert 2025).

43. ***Megachile lateritia*** Smith, 1859
Fig. 44

Megachile lateritia Smith, 1859: 134, ♀.

Type material examined

Holotype

INDONESIA • ♀; Aru; [8 Jan.–2 Jul. 1857]; OUMNH, ENT-HYME2802.

Type locality

Aru.



Fig. 44. *Megachile lateritia* Smith, 1859, holotype, ♀ (OUMNH, ENT-HYME2802). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Notes

Baker (1993: 206) wrote the following:

> "A ♀ labelled 'Aru' [white disc, Wallace] and '*Megachile lateritia* Smith', from W.W. Saunders' collection, standing as *lateritia* in the UMO type collection, is the HOLOTYPE of this species and it has now been labelled accordingly. A second ♀, labelled 'Aru Islands' and '*lateritius* [sic] Sm.'. in NHM, is not regarded as a syntype since its labelling departs materially from that customary for Wallace/Saunders specimens. It has been labelled as of no type status".

Current status

Megachile (*Callomegachile*) *lateritia* Smith, 1859 (Ascher & Pickering 2024).

Distribution

Indonesia (Maluku: Aru) (Smith 1859; Ascher & Pickering 2024).

44. ***Megachile scabrosa*** Smith, 1859
Fig. 45

Megachile scabrosa Smith, 1859: 134, ♀.

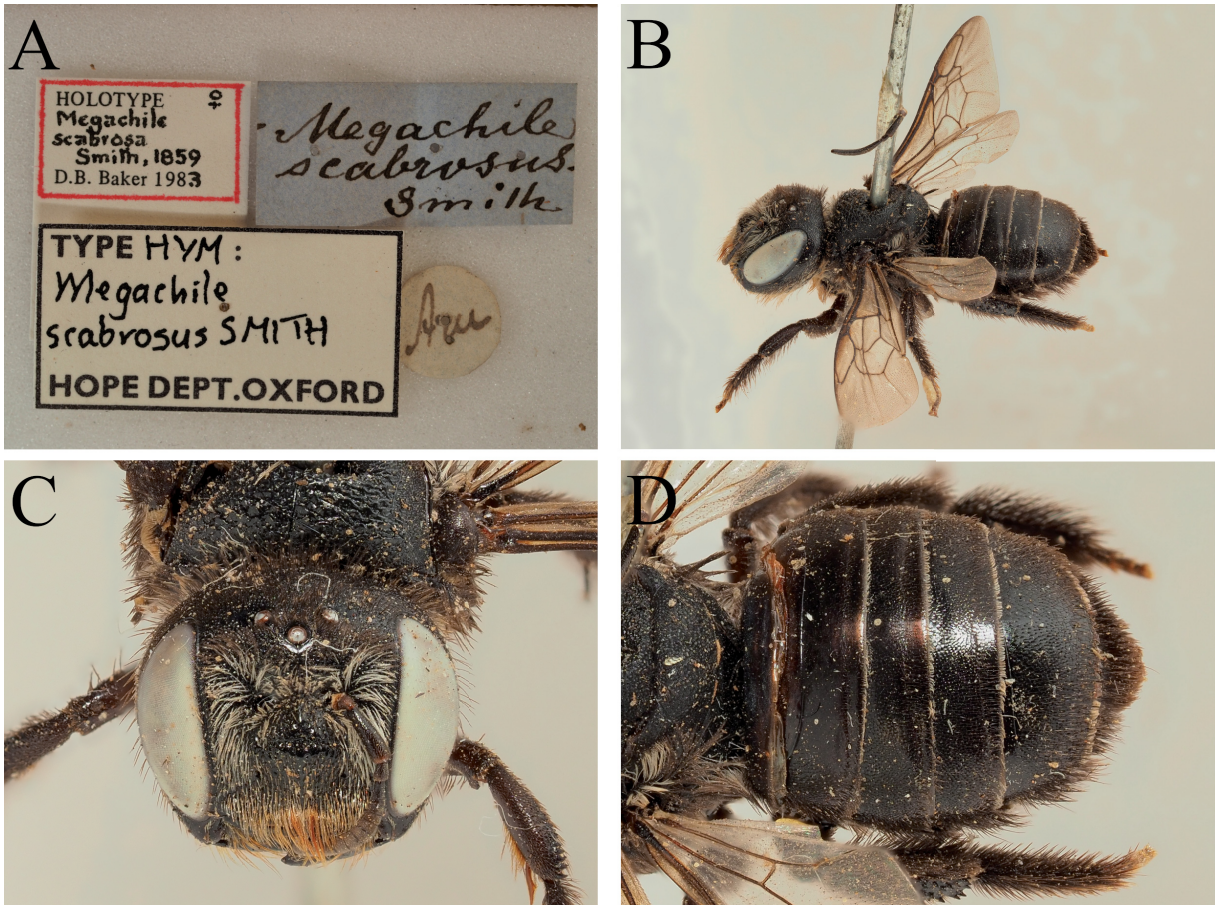

Fig. 45. *Megachile scabrosa* Smith, 1859, holotype, ♀ (OUMNH, ENT-HYME2803). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Type material examined

Holotype

INDONESIA • ♀; Aru; [8 Jan.–2 Jul. 1857]; OUMNH, ENT-HYME2803.

Type locality

Aru.

Notes

Baker (1993: 206) wrote the following:

> "A ♀ in the UMO type collection, labelled 'Aru' [white disc] and '*Megachile scabrosus*. Smith' [blue paper, Smith], is the HOLOTYPE of this species and it has now been labelled accordingly. The type has apparently been extensively broken, and excess of glue obscures much of the ventral surface of the mesosoma; the right antenna is glued to the pin; and tarsi L II and R II alone are intact. A second ♀ in the same collection, labelled 'B' (Bouru] and '*Megachile scabrosus*. [rule] Smith.' [both on blue paper], no doubt the basis of Smith's record from Bouru, has no type status and has been labelled accordingly".

Current status

Lithurgus scabrosus (Smith, 1859) (Michener 2007; Ascher & Pickering 2024).

Distribution

Bangladesh through Southeast Asia to Polynesia (Ascher & Pickering 2024); present also on Hawaii, but unclear how or when it was introduced (Snelling 2003).

45. ***Megachile insularis*** Smith, 1859
Fig. 46

Megachile insularis Smith, 1859: 134, ♀.

Type material examined

Holotype

INDONESIA • ♀; Aru; [8 Jan.–2 Jul. 1857]; OUMNH, ENT-HYME2804.

Type locality

Aru.

Notes

Baker (1993: 207) wrote the following:

> "A ♀ in the UMO type collection, labelled 'Aru' [white disc] and '*Megachile insularis* Smith' [blue paper, Smith], is the HOLOTYPE of this species and it has now been labelled accordingly. [Aru, most probably at Wanumbai (central Kobroör), March-May 1857 (Wallace).]".

Current status

Megachile (*Aethomegachile*) *insularis* Smith, 1859 (Ascher & Pickering 2024).

Distribution

Indonesia (Maluku: Aru) (Smith 1859; Ascher & Pickering 2024).



Fig. 46. *Megachile insularis* Smith, 1859, holotype, ♀ (OUMNH, ENT-HYME2804). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

46. ***Allodape nitida*** Smith, 1859
Fig. 47

Allodape nitida Smith, 1859: 134–135, ♀.

Type material examined

Holotype

INDONESIA • ♀; Aru; [8 Jan.–2 Jul. 1857]; OUMNH, ENT-HYME2805.

Type locality

Aru.

Notes

Baker (1993: 207) identified this specimen as the holotype and stated that he labelled it, but we found no type label; this has now been rectified.

Current status

Braunsapis nitida (Smith, 1859) (Reyes 1993).

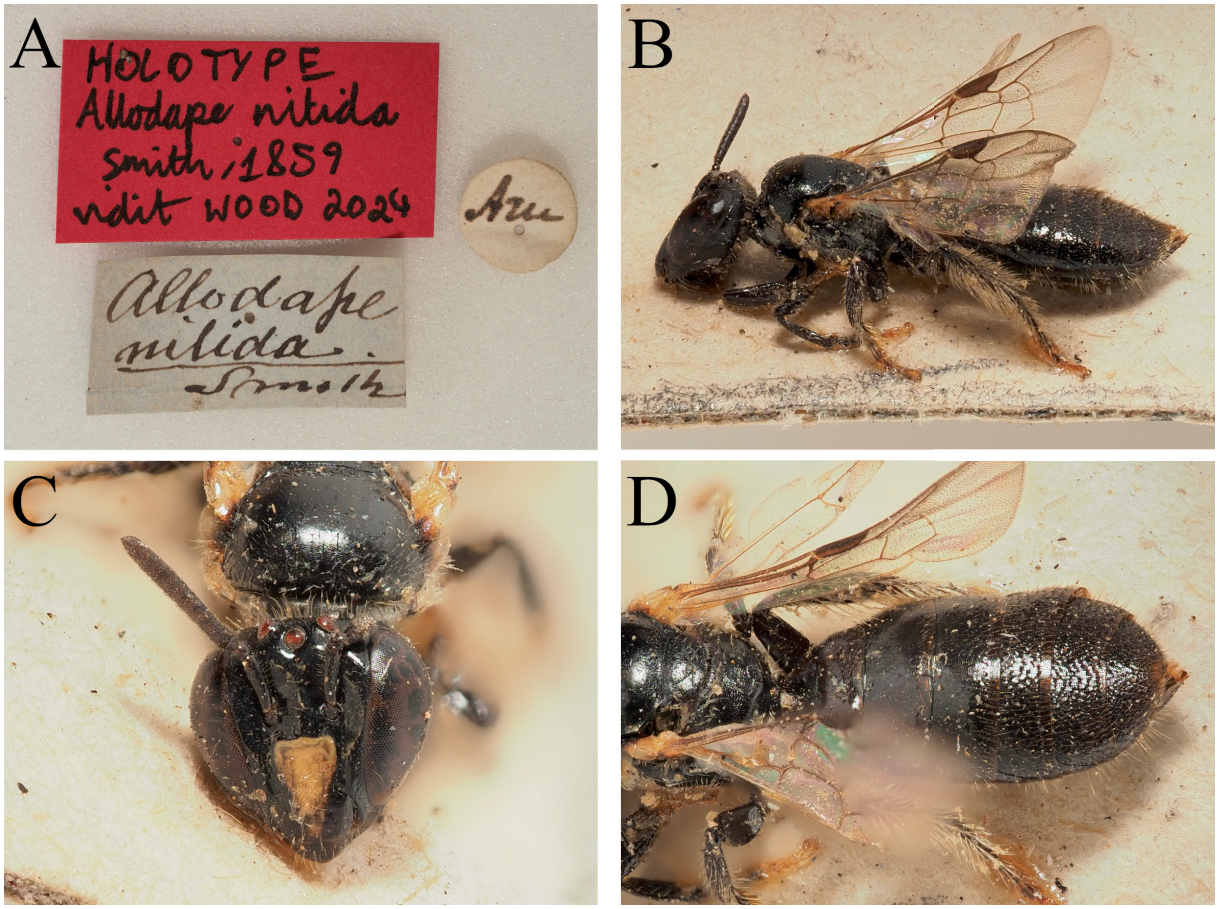

Fig. 47. *Allodape nitida* Smith, 1859, holotype, ♀ (OUMNH, ENT-HYME2805). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Distribution

Indonesia (Maluku: Aru), Papua New Guinea, Australia (Reyes 1993).

47. ***Anthophora elegans*** Smith, 1859
Fig. 48

Anthophora elegans Smith, 1859: 135, ♀.

Type material examined

Lectotype

INDONESIA • ♀; Ké [Kai]; [1–6 Jan. 1857]; OUMNH, ENT-HYME2806-01 (lectotype indicated by Baker 1993, de facto lectotype by present designation).

Paralectotype

INDONESIA • 1 ♀; Key I. [Kai]; [1–6 Jan. 1857]; OUMNH, ENT-HYME2806-02.

Type locality

Key Island [= Kai].

Notes

Baker (1993: 208) wrote the following:

> "Two ♀♀ in the UMO type collection are labelled:-
>
> a) 'Ké' [white disc], *'Anthophora elegans*. Smith' [blue paper, Smith], and *'elegans* Sm. HOLOTYPE Det. M.A. Lieftinck 1955'. In poor condition: has been wetted. The head, and legs R I and R III, have at some time been broken off and crudely re-attached; leg L it is missing from the trochanter, R II from the basitarsus.
> b) 'Key I.' [blue disc], *'Anthoph elegans*, Smith' [blue paper, Smith], and *'elegans* Sm. HOLOPARATYPE [sic: what this term is supposed to mean I do not pretend to know] Det. M.A. Lieftinck 1955'. In similar condition to (a), but intact.
>
> [A third ♀, labelled 'Cer.' [white disc], *'Anthidium* [!] *elegans* [rule] Smith' [blue paper], and 'nec *elegans* Sm. Det. M.A. Lieftinck 1955', evidently the basis of Smith's 1863 record from Ceram, is not conspecific (clypeus not carinate, facial markings more extensive, tergal fasciae narrower).]
>
> A ♀ and a ♂ in NHM are labelled 'Ké /$^{5}_{1}{}^{8}_{24}$' [recte, 1858.23: see notes on B.M. Wallace/Stevens accessions), the ♀ also *'Anthophora elegans* [rule] Smith'. Another ♀, labelled 'Amb' [white disc] and *'Amegilla elegans* Sm, ssp. *alfura* Lieft. dt. M.A. Lieftinck '60', is evidently the basis of Smith's 1860 record from Amboyna. [The name *alfura* was never published.]



Fig. 48. *Anthophora elegans* Smith, 1859, lectotype, ♀ (OUMNH, ENT-HYME2806-01). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

> The two ♀♀ in UMO and the NHM ♀ labelled 'Ké' are accepted as syntypes of *elegans*; the ♂ in NHM labelled 'Ké' may also be a syntype (the sexes of *elegans* are superficially very similar and Smith may have overlooked the presence of a ♂ in Wallace's series) but is probably best excluded from treatment as a paralectotype: it has accordingly been labelled as of no type status. [This specimen, which bears Lieftinck's label *'Amegilla e. elegans* F. Sm. dt. M.A. Lieftinck '60' had been crudely dissected and the uncleared concealed sterna and genitalia placed in a gelatine capsule; the metasoma had been broken off and crudely reattached to the propodeum. Details are now figured: Fig. 23a.]
>
> The UMO ♀ (b), 'Key I.', is now designated as LECTOTYPE, owing to its better condition, and has been labelled accordingly; the other two ♀♀ have been labelled as paralectotypes. Lieftinck's labelling of (a) as holotype was neither correct nor validated by publication".

As Baker's own lectotype designation was also never validated by publication, and so we hereby designate the specimen he selected as the lectotype. This group of species (subgenus *Zonamegilla* Popov, 1950) has never been properly revised in Southeast Asia, and hence the range of *A. elegans* is subject to change following revisionary taxonomy (e.g., clarifying Lieftinck's unpublished concepts).

Current status

Amegilla (*Zonamegilla*) *elegans* (Smith, 1859) (Brooks 1988).

Distribution

Indonesia (Maluku: Kai and Ambon islands) (Smith 1859, 1860b; Ascher & Pickering 2024).

Species described by Smith (1860a) from Sulawesi

48. ***Halictus fraternus*** Smith, 1860

Halictus fraternus Smith, 1860a: 91, ♀.

Type material examined

None.

Type locality

Makassar [south-west Sulawesi].

Notes

Baker (1993: 209) wrote the following:

> "Type material lost or misplaced: there is no specimen now standing above the label '*fraternus* Sm.' in the UMO type collection or above the original drawer-label in Saunders' collection. [Possibly represented by the metasoma now attached to *Nomia modesta* Smith, 1862, q.v., 5.15-2.] *H. fraternus* was redescribed by Blüthgen (1926: 480) from supposedly conspecific material from Sandakan and referred to the group 'Halicti nomioidiformes', later (1931: 291) treated as a subgenus of *Halictus* under the name *Indohalictus*. *Indohalictus* was synonymized by Michener (1965: 178) with *Homalictus*".

Blüthgen (1926: 480–482) did indeed consider the type material of *Halictus fraternus* to be lost, and redescribed the species. Revision is required, as Pauly (1980) did not include this species in his revision of Indonesian *Homalictus* Cockerell, 1919 (treated as a genus), but he later considered it part of this

genus without giving a detailed treatment (Pauly 1986). A new revision would offer the opportunity to designate a neotype to cement the concept of this species.

Current status

Lasioglossum (*Homalictus*) *fraternum* (Smith, 1860) (Ascher & Pickering 2024).

Distribution

Malaysia (Borneo), Indonesia (Sulawesi), Philippines (Palawan) (Blüthgen 1926; Pauly 1986; Ascher & Pickering 2024).

49. ***Nomia concinna*** Smith, 1860
Fig. 49

Nomia concinna Smith, 1860a: 91, ♀♂.

Type material examined

Lectotype

INDONESIA • ♂; Mak. [Makassar, Sulawesi]; [11 Jul.–19 Nov. 1857]; OUMNH, ENT-HYME2807-01 (lectotype indicated by Baker 1993, de facto lectotype designated by Pauly 2009).

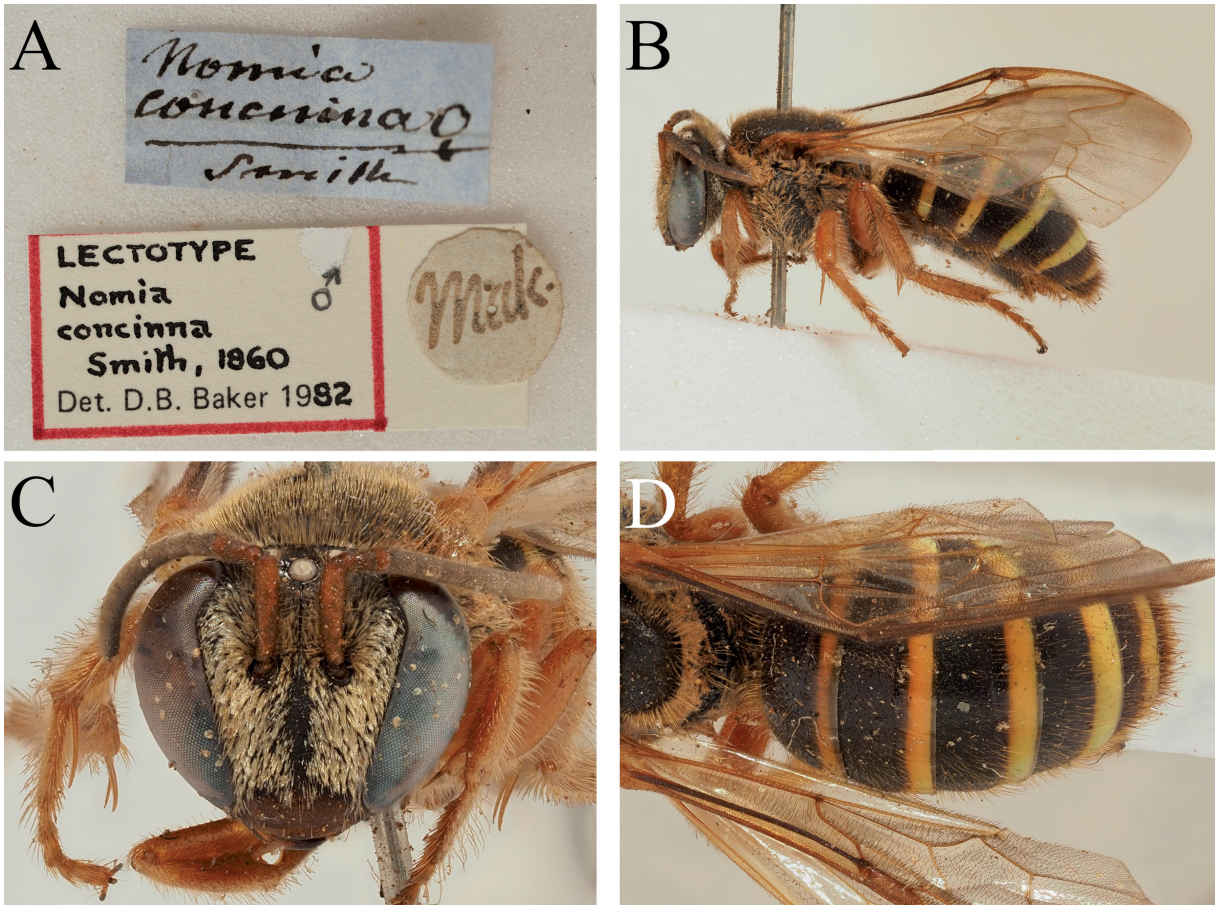

Fig. 49. *Nomia concinna* Smith, 1860, lectotype, ♂ (OUMNH, ENT-HYME2807-01). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Type locality

Makassar [south-west Sulawesi].

Notes

Baker (1993: 209) wrote the following:

> "Three specimens standing as *concinna* in the UMO type collection comprise:-
>
> a) ♂ labelled 'Mak' [white disc] and '*Nomia concinna* ♀ [sic] Smith' [blue paper]: this is a ♂ *Curvinomia*,
> b) ♂ labelled 'Mak' and '*Nomia concinna* ♂ Smith' [blue paper]: this is a ♂ *Lipotriches*.
> c) ♀ labelled 'Cer' [white disc] and '*Nomia concinna* Smith' [blue paper]: this is a ♀ *Curvinomia*.
>
> The Ceram ♀ is excluded by its locality and date (Wallace's first visit to Ceram was in late 1859) and has been labelled as of no type status; its actual identity is irrelevant to present purposes, but it appears not to be conspecific with the Makassar ♂ *Curvinomia*. The latter specimen, i.e., Smith's supposed ♀ and the principal basis of his description, is now designated as LECTOTYPE of *concinna*. The species has been taken recently, but not commonly, by Project Wallace members in N.E. Celebes [NHM; RNH, Leiden]. The identity of the *Lipotriches* ♂ syntype will be dealt with elsewhere".

Pauly (2009: 162) noted Baker's lectotype, and therefore acted as the first publisher of this designation.

Current status

Maculonomia concinna (Smith, 1860) (Pauly 2009).

Distribution

Indonesia (Sulawesi) (Pauly 2009).

50. ***Coelioxys intrudens*** Smith, 1860

Coelioxys intrudens Smith, 1860a: 92, ♀.

Type material examined

None.

Type locality

Makassar [south-west Sulawesi].

Notes

No material of this species could be found in the OUMNH type collection, and Baker (1993) did not deal with this species. The situation is perplexing, because by describing *C. intrudens* here, Smith preoccupied his slightly later use of this name in Smith (1860b), see Section 55.

Current status

Coelioxys intrudens Smith, 1860. It is not currently clear how to interpret this name without available type material; a revision of Sulawesi *Coelioxys* species may allow its application to be inferred through careful reading of the description and application to species concepts for taxa present on this island.

Distribution

Sulawesi (Smith 1860a).

51. ***Ceratina pictifrons*** Smith, 1860
Fig. 50

Ceratina pictifrons Smith, 1860a: 92, ♀.

Type material examined

Holotype

INDONESIA • ♀; Mak. [Makassar, Sulawesi]; [11 Jul.–19 Nov. 1857]; OUMNH, ENT-HYME2808.

Type locality

Makassar [south-west Sulawesi].

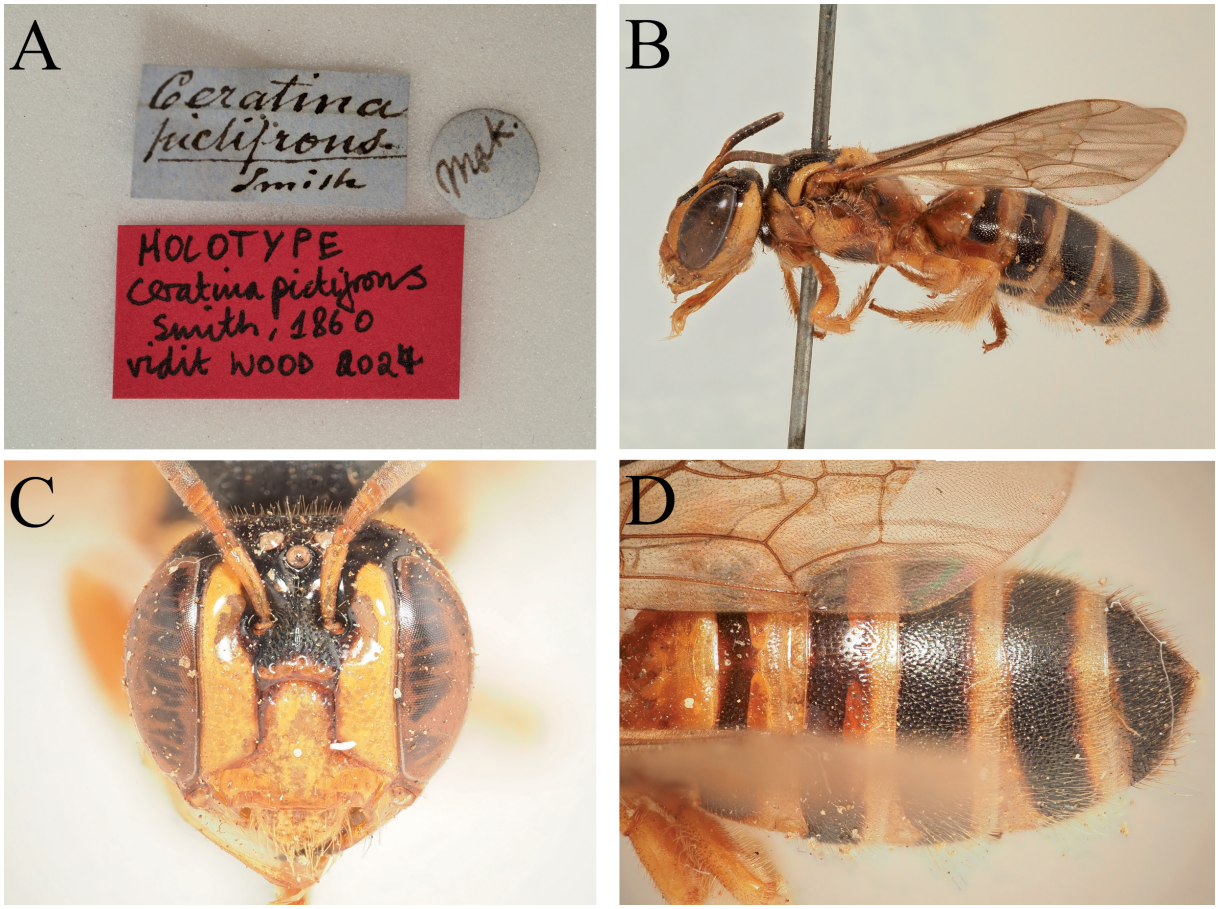

Fig. 50. *Ceratina pictifrons* Smith, 1860, holotype, ♀ (OUMNH, ENT-HYME2808s). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Notes

Baker (1993: 209) wrote the following:

> "A ♀ in the UMO type collection, labelled 'Mak.' [blue disc] and '*Ceratina pictifrons*. Smith' [blue paper, Smith] is the HOLOTYPE of this species and it has now been labelled accordingly. The type is intact and in good condition".

The specimen indicated by Baker was not labelled as the holotype; this has now been rectified. Van der Vecht (1952: 37) gave the publication year as 1861.

Current status

Ceratina (*Lioceratina*) *pictifrons* Smith, 1860 (van der Vecht 1952).

Distribution

Indonesia (Sulawesi) (van der Vecht 1952; Ascher & Pickering 2024).

52. ***Anthophora vigilans*** Smith, 1860
Fig. 51

Anthophora vigilans Smith, 1860a: 92–93, ♀.

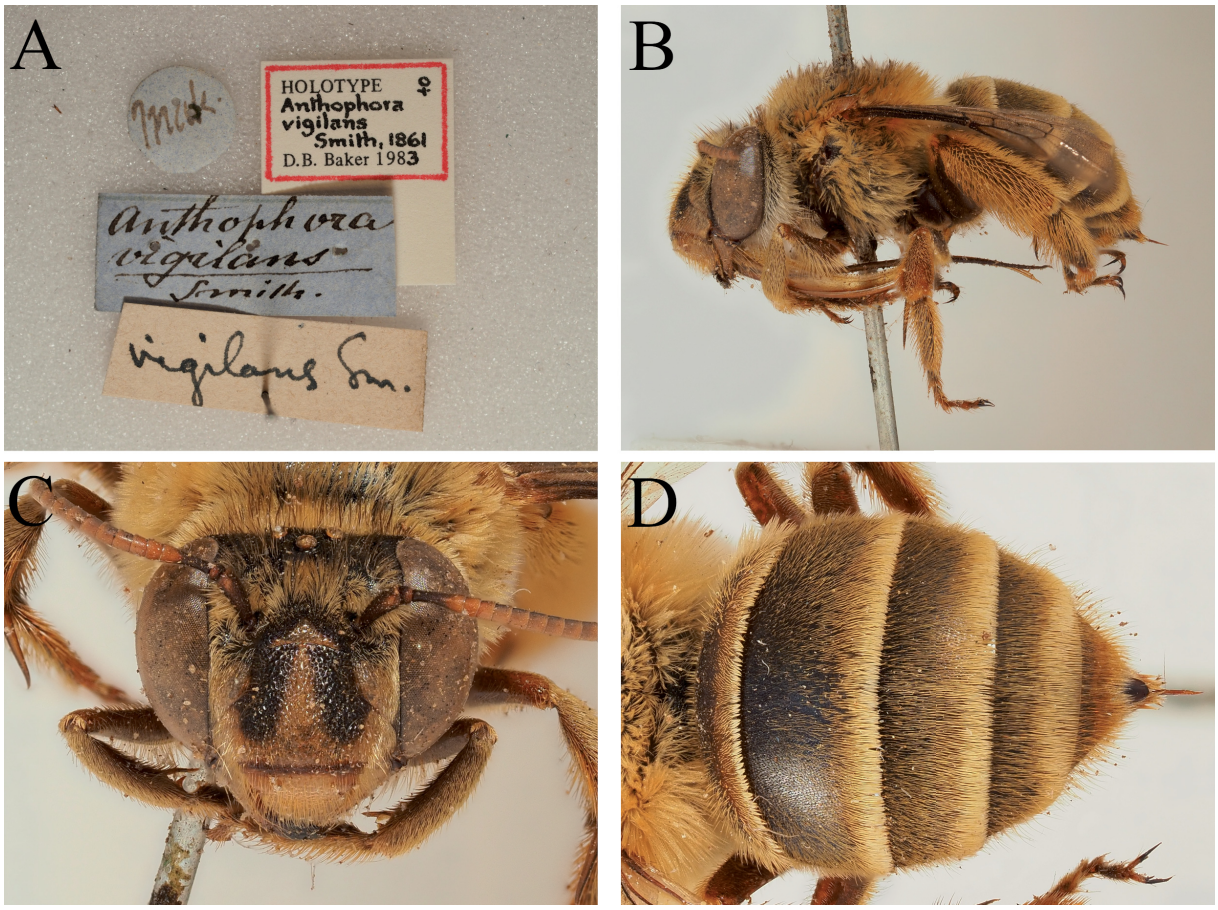

Fig. 51. *Anthophora vigilans* Smith, 1860, holotype, ♀ (OUMNH, ENT-HYME2809). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Type material examined

Holotype

INDONESIA • ♀; Mak. [Makassar, Sulawesi]; [11 Jul.–19 Nov. 1857]; OUMNH, ENT-HYME2809.

Type locality

Makassar [south-west Sulawesi].

Notes

Baker (1993: 210) wrote the following:

> "A ♀ in the UMO type collection, labelled 'Mak.' [blue disc] and '*Anthophora vigilans* [rule] Smith.' [blue paper] is the HOLOTYPE of this species and it has now been labelled accordingly. The type (see pl. VIII) is intact and in good condition.
>
> A second ♀ in the same collection is labelled 'M...' [white disc] and '*Anthophora vigilans*. Sm.' [blue paper, Smith]. The data label is not readily legible but most probably 'Men', accounting for Smith's 1862 record from Menado. It is not, therefore, regarded as a syntype. It is in fair condition and intact but for the loss of distitarsus L III, and is conspecific with the Makassar ♀ but not identical".

We could not find the second specimen from Manado mentioned by Baker, with only one specimen (the labelled holotype) present in the type collection. *Amegilla vigilans* was not included in the revision of Lieftinck (1956a), and has now been treated in detail in an updated revision of Indonesian *Amegilla* (*Glossamegilla*) (Carion *et al*. 2025). This species was mis-interpreted as close to *Amegilla zonata* (Linnaeus, 1758) by Sichel in Dours (1869) and by Cockerell (1907, 1929), leading to erroneous records from Ambon and Papua New Guinea.

Current status

Amegilla (*Glossamegilla*) *vigilans* Smith, 1860 (Brooks 1988).

Distribution

Indonesia (Sulawesi) (Smith 1860a, 1862; Carion *et al*. 2025).

53. ***Apis nigrocincta*** Smith, 1860
Fig. 52

Apis nigrocincta Smith, 1860a: 93, ♀.

Type material examined

Holotype

INDONESIA • ♀; Mak. [Makassar, Sulawesi]; [11 Jul.–19 Nov. 1857]; OUMNH, ENT-HYME2810.

Type locality

Makassar [south-west Sulawesi].

Notes

The specimen is labelled "Mak. 18". Examination of Wallace's 3rd notebook (Beccaloni 2025) reveals the following information:

> "At muddy places nearly dry. abundant about sap of Palms. Apis nigrocincta. Sm.".

Baker (1993: 201) wrote the following:

> "Two ♀♀ standing as *nigrocincta* in the UMO type collection are labelled:
> a) 'Mak. 18.' [blue disc] and '*Apis nigrocincta* Smith' [blue paper].
> b) 'N. [MS addition] China. [print]'.
>
> Specimen (a) is clearly the HOLOTYPE of *nigrocincta* and it has now been labelled accordingly: specimen (b) has been labelled as of no type status. The type is intact but has been wetted".

Baker then wrote about the synonymy of *A. nigrocincta* with *Apis cerana* Fabricius, 1793, but this has been made redundant by subsequent works (Hadisoesilo & Otis 1996; Damus & Otis 1997). The specimen indicated by Baker was not labelled as the holotype; this has now been rectified. The year of publication is incorrectly given as 1861 in some publications (e.g., Hadisoesilo & Otis 1996).

Current status

Apis nigrocincta Smith, 1860 (Hadisoesilo & Otis 1996; Damus & Otis 1997).

Distribution

Indonesia (Sulawesi, Sangihe) and Philippines (Mindanao) (Hadisoesilo & Otis 1996; Damus & Otis 1997; Ascher & Pickering 2024).



Fig. 52. *Apis nigrocincta* Smith, 1860, holotype, ♀ (OUMNH, ENT-HYME2810). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Species described by Smith (1860b) from Bacan, Ambon, and Kajoa islands and Manokwari (Doberai Peninsula, New Guinea)

54. ***Prosopis eximius*** Smith, 1860
Fig. 53

Prosopis eximius Smith, 1860b: 131–132, ♀.

Type material examined

Holotype

INDONESIA • ♀; Bac. [Bachian]; [21 Oct. 1858 – 13 Apr. 1859]; OUMNH, ENT-HYME2811.

Other material examined

INDONESIA • 1 ♂; Gil. [Gilolo]; [either 1 Feb.–1 Mar. 1858 or 14 Sep.–1 Oct. 1858]; OUMNH (of no type status).

Type locality

Bachian [= Bacan].



Fig. 53. *Prosopis eximius* Smith, 1860, holotype, ♀ (OUMNH, ENT-HYME2811). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Notes

Baker (1993: 211) wrote the following:

> "A ♀ in the UMO type collection, labelled 'Bac.' [white disc], '*Prosopis eximius* Smith' (Smith) and '*eximius* HOLOTYPE Det. M.A. Lieftinck 1955' is, as recognized by Lieftinck, the holotype of this species. It is intact and in good condition, other than that the R fore-wing is torn from apex to base.
>
> A ♂ in the same collection, labelled 'Gil.' [white disc], '*Prosopis eximius* Smith' [blue paper, Smith], and 'This is a ♂ ! Designated as the ALLOTYPE. Det. M.A. Lieftinck 1955', no doubt the basis of Smith's 1862 record from Gilolo, has no type status and has been labelled accordingly".

Hirashima & Lieftinck (1982: 11–13) did not mention that they revised the type of *P. eximius*, which is strange because the type is clearly marked with a holotype label placed by Lieftinck in 1955 (Fig. 53A). The male from Gilolo was also not mentioned, which is peculiar. Further study is required. Michener (1965: 146) incorrectly spelt the name as *Palaeorhiza exima*.

Current status

Palaeorhiza (*Heterorhiza*) *eximia* (Smith, 1860) (Hirashima & Lieftinck 1982).

Distribution

Indonesia (Maluku: Bacan, ?North Maluku: Halmahera) (Smith 1860b, 1862; Hirashima & Lieftinck 1982; Ascher & Pickering 2024).

55. ***Coelioxys intrudens*** Smith, 1860
Fig. 54

Coelioxys intrudens Smith, 1860b: 132–133, ♀.

Type material examined

Holotype

INDONESIA • ♀; Bac. [Bachian]; [21 Oct. 1858 –13 Apr. 1859]; OUMNH, ENT-HYME2812.

Type locality

Bachian [= Bacan].

Notes

Baker (1993: 211–212) wrote the following:

> "Two ♀ *Coelioxys* standing over the drawer-label '*intrudens* Smith' [no further indication] are labelled:-
> a) 'Bac.' [white disc] and '*Coelioxys intrudens* [rule] Smith.'
>
> b) 'Bouru' [white disc] and 'Lecto- [amended from 'Para-'] typus' [anonymous red, printed, modern label].
>
> Specimen (a) is the HOLOTYPE of *C. intrudens* Smith, 1860: 132, and it has now been labelled accordingly. It is intact but for the loss of some tarsal segments, but is in poor condition.

> The labelling of specimen (b) as 'lectotype' is absurd. Wallace did not reach Bouru until May 1861 and material from his collections on that island did not reach the B.M, until the end of 1862. This specimen, which has now been labelled as of NO TYPE STATUS, is conspecific with (a) and is no doubt that on which Smith's 1863 record was based.
>
> *Coelioxys smithii* is a widely distributed species, occurring from Sumatra eastwards to New Guinea. It is a known parasite of *Creightonella frontalis* (F.), and from collection data it appears probable that other species of the *smithii* group (♀ clypeus produced and longitudinally carinate) are also parasites of *Creightonella*".

Coelioxys intrudens Smith, 1860b is a junior primary homonym of *C. intrudens* Smith, 1860a. Dalla Torre (1896: 493) noticed this, and provided a replacement name. It is unfortunate that the type material of *C. intrudens* Smith, 1860 is apparently lost, but this (presumably) unintentional homonymy cannot be changed. It is clear that Smith was referring to different specimens, as he gives the length of *C. intrudens* Smith, 1860a as 4 ½ lines (= 9.5 mm) and the length of *C. intrudens* Smith, 1860b as 7 ½ lines (= 15.8 mm).

Current status

Coelioxys smithii Dalla Torre, 1896.



Fig. 54. *Coelioxys intrudens* Smith, 1860, holotype, ♀ (OUMNH, ENT-HYME2812). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Apex of metasoma, dorsal view.

Distribution

India (Meghalaya), Taiwan, Malaysia (Peninsula, Borneo), Indonesia (Sumatra, Sulawesi, Bacan, Buru), Papua New Guinea (Smith 1860b, 1863; Ascher & Pickering 2024).

56. ***Megachile pluto*** Smith, 1860
Fig. 55

Megachile pluto Smith, 1860b: 133, ♀.

Type material examined

Holotype

INDONESIA • ♀; Bac. [Bachian]; [21 Oct. 1858–13 Apr. 1859]; OUMNH, ENT-HYME2813.

Type locality

Bachian [= Bacan].

Notes

The specimen is labelled "Bac. 59". Examination of Wallace's 5th notebook (Beccaloni 2025) reveals the following information:



Fig. 55. *Megachile pluto* Smith, 1860, holotype, ♀ (OUMNH, ENT-HYME2813). **A**. Label information. **B**. Habitus, dorsal view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

> "gigas! immense jaws,- flying round in mountain forest with loud beetle like hum!! Megachile pluto. Sm.!!!".

Baker (1993: 212) wrote the following:

> "A ♀ labelled 'Bac. 59' [white disc] and '*Megachile Pluto*. Smith', in the UMO type collection, is the HOLOTYPE of this species. It is intact and in fair condition.
>
> In view of recent mis-statements [e.g., in Messer, 1984] concerning the distribution and supposed endangered status of this species, commonly but erroneously referred to as the largest known species of bee, the following occurrences may be placed on record:-
> Zuid Halmaheira [the 'Noord' of the printed label altered in ink], pre-1863 (H.A. Bernstein), ♀.
> Ternate, Ake Abdas, 1500 m., 1 ix 1951 (native collector), ♀.
> NW Obi, Laiwui, 0-200 m., 15 ix 1953 (A.M.R. Wegner), ♀".

Baker did not give a repository for the records of *M. pluto* he listed, presumably targeted at Messer's (1984: 165) statement that "The species, which is the world's largest bee (Michener, 1965), was previously known from only two specimens (Friese, 1909), and presumed extinct (Wells *et al*., 1983)". Debate continues to surround this species, whether it genuinely is the largest bee in the world (Michener 1965: 191), how rare it genuinely is, its current conservation status, and its current legal protection (e.g., Vereecken 2018). Whilst it now appears to be the case that it is present across the North Maluku islands, focused rather than sporadic sampling and monitoring efforts are needed to genuinely establish its current status. The OUMNH specimen has now been labelled as the holotype.

Current status

Megachile (*Callomegachile*) *pluto* Smith, 1860 (Ascher & Pickering 2024).

Distribution

Indonesia (North Maluku: Bacan, Halmahera, Obi, Ternate, Tidor) (Smith 1860b; Messer 1984; Baker 1993; Ascher & Pickering 2024). A recent Facebook posting indicates that *M. pluto* is also present on Morotai Island, broadening its distribution across the North Maluka region (MCO unpubl. data).

57. ***Megachile lachesis*** Smith, 1860
Fig. 56

Megachile lachesis Smith, 1860b: 133–134, ♀.

Type material examined

Lectotype

INDONESIA • ♀; Bac. [Bachian]; [21 Oct. 1858–13 Apr. 1859]; OUMNH, ENT-HYME2814-01 (lectotype designated by Lieftinck 1958).

Paralectotype

INDONESIA • 1 ♀; Amb. [Amboyna]; [30 Nov. 1857–4 Jan. 1858]; OUMNH, ENT-HYME2814-02.

Type locality

Bachian [= Bacan], Amboyna [= Ambon]. Fixed as Bacan by lectotype designation.

Notes

Baker (1993: 212–214) wrote the following:

"Five conspecific specimens standing as *lachesis* in the UMO type collection are labelled:-
a) ♂, 'G' [?, reading uncertain, ? Gilolo; white disc] and '*Megachile Lachesis*. Smith.' [blue paper, Smith],
b) ♂, 'Cer. E.' [presumably Ceram, East; white disc] and '*M. Lachesis* ♂ ?' [blue paper, Smith].
c) ♀, ' *Megachile Lachesis*. Smith.' [blue paper, Smith].
d) ♀, 'Bac.' [white disc], '*Megachile Lachesis* Smith', '*Megachile lachesis* Sm. Mitchell - 1956', and 'Lectotype O.U.M.' [red-margined disc],
e) ♀, 'makes round holes in clayey ground Bouru' [Wallace] and '*Megachile Lachesis* Sm' [blue paper, Smith].

A sixth specimen, (f), found among miscellaneous megachilids in another part of the collections, is labelled 'Amb' [white disc, Wallace] and '*Megachile Lachesis* Smith' [blue paper, Smith].

The two ♂♂ and the Bouru ♀ (e) cannot be regarded as syntypes, and although the ♀ (c) could represent one of the missing localities [Mysol or Salwatty] it would not be safe to assume that it did in fact do so (*C. frontalis* is an abundant and widely-distributed species): all four specimens have therefore been labelled as of no type status. The ♀♀ (d) from Bachian and (f) from Amboyna are regarded as syntypes and Mitchell's labelling of the former as LECTOTYPE of *lachesis* may be accepted. The specimen is intact but shows mite infestation".



Fig. 56. *Megachile lachesis* Smith, 1860, lectotype, ♀ (OUMNH, ENT-HYME2814-01). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Theodore B. Mitchell did not publish on *Megachile* in the Eastern Hemisphere after 1956 (see bibliography in Michener 2007), and published no lectotype designation for *M. lachesis*. The white disc indicating the island of Bacan seems to have disappeared, but the specimen is clearly the one indicated by Baker (e.g., mites are present on the specimen, Fig. 56D). Although well-reasoned, Baker did not mention the important work by Lieftinck (1958). In this, Lieftinck traced the original Fabrician male specimen of *Anthophora frontalis* Fabricius, 1804 [= *Megachile frontalis*] from Ambon Island (*Habitat in Amboina Mus. Dom. Billardiere*), this specimen being present in Fabricius's collection in Kiel, Germany. This material is now in the Copenhagen collection on indefinite loan from Kiel since 1958 (Zimsen 1964; van Roie *et al*. 2024; M. Kuhlmann pers. com.). Lieftinck notes that Friese (1909: 241) already suggested the provisional synonymy of *M. lachesis* with *M. frontalis*, but that no-one had attempted to corroborate this.

Lieftinck visited the OUMNH collection in October 1955 and compared contemporary specimens from Batjan [= Bacan], Halmahera, and Ambon with the type series defined as "3♀ from Batjan, Buru and loc. incert., 2♂ from Ceram and "S", with which they all agreed". These five specimens match the five described by Baker. Lieftinck (1958: 464) stated "The ♀ from Batjan at Oxford (white labels "Bac" and ditto identification label of F. Smith) is herewith designated as the lectotype of *lachesis* F. Smith". Even though the specimen was not labelled by Lieftinck, although it may have been him who added the red circular lectotype disc, the description of the specimen he gave is sufficient to allow recognition of this precise specimen (ICZN 1999 Article 74), and his designation can be accepted as valid.

Baker's omission of Lieftinck's (1958) designation is curious, because he was clearly aware of this work, citing this paper within the chresonomic list for *Megachile foliata* Smith, 1860 and also in the overall references for the thesis (Baker 1993: 95, 215).

Current status

Megachile (*Creightonella*) *frontalis* (Fabricius, 1804) (Lieftinck 1958; Michener 1965; Ascher & Pickering 2024).

Distribution

Philippines, Indonesia (Sulawesi, North Maluku, Maluku, Papua s. lat.), Papua New Guinea (Ascher & Pickering 2024), expanding to the west if *M. atrata* Smith, 1853 is considered conspecific (Lieftinck 1958; Baker 1993).

58. ***Megachile clotho*** Smith, 1860
Fig. 57

Megachile clotho Smith, 1860b: 134, ♀.

Type material examined

Holotype

INDONESIA • ♀; Bac. [Bachian]; [21 Oct. 1858–13 Apr. 1859]; OUMNH, ENT-HYME2815.

Other material examined

INDONESIA • 1 ♀; Sulawesi, Palpo; S. Risch det.; RMNH • 1 ♀; Sulawesi, Lake Poso, Pendolo; 650 m a.s.l.; 1–28 Feb. 1950; C.J.H. Franssen leg.; S. Risch det.; RMNH • 1 ♀; Sulawesi, Bonta; 40 m a.s.l.; 1 Mar.–30 Apr. 1949; C.J.H. Franssen leg.; S. Risch det.; RMNH • 2 ♀♀; Sulawesi, Malakadji; 700 m a.s.l.; 1–30 Jun. 1949; C.J.H. Franssen leg.; S. Risch det.; RMNH • 1 ♀; Sulawesi, Boku; 1200 m a.s.l.; 1–31 May 1949; C.J.H. Franssen leg.; S. Risch det.; RMNH • 1 ♂; Sulawesi, Makassar; 1–31 Sep. 1949; C.J.H. Franssen leg.; S. Risch det.; RMNH • 1 ♂; Sulawesi, Mt Klabat,

15 km ESE Manado; 5 Dec. 2000; S. Risch leg.; S. Risch det.; SRC • 1 ♂; Moluccas, Ambon; 1–31 Jan. 1962; A.M.R. Wegner leg.; S. Risch det.; RMNH • 1 ♀; Moluccas, Ambon; 3 Oct. 1966; A.M.R. Wegner leg.; S. Risch det.; RMNH • 1 ♀; Moluccas, Ambon; 1–30 Oct. 1950; S. Risch det.; RMNH • 1 ♀; Moluccas, Ambon; 1–30 Oct. 1949; M.A. Lieftinck leg.; S. Risch det.; RMNH • 1 ♀; Moluccas, Ambon; 18 Oct. 1963; A.M.R. Wegner leg.; S. Risch det.; RMNH • 1 ♀; Moluccas, Ceram; S. Risch det.; RMNH • 1 ♀; Moluccas, NW Moluccas, Majau Isl.; 7 Nov. 1943; A.M.R. Wegner leg.; S. Risch det.; RMNH • 1 ♀; Moluccas, Halmahera, Goa-Plains; 50–100 m a.s.l.; 9–12 Sep. 1951; A.M.R. Wegner leg.; S. Risch det.; RMNH • 1 ♀; Moluccas, S-Batjan [Bacan]; 0 m a.s.l.; 1 Jun.–31 Jul. 1953; A.M.R. Wegner leg.; S. Risch det.; RMNH • 1 ♀; Moluccas, Misool, Fakal; 0–75 m a.s.l.; 8–20 Sep. 1948; M.A. Lieftinck leg.; S. Risch det.; RMNH • 1 ♂, 9 ♀♀; Moluccas, Obi, Laiwui (Isl.); 1–31 Sep. 1953; A.M.R. Wegner leg.; S. Risch det.; RMNH • 3 ♀♀; Moluccas, Obi, Laiwui (Isl.), 1 Sep.–30 Oct. 1953; A.M.R. Wegner leg.; S. Risch det.; RMNH • 4 ♂♂, 8 ♀♀; Moluccas, West Obi, Kasowari; 0–50 m a.s.l.; 1 Aug.–31 Sep. 1953; A.M.R. Wegner leg.; S. Risch det.; RMNH • 1 ♀; Moluccas, West Obi, Kasowari; 18 Aug. 1953; A.M.R. Wegner leg.; S. Risch det.; RMNH • 2 ♀♀; Moluccas, West Obi, Kasowari; 17 Aug. 1953; A.M.R. Wegner leg.; S. Risch det.; RMNH • 1 ♂, 1 ♀; Moluccas, NW Obi (Desa) Angggai; 0–50 m a.s.l.; 1–30 Oct. 1953; A.M.R. Wegner leg.; S. Risch det.; RMNH • 35 ♂♂, 13 ♀♀; Moluccas, Obi Isl.; 1 Feb.–31 Sep. 1953; A.M.R. Wegner leg.; S. Risch det.; RMNH • 1 ♀; Moluccas, Buru, Waprea; 24 Jun. 1959; A.M.R. Wegner leg.; S. Risch det.; RMNH • 1 ♂, 24 ♀♀; Moluccas, Buru, Baluvalu; 9–28 Jun. 1959; A.M.R. Wegner leg.; S. Risch det.; RMNH • 31 ♀♀; Moluccas, Buru, Wamlana; 31 May–7 Jun. 1959; A.M.R. Wegner leg.; S. Risch det.; RMNH • 8 ♀♀; S New Guinea, Upper Digul River; 1 Jun.–31 Aug. 1959; B. Monolphus leg.; S. Risch det.; RMNH • 2 ♂♂; NW New

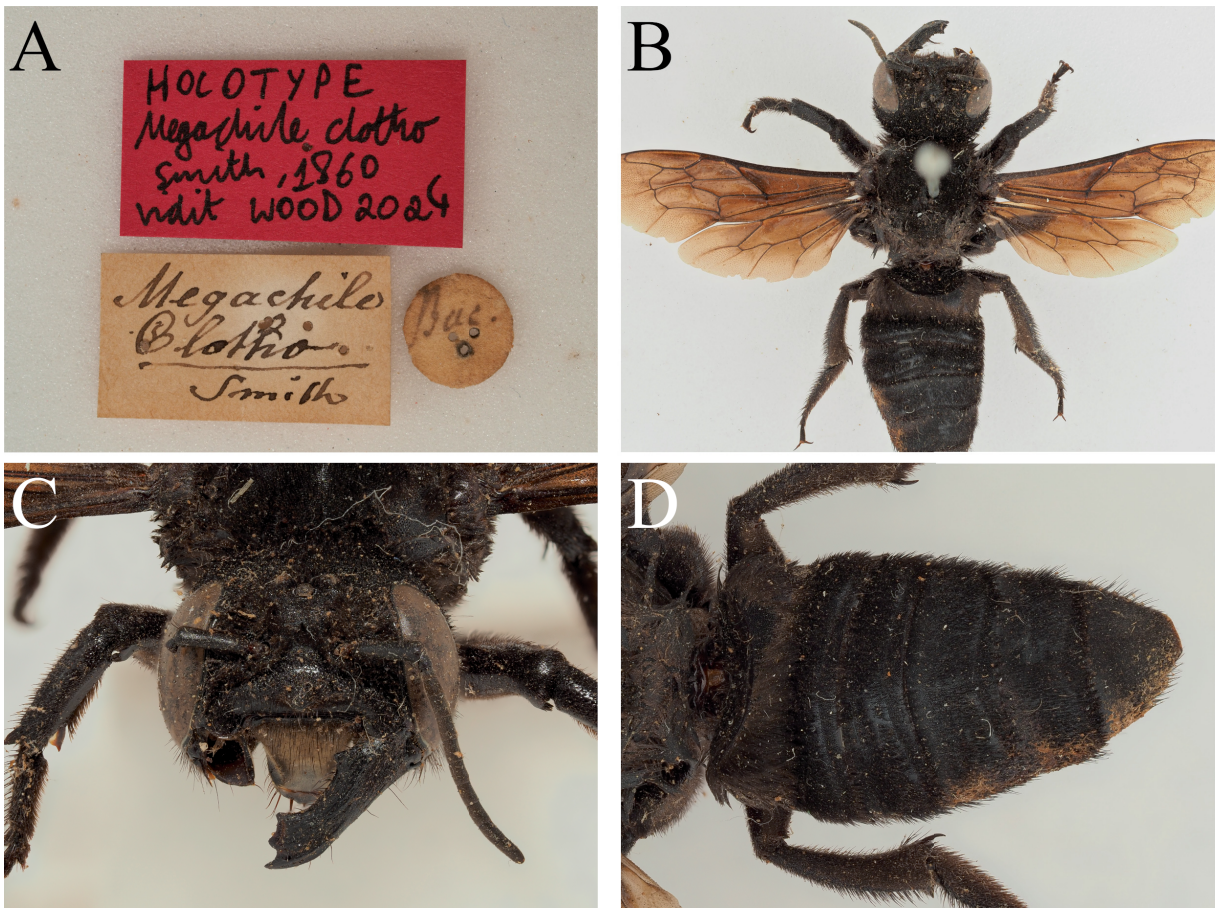

Fig. 57. *Megachile clotho* Smith, 1860, holotype, ♀ (OUMNH, ENT-HYME2815). **A**. Label information. **B**. Habitus, dorsal view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Guinea, Sorong; 28 Aug.–6 Nov. 1948; M.A. Lieftinck leg.; S. Risch det.; RMNH • 1 ♂, 3 ♀♀; NW New Guinea, Sorong; 8 Jul.–14 Aug. 1949; M.A. Lieftinck leg.; S. Risch det.; RMNH • 1 ♂; West Papua, Saoka; 19 Mar. 1957; G.F. Mees leg.; S. Risch det.; RMNH • 2 ♀♀; Papua, Kawakit; 10–12 Nov. 1959; N.N.G. Expedition; S. Risch det.; RMNH • 1 ♀; West Papua, Garrian [Gariau] on Lake Jamoer [Lake Jamur]; 7 Dec. 1957; L.D. Brongersma leg.; S. Risch det.; RMNH • 1 ♀; Papua, Mindiptana; 1–31 Jul. 1959; Benno leg.; S. Risch det.; RMNH • 1 ♀; West Papua, Ajamaroe; 10 Jun. 1952; L.D. Brongersma and W.J. Roosdorp leg.; S. Risch det.; RMNH.

PAPUA NEW GUINEA • 1 ♀; Doa, 75 km W of Port Moresby; 17 Jul. 1962; R. Straatman leg.; S. Risch det.; RMNH.

Type locality

Bachian [= Bacan].

Notes

In the material examined, we give here only specimens matching the dark-winged form, i.e., *M. clotho*. We treat *M. clotho* as a junior synonym of *M. tuberculata*, see Section 9, and examined specimens displaying yellow wings (i.e., *M. tuberculata*) are listed under that species.

Baker (1993: 214) wrote the following:

> "(*C. clotho* represents the eastern, black-winged form of *tuberculatum*: see Section 1.4.2.1.)
>
> Three ♀♀ standing as *clotho* in the UMO type collection are labelled:-
> a) 'Gilolo' [white disc] and '*Megachile Clotho*. Sm' [blue paper].
> b) 'M' [Morty; white disc], 'Megachile Clotho. Smith.' [white paper], 'Megachile clotho Sm. Mitchell - 1956' and 'Lectotype O.U.M.' [redmargined disc]. False type.
> c) 'Bac.' [white disc] and '*Megachile clotho* Smith'.
>
> In this instance (*cf. supra, lachesis*) Mitchell's labelling is inacceptable because the specimen concerned did not come from the type locality and in fact could not have been before Smith when his description was drafted: Allen did not collect on Morty until late 1860. Specimen (c) must be recognized as the HOLOTYPE of *clotho* and it has been labelled accordingly. It is in poor condition: the greater part of the R mandible has been broken off, the R flagellum and the apical segments of tarsus L II lost. Specimens (a) and (b) have been labelled as of no type status".

The specimen indicated by Baker was not labelled as holotype; this has now been rectified.

Baker (1993: 20–22) dealt with variation in the wing colour of *Megachile tuberculata* (yellow-winged; Fig. 8C) and of *Megachile clotho* (dark-winged, Fig. 57B). The two type specimens are structurally identical, with only wing colouration and geographical provence allowing separation, with *M. tuberculata* found to Borneo and Java, and *M. clotho* found from Sulawesi and the Philippines to Papua New Guinea, i.e., broadly showing separation along the Wallace Line. We agree with Baker that *M. clotho* is only a form of *M. tuberculata* **syn. nov.**, and formally publish this synonymy.

Current status

Megachile (*Callomegachile*) *tuberculata* Smith, 1857 **syn. nov.**

Distribution

India, Bhutan, Thailand, Malaysia (Peninsula, Borneo), Singapore, Indonesia (Sumatra, Java, Sulawesi, North Maluku, Maluku, Papua s. lat.), Philippines, Papua New Guinea (Baltazar 1966; Baker 1993; Ascher *et al*. 2022; Ascher & Pickering 2024; current study).

59. ***Megachile alecto*** Smith, 1860

Megachile alecto Smith, 1860b: 134, ♂.

Type material examined

Lectotype

INDONESIA • ♂; Dor 4 [Dory]; [11 Apr.–29 Jul. 1858]; NHMUK, Type 17a 2838 (lectotype designated by Michener 1965, examined by photograph).

Type locality

Dory [= Dore Bay, now Manokwari, Doberai Peninsula, West Papua].

Notes

Baker (1993: 214–215) wrote the following:

> "To account for Smith's indicated localities there should be a minimum of five specimens present in collections.
>
> UMO
> Four specimens standing as *alecto* in the type collection, all determined by Smith, are labelled:-
> a) 'Gil.' [white disc] and '*Megachile Alecto*. ♂. Sm.' [blue paper].
> b) 'M.' [white disc] and '*Megachile Alecto*. Sm.' [blue paper].
> c) 'Gil.' [white disc] and '*Megachile Alecto*. Sm. ♀' [blue paper].
> d) 'M.' [white disc] and '*Megachile Alecto* Sm.'.
>
> Specimens (a) and (b) are ♂♂ of *Creightonella frontalis* (F., 1804), specimens (c) and (d) ♀♀ of *Megachile* (*Callochile*) *foliata* Smith, 1860. Neither of the ♂♂ is from the type locality for *alecto*, and not one of these specimens can be regarded as a syntype. All four have been labelled as of no type status. [The 'M.' of specimens (b) and (d) in this instance indicates Mysol (1860, Allen) rather than Morty: *cf.* Smith 1871.]
>
> NHM
> A ♂ in NHM, labelled 'Dor 4' [Dory; white disc], '*Megachile Alecto*. (rule) Smith' [Smith], 'type [MS] F.Sm. Coll. 79.22 [print]' and '*Megachile alecto* Sm. Lectotype C.D. Michener 1960', B.M. Type Hym. 17 a 2838, is apparently the one extant specimen from the type locality, but how it came to be in Smith's collection rather than Saunders' is not apparent. It is best regarded as the HOLOTYPE of *alecto*. Two further specimens in NHM, a ♂ and a ♀ of frontalis, labelled only 'Ceram' [blue disc], are, like the Oxford specimens, of no type status. Smith's localities Ternate (1862) and Morty Island (1865) remain for the present unsupported by specimens".

Michener (1965: 205) did indeed publish the lectotype designation of this specimen, and whilst we agree with Baker's reasoning, there is no pressing need to label the NHMUK specimen as the holotype (cf. ICZN recommendation 73F). The specimen also bears an accession label reading "F. Sm. Coll. 79.22" and "type", indicating that it came from the personal collection of Smith. It may have been retained by him rather than returned to the W.W. Saunders collection.

Examination of Wallace's 3rd notebook (Beccaloni 2025) reveals the following information:

> "4. Hymen - at flowers.. flies very rapidly. sting bad *Megachile alecto*. Sm."

This specimen numbering supports the position that the NHMUK is the original specimen collected by Wallace, since it has the correct label number. It is unclear why Wallace wrote that the sting was bad, since the specimen is a male. He may have confused it with another bee collected on the same day, or during the same period.

Current status

Megachile (*Creightonella*) *frontalis* (Fabricius, 1804) (Lieftinck 1958; Michener 1965; Ascher & Pickering 2024).

Distribution

Philippines, Indonesia (Sulawesi, North Maluku, Maluku, Papua s. lat.), Papua New Guinea (Ascher & Pickering 2024), expanding to the west if *M. atrata* Smith, 1853 is considered conspecific (Lieftinck 1958; Baker 1993).

60. ***Megachile foliata*** Smith, 1860
Fig. 58

Megachile foliata Smith, 1860b: 134, ♀.

Type material examined

Holotype

INDONESIA • ♀; Bac. [Bachian]; [21 Oct. 1858–13 Apr. 1859]; OUMNH, ENT-HYME2816.

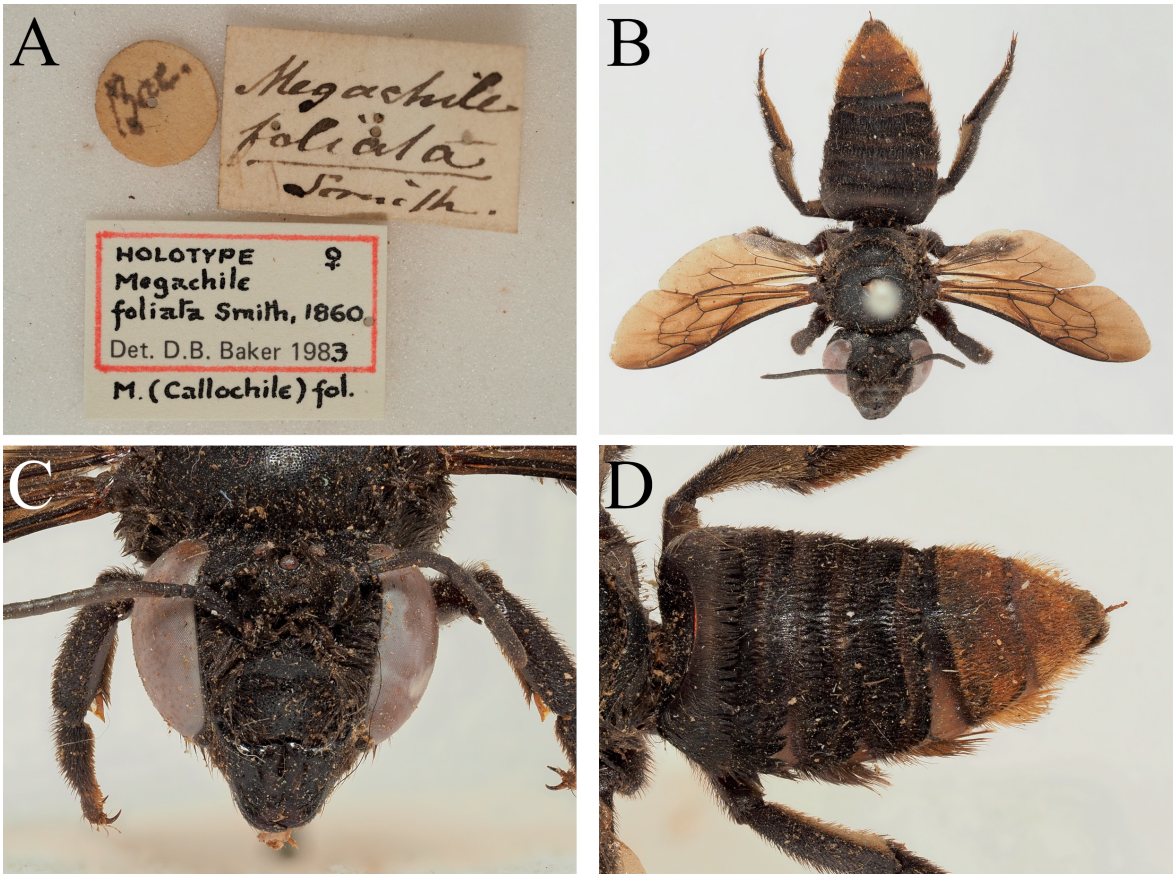

Fig. 58. *Megachile foliata* Smith, 1860, holotype, ♀ (OUMNH, ENT-HYME2816). **A**. Label information. **B**. Habitus, dorsal view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Type locality

Bachian [= Bacan].

Notes

Baker (1993: 215) wrote the following:

> "A ♀ in the UMO type collection, labelled 'Bac.' [white disc: Batian, Oct 1858-Apr 1859 (Wallace)] and '*Megachile foliata* Smith.' [Smith] is the HOLOTYPE of this species and it has now been labelled acordingly. Two other ♀♀, from Gilolo and Mysol, taken by Smith to be ♀♀ of *alecto* and so labelled by him (*vide supra*, 5.13-6), cannot be regarded as syntypes of *foliata*".

Current status

Megachile (*Amegachile*) *foliata* Smith, 1860 (Ascher & Pickering 2024).

Distribution

Indonesia (Maluku: Ambon, Buru, Kai; North Maluku: Bacan, Southwest Papua: Misool), Papua New Guinea, Bismarck Archipelago, and the Solomon Islands (Lieftinck 1958, as *M. placida* ssp. *puncticollis* Friese, 1903; Ascher & Pickering 2024; current study). This includes *Megachile placida* Smith, 1862 as a junior synonym, see Section 67.

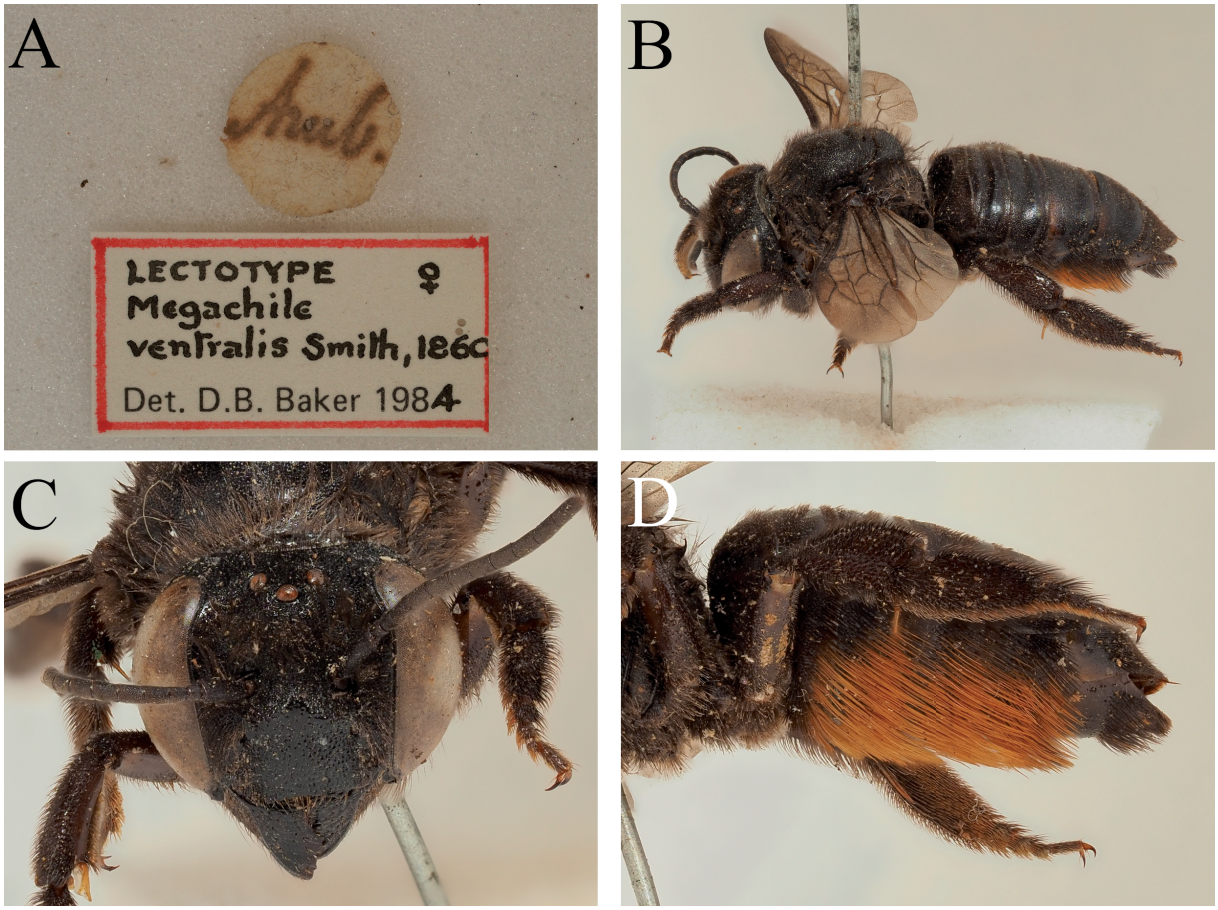

Fig. 59. *Megachile ventralis* Smith, 1860, holotype, ♀ (OUMNH, ENT-HYME2817). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, lateral view.

61. ***Megachile ventralis*** Smith, 1860
Fig. 59

Megachile ventralis Smith, 1860b: 134–135, ♀♂.

Type material examined

Lectotype
INDONESIA • ♀; Amb. [Amboyna]; [30 Nov. 1857–4 Jan. 1858]; OUMNH, ENT-HYME2817 (lectotype indicated by Baker 1993, de facto lectotype by present designation).

Type locality

Amboyna [= Ambon].

Notes

Baker (1993: 215) wrote the following:

> "Two ♀♀ in the UMO type collection represent this species; Smith's ♂, or supposed ♂, appears not to be extant in the Oxford collections.
>
> The ♀ labelled 'Amb.' [white disc] is now designated, recognizing that the ♂ may yet be located, as LECTOTYPE of *ventralis*. [*Megachile ventralis* Smith, 1860, is not considered to be invalidated by *Apis ventralis* Panzer, 1798, at one time (Walckenaer, 1802: 139) referred to *Megachile* but subsequently (*cf*. Peets, 1910: 45, 50) recognized as a species of *Osmia*. *Megachile ventralis* Smith, 1879, = *dupla* Ritsema, 1880, is another species.] The type is virtually intact and in fair condition, except that the head has at some time become detached and been crudely re-attached.
>
> The second ♀, labelled 'Gag,' [white disc: Gagie of Wallace, 1886: 537, 539 and map, 538; Gag of modern maps, a small island west of Waigeu] and '*Megachile ventralis* Smith' [blue paper, possibly transferred from the Amboyna ♀], must be regarded as of no type status and it has been labelled accordingly: Wallace did not visit Gagie until October 1860 (it is remarkable that under the circumstances of his visit he found opportunity for any collecting !), and the present specimen could not possibly have been before Smith when he prepared his description.
>
> *M. ventralis* (referred by Michener to *Eutricharaea*: see comment under *M. insularis* Smith, 1859, 5.11-7) is a member of the rather numerous group of chiefly Malesian Megachile typified by *M. laticeps* Smith, 1853".

We recognise Baker's logic, and the specimen indicated by Baker is formally designated here as the lectotype.

Current status

Megachile (*Aethomegachile*) *ventralis* Smith, 1860 (Ascher & Pickering 2024).

Distribution

Indonesia (Maluku: Ambon; Southwest Papua: Gag) (Smith 1860b; Baker 1993). Ascher & Pickering (2024) also give the Solomon Islands based on SEMC specimens identified by Baker.

62. ***Xylocopa coronata*** Smith, 1860
Fig. 60

Xylocopa coronata Smith, 1860b: 135, ♀.

Type material examined

Lectotype

INDONESIA • ♀; Kai. [Kaisaa]; [13–20 Oct. 1858]; OUMNH, ENT-HYME2818-01 (lectotype indicated by Lieftinck 1956b and Baker 1993, de facto lectotype by present designation).

Paralectotype

INDONESIA • 1 ♀; Kai. [Kaisaa]; [13–20 Oct. 1858]; OUMNH, ENT-HYME2818-02.

Other material examined

INDONESIA • 1 ♀; Gil. [Gilolo]; [probably 2 Oct.–5 Nov. 1860]; OUMNH.

Type locality

Kaisaa [= Kajoa].

Notes

Baker (1993: 216) wrote the following:

> "Three ♀♀ standing as *coronata* in the UMO type collection and all with Smith's determination labels are labelled:-
> a) 'Kai.' [white disc] and '*Xylocopa coronata* Smith,'

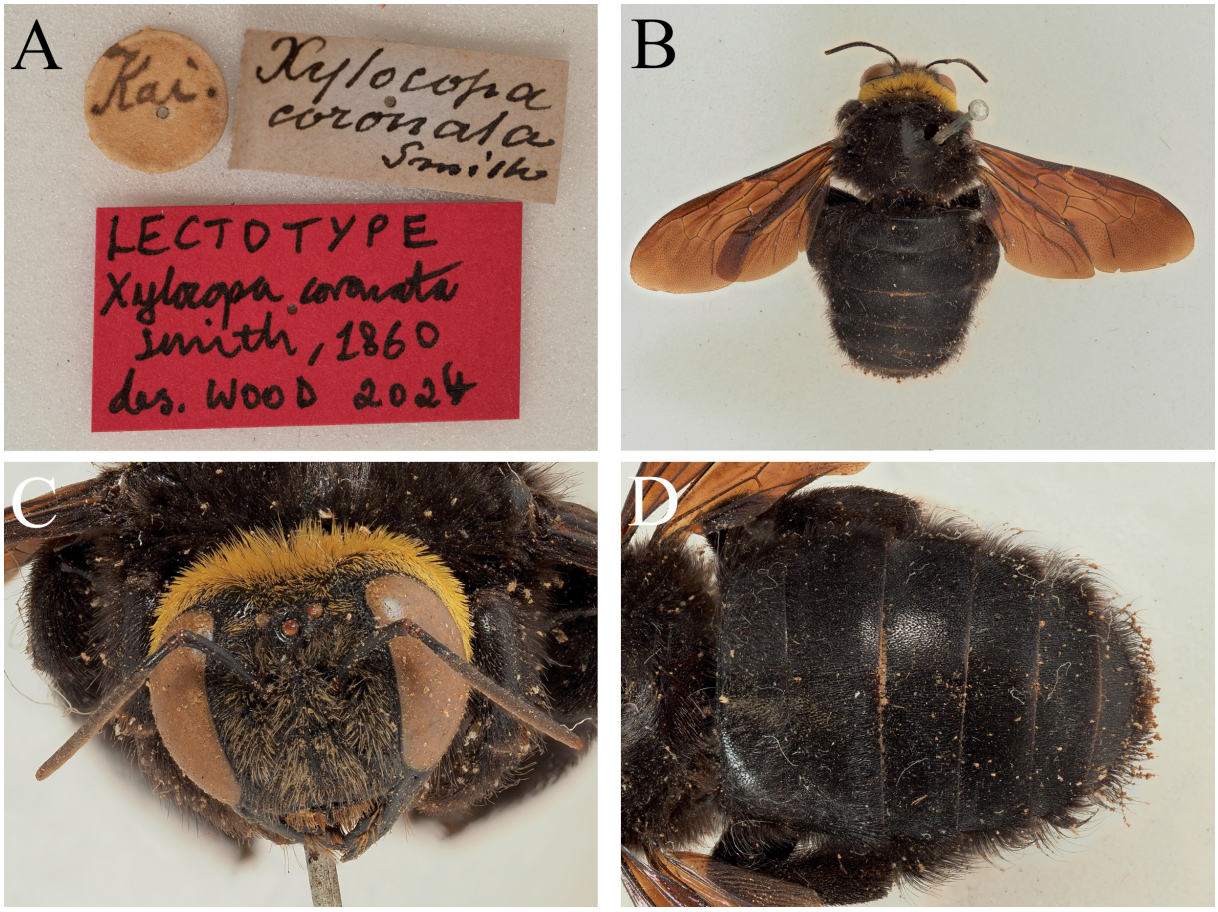

Fig. 60. *Xylocopa coronata* Smith, 1860, lectotype, ♀ (OUMNH, ENT-HYME2818-01). **A**. Label information. **B**. Habitus, dorsal view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

b) 'Kai.' [white disc] and '*Xylocopa coronata* Smith' [blue paper].
c) 'Gil.' [white disc] and '*Xylocopa coronata* Smith.' [blue paper],

Lieftinck (1956: 62) has '2 ♀ bearing round white labels "Kai" and "Kaio", with additional white labels "*Xylocopa coronata* Smith" in F, SMITH'S hand, here selected as lectotype and paratype (OUM, type collection)'. Apart from the errors concerning the labels, this was not a valid type fixation since Lieftinck failed to identify either (a) or (b) as the lectotype; further, he did not label these two specimens as lectotype and 'paratype'. Specimen (b) is now formally designated as the LECTOTYPE of *coronata* and it has been labelled accordingly; specimen (a) has been labelled as a paralectotype. The lectotype is intact; the paralectotype has lost the apical segments of tarsus L III.

Specimen (c), no doubt the basis of Smith's record from Gilolo, has no type status and has so been labelled".

Baker is correct to argue that Lieftinck's lectotype designation was invalid because said designation was, as written, ambiguous as to which specimen was selected, and neither specimen was labelled (ICZN 1999 Article 74.5). However, Baker also did not label a specimen as lectotype! In order to finally define this lectotype, the specimen indicated by Baker is formally designated here as the lectotype (Fig. 60).

More interestingly than these technical designations, Lieftinck (1955, 1956b) resurrected *X. forbesii* W.F. Kirby, 1883 as a valid species distinct from *X. coronata* and found on the Tanimbar islands, and defined *X. coronata* as senior to the differently coloured but structurally identical *X. combinata* Ritsema, 1876 (found within the North Maluku islands on the island of Obi).

Current status

Xylocopa (*Maiella*) *coronata* Smith, 1860 (Ascher & Pickering 2024).

Distribution

Indonesia (North Maluku islands) (Smith 1860b, 1862, 1865; Lieftinck 1955, 1956b).

63. ***Xylocopa unicolor*** Smith, 1860
Fig. 61

Xylocopa unicolor Smith, 1860b: 135, ♀♂.

Type material examined

Lectotype

INDONESIA • ♀; Amb. [Amboyna]; [30 Nov. 1857–4 Jan. 1858]; OUMNH, ENT-HYME2819-01 (lectotype indicated by Baker 1993, de facto lectotype by present designation).

Paralectotype

INDONESIA • 1 ♀; Amb. [Amboyna]; [30 Nov. 1857–4 Jan. 1858]; OUMNH, ENT-HYME2819-02.

Type locality

Amboyna [= Ambon].

Notes

Baker (1993: 216–217) wrote the following:

"Two ♀♀ in the UMO type collection, and formerly standing as unicolor in Saunders' collection bear identical labels 'Amb.' [white disc] and '*Xylocopa unicolor* Smith.' [Smith's hand] and

may be accepted as syntypes of that species. Smith's ♂ syntype, labelled 'Amb' [white disc], '*Xylocopa unicolor* Smith' [Smith] and 'nec *unicolor* Sm. Det. M.A. Lieftinck 1955', and a third ♀, labelled 'B' [or β ?: small, square, blue label, not Wallace], '*Xylocopa unicolor* Smith' [Smith], and 'nec *unicolor* Sm. Det. M.A. Lieftinck 1955', doubtless, in spite of the variant labelling, the basis of Smith's 1863 record from Bouru, both also formerly standing as *unicolor* in Saunders' collection (now in the Museum's general collection), are, as Lieftinck's labelling indicates, not conspecific with the Amboyna ♀♀.

Lieftinck (1956: 67) stated 'I have selected one of SMITH's examples marked "Amb" as the lectotype of *unicolor*'. This was not a valid type fixation since Lieftinck gave no information that would enable recognition of the specimen allegedly selected (cf. ICZN Rec. 74C), and, further, did not label, as lectotype or otherwise, either specimen. The specimen now designated as LECTOTYPE of *unicolor*, and labelled accordingly, is that in better condition and intact. The second Amboyna ♀ (when taken, in fresher condition, with entire wing margins), having the mesoscutum crushed and its pubescence matted, and lacking the apical segments of tarsus R I, and Smith's supposed ♂ (described but not named by Lieftinck) have been labelled as paralectotypes. The Bouru ♀, curiously referred to by Lieftinck (1956: 67) as of unknown locality, has been labelled as of no type status: it was apparently regarded by Lieftinck as ['would well go with'] *buruana*, but was not included by him under the material of that species listed on p. 70 of his paper".

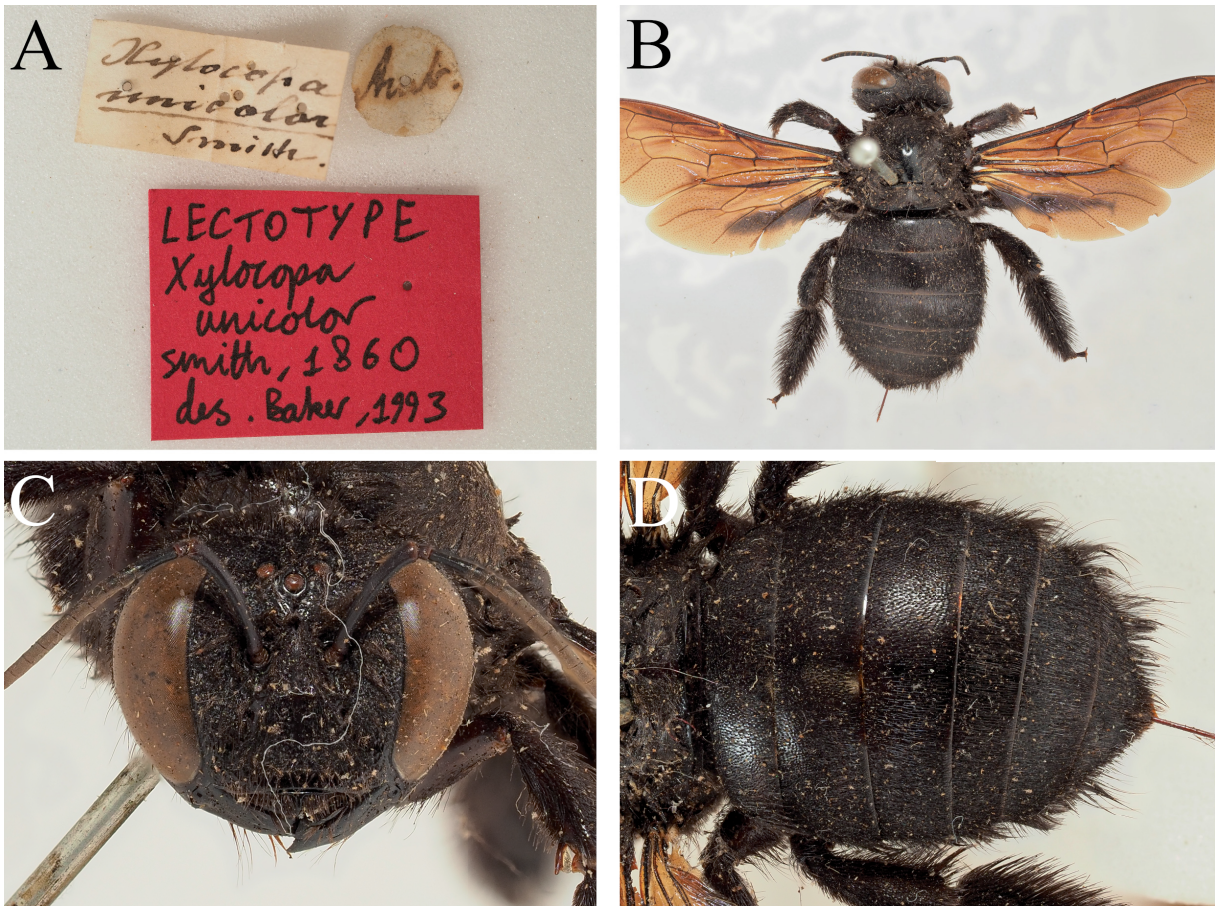

Fig. 61. *Xylocopa unicolor* Smith, 1860, lectotype, ♀ (OUMNH, ENT-HYME2819-01). **A**. Label information. **B**. Habitus, dorsal view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

As for *Xylocopa coronata*, Baker's reasoning for rejecting Lieftinck's (1956b) designation of a lectotype is valid, but again Baker also did not label a specimen as lectotype! In order to finally define this lectotype, the specimen indicated by Baker is formally designated here as the lectotype (Fig. 61).

Current status

Xylocopa (*Maiella*) *unicolor* Smith, 1860 (Ascher & Pickering 2024).

Distribution

Indonesia (Maluku: Ambon, Boano, Ceram, Haruku, Saparua) (Lieftinck 1956b).

Species described by Smith (1862) from the islands of Halmahera, Sulawesi, and Ternate

64. ***Nomia clavata*** Smith, 1862
Fig. 62

Nomia clavata Smith, 1862: 59, ♂.

Type material examined

Holotype

INDONESIA • ♂; Gil. [Gilolo]; [probably 2 Oct.–5 Nov. 1860]; OUMNH, ENT-HYME2474.

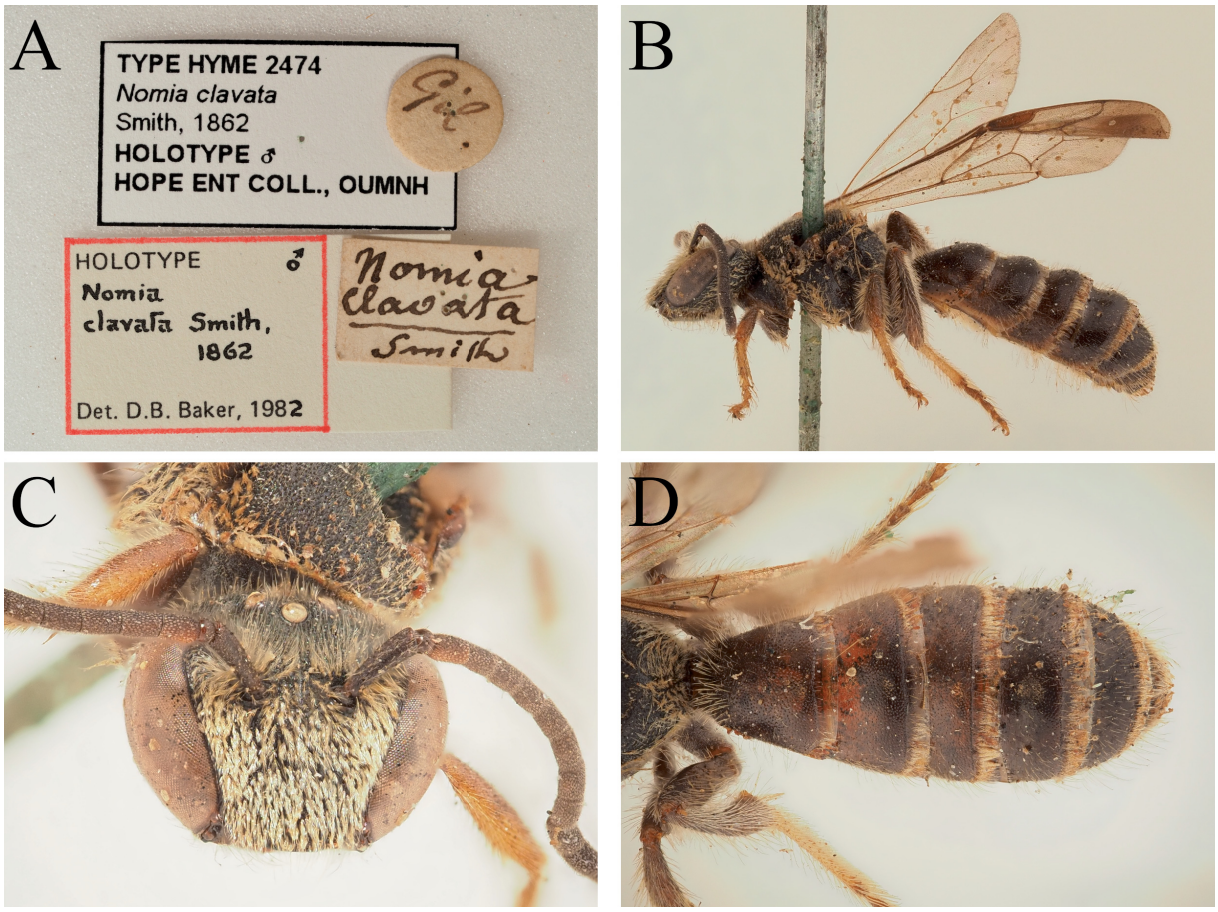

Fig. 62. *Nomia clavata* Smith, 1862, holotype, ♂ (OUMNH, ENT-HYME2474). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Type locality

Gilolo [= Halmahera].

Notes

Baker (1993: 222) wrote the following:

> "Of three ♂♂ standing as *clavata* in the UMO type collection, two, one labelled 'M' [Morty] and *'Nomia clavata*. Smith', the other 'Morty Isl.', evidently the basis of Smith's 1865 record, are of no type status and have been labelled accordingly. The third, labelled 'Gil.' [Gilolo] and *'Nomia clavata* Smith', is the HOLOTYPE of *clavata* and has so been labelled.
>
> Wallace's three ♂♂ are conspecific. They belong to a widely distributed [southern India and Nepal eastwards to the Philippines and New Guinea] species for which the earliest available name is probably *Lipotriches modesta* (Smith, 1862), q.v., 5.15-2. In the ♂, the nature of the specialized pubescence of sterna 3-5 and the structural peculiarities of sterna 5 and 6 are diagnostic. *L. pulchriventris* belongs to a rather numerous group of small, slender forms, with, in the ♂, a more or less elongate, subclavate metasoma. Other oriental species include, *e.g.*. *ceratina* (Smith, 1857), *basalis* (Smith, 1857), *elongatula* (Cockerell, 1915) and *yasumatsui* (Hirashima, 1961): all comb. nov. in *Lipotriches*".

Baker placed *N. clavata* in combination with *Lipotriches*, this name becoming a junior secondary homonym of *L. clavata* (Smith, 1853) (described as *Halictus clavatus* from Sierre Leone). The name *Nomia wallacei* Cockerell, 1939 was proposed as a replacement name, but as Baker placed *N. clavata* in synonymy with *L. pulchriventris* Cameron, 1897, this replacement name is relegated to a junior synonym. Pauly (2009) repeated Baker's synonymy, thus becoming its first publisher.

As for the date of collection, Wallace visited Halmahera twice in 1858 (1 Feb.–1 Mar. 1858 and 14 Sep.–1 Oct. 1858; Wallace 1869) and again in 1860. Since Smith (1860b) described *X. coronata* from Kajoa based on material collected in 1858 (see Section 62) before later reporting it from Halmahera (Smith 1862), it is likely that all Halmahera material reported in Smith (1862) is based on the 2 Oct.–5 Nov. 1860 visit to this island.

Current status

Lipotriches (*Rhopalomelissa*) *pulchriventris* (Cameron, 1897) (Pauly 2009).

Distribution

India, Sri Lanka, Nepal, China, Vietnam, Laos, Thailand, Malaysia, Philippines, Indonesia (Borneo, Sumatra, Java, Sulawesi, East Nusa Tenggara, North Maluku), New Guinea, Solomon Islands, and Australia (Queensland) (Pauly 2009).

65. ***Nomia modesta*** Smith, 1862
Fig. 63

Nomia modesta Smith, 1862: 59–60, ♀.

Type material examined

Holotype

INDONESIA • ♀; Gil. [Gilolo]; [probably 2 Oct.–5 Nov. 1860]; OUMNH, ENT-HYME2475.

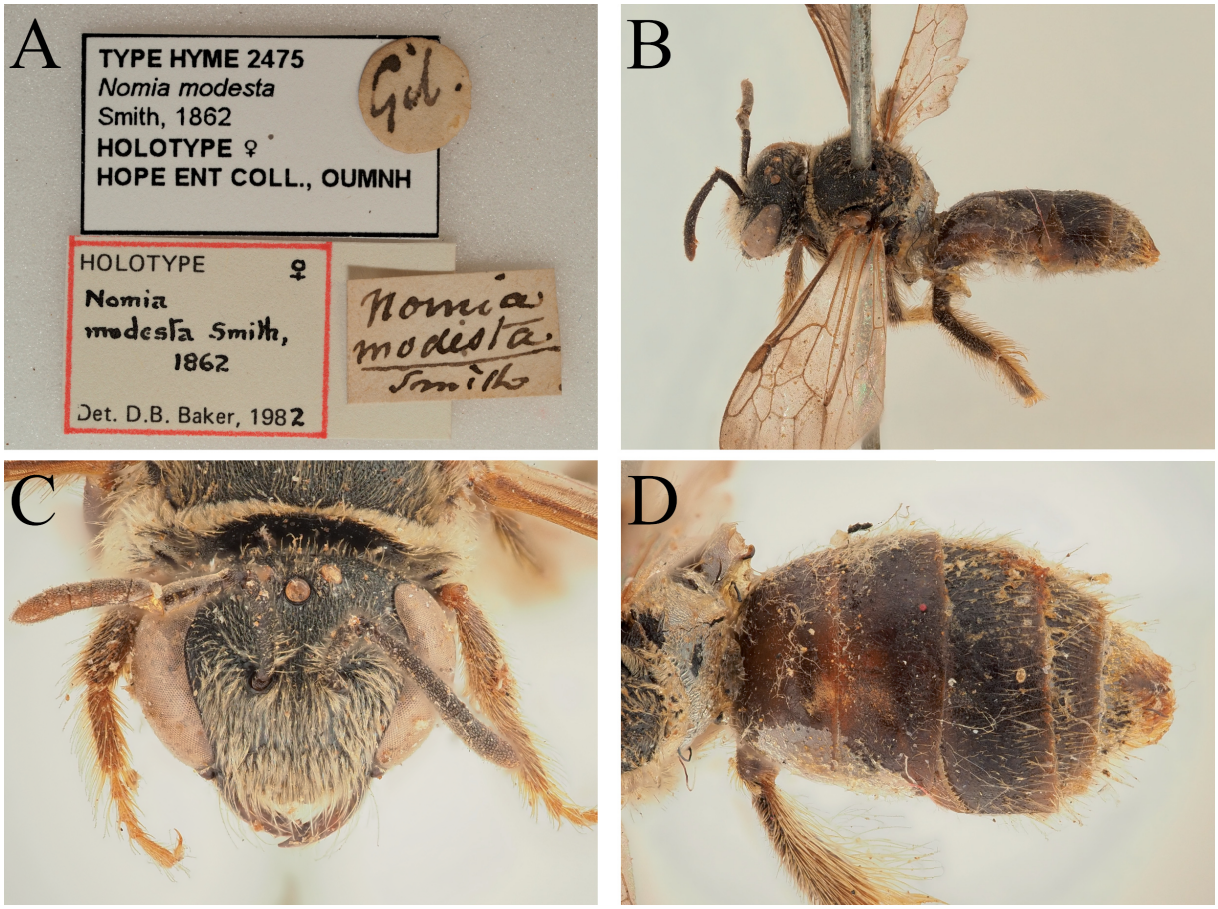

Fig. 63. *Nomia modesta* Smith, 1862, holotype, ♀ (OUMNH, ENT-HYME2475). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Type locality

Gilolo [= Halmahera].

Notes

Pauly (2009) treated this species as distinct from *L. pulchriventris*, in contrast to the tentative suggestion of Baker (1993: 222) who thought that they might be conspecific. For comments on the collecting date, see Section 64.

Current status

Lipotriches (*Rhopalomelissa*) *modesta* (Smith, 1862) (Pauly 2009).

Distribution

Indonesia (Java, North Maluku), Papua New Guinea, Bismark Archipelago, Solomon Islands, and Australia (Queensland) (Michener 1965; Pauly 2009).

66. ***Megachile aterrima*** Smith, 1862
Fig. 64

Megachile aterrima Smith, 1862: 60, ♀.

Type material examined

Holotype

INDONESIA • ♀; Tond. [Tondano, Sulawesi]; [10 Jun.–23 Sep. 1859]; OUMNH, ENT-HYME2820.

Type locality

Celebes (Tondano).

Notes

Baker (1993: 223) wrote the following:

> "A ♀ in the UMO type collection, labelled 'Tond.' [white disc] and *'Megachile aterrima* Smith.', is the HOLOTYPE of this species and it has now been labelled accordingly. It is substantially intact and in good condition. Two ♀♀ in NHM, labelled 'Celebes / $^{5}_{2}\,^{5}_{2}$', are not conspecific with the Oxford ♀ but are *Creightonella frontalis* (F., 1804)".

Wallace was in Manado on Sulawesi between 10 Jun.–23 Sep. 1859, and Tondano is some 20 kilometers to the south-east of this city.



Fig. 64. *Megachile aterrima* Smith, 1862, holotype, ♀ (OUMNH, ENT-HYME2820). **A**. Label information. **B**. Habitus, dorsal view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Current status

Megachile (*Alocanthedon*) *aterrima* Smith, 1862. Ascher & Pickering (2024) list this species as part of the subgenus *Callomegachile* Michener, 1962. However, they were separated into the subgenus *Alocanthedon* Engel & Gonzalez, 2011 that was first outlined by Baker (1993: 108). Given the distinctive morphology of this group, we list *M. aterrima* within this subgenus.

Distribution

Indonesia (Sulawesi) (Smith 1862; Baker 1993; Engel & Gonzalez 2011).

67. ***Megachile placida*** Smith, 1862
Fig. 65

Megachile placida Smith, 1862: 60, ♂.

Type material examined

Holotype

INDONESIA • ♂; Gil. [Gilolo]; [probably 2 Oct.–5 Nov. 1860]; OUMNH, ENT-HYME2821.

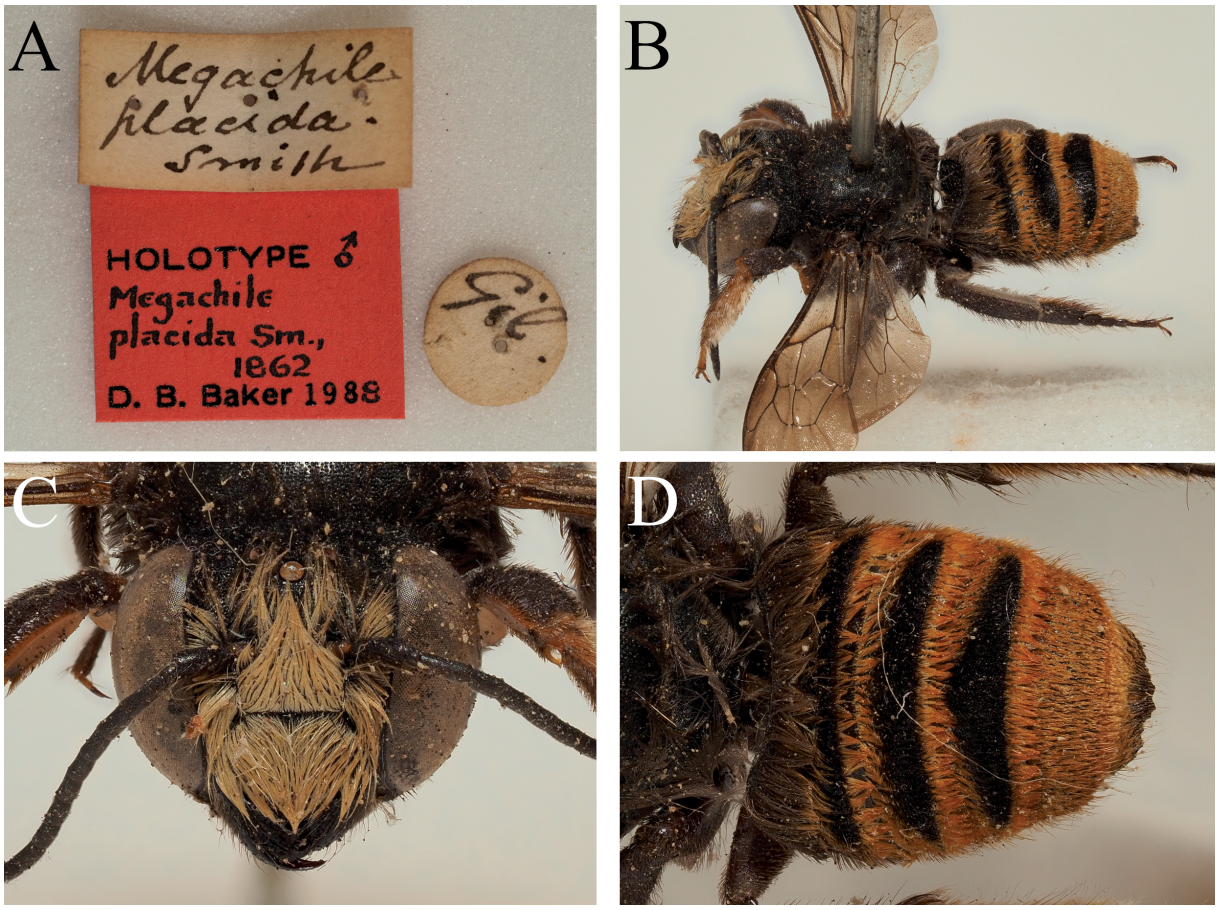

Fig. 65. *Megachile placida* Smith, 1862, holotype, ♂ (OUMNH, ENT-HYME2821). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Type locality

Gilolo [= Halmahera].

Notes

Baker (1993: 223) wrote the following:

> "Of two ♂♂ standing as *placida* in the UMO type collection, one, labelled 'Gil.' [white disc] and *'Megachile placida*. Smith', is the HOLOTYPE of that species and it has now been labelled accordingly. It is intact and in fair condition. The other, labelled 'M.' [Mysol, white disc] and *'Megachile placida* Smith' [blue paper, Smith], evidently the basis of Smith's 1863 record from Mysol, has been labelled as of no type status. From collection data, *placida* would appear to be the ♂ of *foliata* Smith, 1860, q.v., 5.13-7".

Baker indicated that *M. placida* was a synonym of *M. foliata* by combining them using "syn. nov.". For the Oriental species typified by the widespread *Megachile bicolor* (Fabricius, 1781) (the *Callochile* Michener, 1962 of Michener), specimens from the Moluccas show variation in the extent of the reddish pubescence, with a similar structure. We agree with the position of Baker, and formally synonymise *M. placida* with *M. foliata* **syn. nov.** For comments on the suggested collecting date, see Section 64.

Current status

Megachile (*Amegachile*) *foliata* Smith, 1860 **syn. nov.**

Distribution

Indonesia (Maluku: Ambon, Buru, Kai; North Maluku: Bacan, Southwest Papua: Misool), Papua New Guinea, Bismarck Archipelago, and the Solomon Islands (Lieftinck 1958, as *M. placida* ssp. *puncticollis* Friese, 1903; Ascher & Pickering 2024; current study).

68. ***Megachile laboriosa*** Smith, 1862
Fig. 66

Megachile laboriosa Smith, 1862: 60, ♂.

Type material examined

Holotype

INDONESIA • ♂; Ter. [Ternate]; [probably between 8 Jan. 1858–1 May 1859]; OUMNH, ENTHYME2822.

Type locality

Ternate.

Notes

Baker (1993: 223) wrote the following:

> "A ♂ in the UMO type collection, labelled 'Ter.' [white disc] and '*Megachile laboriosa* Smith' [Smith], is the HOLOTYPE of this species and it has now been labelled accordingly. The type is intact but for the loss of the R antenna and the apical segments of tarsus L I.
>
> *C. laboriosum* belongs to a small group of medium-sized, strikingly coloured *Chalicodoma* centred on New Guinea. The group includes *nidulator* (Smith, 1865), *tertium* (Dalla Torre, 1896)

> [= *senex* Smith, 1865, nec Smith, 1853, nec Smith 1862, = *albiceps* (Friese, 1903)], *pretiosum* (Friese, 1909), *hertlei* (Friese, 1911) [= *regina* (Cheesman, 1938) nec (Friese, 1903)] and *luteiceps* (Friese, 1911) [= *malayanum* var. *auriceps* (Meade-Waldo, 1914)]. To what extent these and their relatives may represent colour-forms of a smaller number of species is uncertain: ♂♂ of most have not been collected, or, at least, are not present in Berlin, Leiden, London, Oxford, Paris or Wien.
>
> *Chalicodoma tertium* is very perfectly mimicked by *Megachile* (*Callochile*) *lorentzi* Friese, 1911. Similar mimicry groups among strikingly patterned megachilines are more familiar in the Ethiopian fauna, where they may involve more than one subgenus each of *Chalicodoma* and *Megachile*, sometimes also *Creightonella* (which, on biological and structural grounds, is the more primitive of the three). Study of one such group suggests that a *Megachile* (*Amegachile*) species is the model for mimics in two subgenera of *Chalicodoma*, (*Callomegachile*) and (*Pseudomegachile*)".

For the collecting date, Wallace visited the island of Ternate at least five times in 1858–1859, between 8 Jan.–1 Feb. 1858; 1–25 Mar. 1858; 15 Aug.–14 Sep. 1858; 2–9 Oct. 1858; and 20 Apr.–1 May 1859 (Wallace 1869). Importantly, he sent a letter from Ternate between 2–9 March 1858 to Charles Darwin



Fig. 66. *Megachile laboriosa* Smith, 1862, holotype, ♂ (OUMNH, ENT-HYME2822). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

(the famous "Ternate manuscript" concerning what became the theory of evolution) (Smith 2014). It is impossible to pin down when exactly this specimen was collected over this period.

Current status

Megachile (*Callomegachile*) *laboriosa* Smith, 1862 (Ascher & Pickering 2024).

Distribution

Indonesia (North Maluku: Ternate) (Smith 1862; Ascher & Pickering 2024).

69. ***Xylocopa volatilis*** Smith, 1862
Fig. 67

Xylocopa volatilis Smith, 1862: 61, ♂.

Type material examined

Holotype

INDONESIA • ♂; Men. [Menado]; [10 Jun.–23 Sep. 1859]; OUMNH, ENT-HYME2823.



Fig. 67. *Xylocopa volatilis* Smith, 1862, holotype, ♂ (OUMNH, ENT-HYME2823). **A**. Label information. **B**. Habitus, dorsal view. **C**. Head, dorsolateral view. **D**. Hind legs and metasoma, lateral view.

Type locality

Menado [= Manado, Sulawesi].

Notes

Baker (1993: 223–224) wrote the following:

> "Two ♂♂ standing as *volatilis* in the UMO type collection are labelled:-
> a) 'Men.' [Menado, white disc], '*Xylocopa volatilis* Smith' [Smith] and 'type *volatilis* Smith rev. Lieftinck '55'. This ♂ is the HOLOTYPE of *volatilis* and it has now been labelled accordingly. It is in good condition and intact but for the loss of the greater part of the R flagellum.
> b) 'Seneg' [?] and '*X. confusa* (auct) Per. Det. M.A. Lieftinck 1955'. This was presumably a specimen misplaced in Saunders' collection and transferred with (a) to the type collection. There is nothing in Smith's description of *volatilis* to suggest that he may have seen more than one specimen".

The specimen indicated by Baker was not labelled as holotype; this has now been rectified.

Current status

Xylocopa (*Maiella*) *nobilis* Smith, 1858 (van der Vecht 1953; Ascher & Pickering 2024).

Distribution

Indonesia (Sulawesi, Sula islands) (van der Vecht 1953). Ascher & Pickering (2024) list also North Maluku and Maluku; the source of these records is not stated, but may be from works such as Maidl (1912) who cited the species from Ambon Island. Van der Vecht (1953: 59) cautions against any records from east of the Sula islands without confirmation.

70. ***Xylocopa diversipes*** Smith, 1862
Fig. 68

Xylocopa diversipes Smith, 1862: 61, ♂.

Type material examined

Holotype

INDONESIA • ♂; Tond. [Tondano, Sulawesi]; [10 Jun.–23 Sep. 1859]; OUMNH, ENT-HYME2824.

Type locality

Celebes (Tondano).

Notes

Baker (1993: 224) identified this specimen as the holotype and stated that he labelled it, but we found no type label; this has now been rectified.

Current status

Xylocopa (*Maiella*) *diversipes* Smith, 1862 (van der Vecht 1953; Ascher & Pickering 2024).

Distribution

Indonesia (Sulawesi) (van der Vecht 1953; Ascher & Pickering 2024).



Fig. 68. *Xylocopa diversipes* Smith, 1862, holotype, ♂ (OUMNH, ENT-HYME2824). **A**. Label information. **B**. Habitus, dorsal view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

71. ***Xylocopa perforator*** Smith, 1862
Figs 69–70

Xylocopa perforator Smith, 1862: 61–62, ♀♂.

Type material examined

Lectotype

INDONESIA • ♀; Tim. [Timor, probably Kupang, East Nusa Tenggara]; [most likely 13–27 May 1859]; OUMNH, ENT-HYME2825 (lectotype designated by Lieftinck 1956b).

Paralectotypes

INDONESIA • 1 ♂; Tim. [Timor, probably Kupang, East Nusa Tenggara]; [most likely 13–27 May 1859]; OUMNH • 1 ♂; Tim. [Timor, probably Kupang, East Nusa Tenggara]; [most likely 13–27 May 1859]; NHMUK, Type 17b, 151 (examined by photograph).

Type locality

Nominally Ternate, but most likely Timor (Lieftinck 1956b).

Notes

Lieftinck (1955: 31–32) published on *X. perforator*, giving a terra typica of Ternate (under the name *X. perforator* Smith, 1861) and a distribution spanning Sumatra, Java, Borneo, the Lesser Sunda islands, and Batjan [= Bacan], the latter based on a single female specimen. He wrote:

> "*X. perforator* was originally described from Ternate (North Moluccas), but it has apparently either been neglected by entomologists on account of its large size and supposed abundant, or it is very scarce in these eastern islands, for recent expeditions to Halmahera, Ternate, Batjan, and Obi yielded no further specimens. The presence in the Leiden Museum of a female from Batjan (Van der Weele collection), however, is significant and of great interest".

Lieftinck (1956b: 73) then published further on the species:

> "Type material studied. — 1 ♀, 1 ♂, both carrying round labels indicated "Tim" [= Timor !] and, in addition, ♀ with blue, ♂ with white labels "*Xylocopa perforator* Smith" in F. Smith's handwriting (type collection, OUM). 1 ♂, with round label "Tim", in the type collection, No. 17 B. 51 (BM). — The pair in the Oxford Museum should be considered to be the types of this species, and since Smith described the ♀ first, I have selected the ♀ in that collection as the lectotype of *perforator* F. Smith, the ♂ in the Oxford and British Museums representing Smith's cotypes.

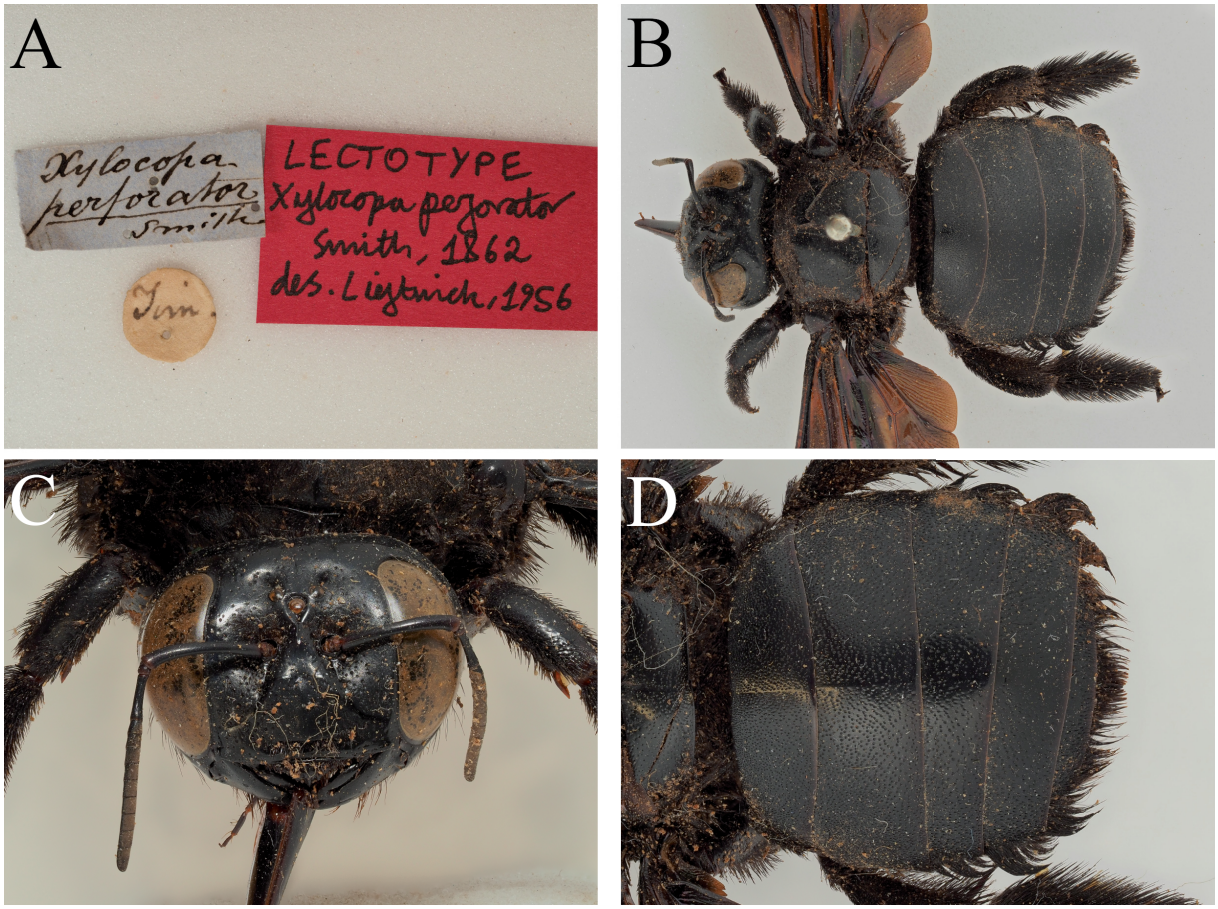

Fig. 69. *Xylocopa perforator* Smith, 1862, lectotype, ♀ (OUMNH, ENT-HYME2825). **A**. Label information. **B**. Habitus, dorsal view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

> In a previous paper (loc. cit.) I have already expressed doubt as to the correctness of the interpretation of the locality originally given for *perforator*, since no specimens had ever been taken since on the Moluccan islands. A recent examination of the three specimens present in the Oxford University and British Museum collections has proved that all carry a written label with "Tim", which obviously is an abbreviation of Timor, on which island the species has repeatedly been collected in more recent times as well. The original locality thus is Timor, not Ternate".

Baker (1993: 224) disagreed with Lieftinck's treatment, quoting some of the text reproduced above and adding:

> "All this deliberation and speculation, and the resultant false lectotype designation, could have been avoided if Lieftinck had (1) realized that the Timor specimens were those recorded in Smith's 1863 paper, and (2) noticed that Smith's ♀ syntype of *perforator* from Ternate had been left behind in Saunders' collection, standing over Smith's drawer-label '*perforator* Ternate. Sm.', when the Timor specimens were removed to the type collection. Further, even if he was not aware of the Timor record in Smith's 1863 paper, Lieftinck should have realized, particularly since he dated Smith's Ceram, Celebes, Ternate, Gilolo paper to 1861, that any Timor specimens were hardly likely to have been before Smith when the latter paper was drafted' ; and might have wondered why, if Smith had had three specimens all clearly labelled 'Tim' before him, he should have given the locality as Ternate.
>
> As to the identities of the two species here concerned, that from Ternate, which must be Smith's *perforator*".

We disagree with Baker's treatment for two reasons. The first is that we have been unable to retrieve any additional *X. perforator* specimens in the main OUMNH collection, specifically searching in the drawers that contain the W.W. Saunders collection. It is therefore difficult to judge what they are or may have been. The more important reason is that Smith (1862) clearly described the species in the female and male sexes; given that Baker claims that only a single female from Ternate was left behind in the Saunders collection, then how could Smith have also described the male? The male specimen labelled as coming from Timor clearly matches Smith's description in "the eyes very large, nearly touching on the vertex" (Fig. 70B), "the clypeus triangular, the anterior margin fringed with short pale pubescence" (Fig. 70C), and "the anterior tarsi dilated, fringed with black pubescence behind; beneath it is nearly white" (Fig. 70D–E).

This male specimen or the specimen in the NHMUK (also a male) must be syntypic (or at least, one of them must be syntypic) because Smith must have examined them (or it) in order to write the description of the male sex. Given the known existence of three specimens all labelled as coming from Timor, the necessity of at least one of the male specimens being part of the original type series, and the subsequent study of the geographical distribution of this species (Lieftinck 1955, 1956b), we consider it most likely that Smith simply gave the wrong island in his original description, both Ternate and Timor beginning with the same letter.

In terms of the collecting period, Baker is correct to imply in his writing that Wallace visited Timor in 1861, as Wallace departed Ternate on 2 Jan. 1861, arriving in Dili in Timor-Leste on 7 Jan. 1861 and staying there until 25 Apr. 1861 (Wallace 1869). Given that the bee section (pages 49–66) of Smith (1862) was not published until 1 Mar. 1862 (and pages 36–48 were published on 1 Nov. 1861) it is not impossible that Smith examined these specimens from Dili when writing the description of *X. perforator*, but it is unlikely given the observed lag seen for the collection and description dates for other species. A much more likely explanation is that Wallace previously visited Timor between 25–26 Nov. 1857 *en route* from Makassar to Ambon Island (19–30 Nov. 1857), spending a day each in Kupang and Dili, and again between 13–27 May 1859 at Kupang after departing Ternate on 1 May 1859 (Wallace 1869).

Baker (2001: 280) gave the same collecting dates, writing that:

> "Wallace's Timor insects were included in his 'Ternate &c and Menado' consignment of October 1859 (notebook, p. [32]). They were not listed separately but counted in with the Ternate insects, the totals being private 900, sale 'abt. 2000'. British Museum: the BM appears to have purchased no Timor insects from this consignment, unless they became mixed with the Menado material purchased in September and October 1860 (Accession Numbers 60.76, 60.90). The only direct



Fig. 70. *Xylocopa perforator* Smith, 1862, paralectotype, ♂ (OUMNH). **A**. Label information. **B**. Habitus, dorsal view. **C**. Head, frontal view. **D**. Right foreleg, dorsal view. **E**. Right foreleg, ventral view. **F**. Metasoma, dorsal view.

> reference in the Accessions Register to Timor material does not appear until August 1862 and even that entry is doubtful, having been annotated 'should be Batchian v. Koltes Novitates'. W.W. Saunders: Saunders' Timor Hymenoptera, jointly with others from Mysol, Ceram, Waigiou and Bouru, were treated by Smith (1863, read 15 January 1863). Pinned specimens were labelled 'Tim.'.".

We believe that it is much more likely that Smith would have examined some of these Timor specimens from May 1859 mixed in with specimens from Ternate. Given the collection dates of other specimens published in Smith (1862), we consider 13–27 May 1859 the most likely collecting dates for *X. perforator* and Kupang (Indonesia, East Nusa Tenggara) to be the most likely terra typica. We have therefore labelled the specimen indicated by Lieftinck (1956b) as the lectotype (Fig. 69), as his comments allow it to be unambiguously recognised within the OUMNH collection (ICZN 1999 Article 74), and the male is labelled as paralectotype (Fig. 70).

Current status

Xylocopa (*Platynopoda*) *perforator* Smith, 1862.

Distribution

Indonesia (Sumatra, Java, Borneo, Lesser Sunda Islands) and Timor-Leste (Maa 1939; Lieftinck 1955, 1956b). Ascher & Pickering (2024) also gives locations in Malaysia (Peninsula, Borneo).



Fig. 71. *Prosopis apicata* Smith, 1863, holotype, ♀ (OUMNH, ENT-HYME2826). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Species described by Smith (1863) from the islands of Buru, Misool, Seram, Timor, and Waigeo, and also Manokwari (Doberai Peninsula, New Guinea)

72. ***Prosopis apicata*** Smith, 1863
Fig. 71

Prosopis apicata Smith, 1863: 44, ♀.

Type material examined

Holotype
INDONESIA • ♀; M. [Mysol]; [probably 24 Feb.–1 Jul. 1860]; OUMNH, ENT-HYME2826.

Type locality

Mysol [= Misool].

Notes

Baker (1993: 229) identified this specimen as the holotype and stated that he labelled it, but we found no type label; this has now been rectified. Wallace did not collect on Misool (Wallace 1869), and this material was collected by his assistant Charles Allen. Baker (1993: 174) estimated that this would have occurred between 24 Feb. 1860 when Wallace and Allen separated, and 1 Jul. 1860 when Allen arrived at Wahai on the island of Ceram.

Current status

Palaeorhiza (*Callorhiza*) *apicata* (Smith, 1863) (Hirashima 1989).

Distribution

Indonesia (Southwest Papua: Misool) (Smith 1863; Michener 1965; Hirashima 1989; Ascher & Pickering 2024).

73. ***Prosopis lusoria*** Smith, 1863
Fig. 72

Prosopis lusoria Smith, 1863: 44, ♀.

Type material examined

Holotype
INDONESIA • ♀; M. [Mysol]; [probably 24 Feb.–1 Jul. 1860]; OUMNH, ENT-HYME2827.

Type locality

Mysol [= Misool].

Notes

Baker (1993: 229) identified this specimen as the holotype and stated that he labelled it, but we found no type label; this has now been rectified. For collecting date, see discussion in Section 72.

Current status

Palaeorhiza (*Heterorhiza*) *lusoria* (Smith, 1863) (Hirashima & Lieftinck 1982).

Distribution

Indonesia (Southwest Papua: Misool) and Papua New Guinea (Smith 1863; Hirashima & Lieftinck 1982; Ascher & Pickering 2024).



Fig. 72. *Prosopis lusoria* Smith, 1863, holotype, ♀ (OUMNH, ENT-HYME2827). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

74. ***Prosopis imperialis*** Smith, 1863
Fig. 73

Prosopis imperialis Smith, 1863: 44–45, ♀.

Type material examined

Holotype

INDONESIA • ♀; Dor. 10. [Dory]; [11 Apr.–29 Jul. 1858]; OUMNH, ENT-HYME2828.

Type locality

Dory [= Dore Bay, now Manokwari, Doberai Peninsula, West Papua].

Notes

The specimen is labelled "Dor. 10". Examination of Wallace's 3rd notebook (Beccaloni 2025) reveals the following information under "Dorey. (N. Guinea).. Notes on Miscellaneous.":

> "Bee? stings acutely but soon goes off - at flowers."

This presumably refers to *P. imperialis*, with its hylaeine and relatively hairless morphology possibly causing Wallace's uncertainty as to whether or not it was truly a bee.

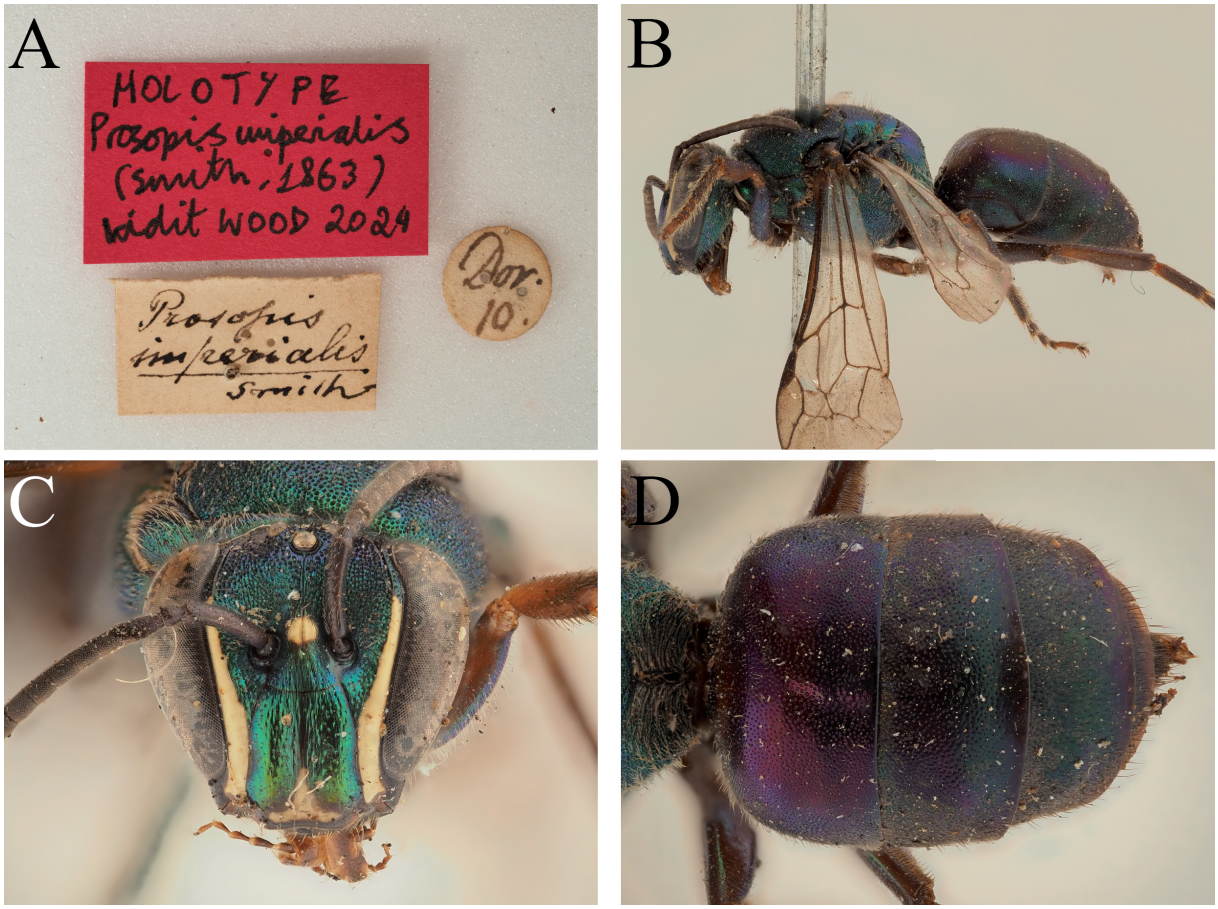

Fig. 73. *Prosopis imperialis* Smith, 1863, holotype, ♀ (OUMNH, ENT-HYME2828). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Hirashima (1980: 114) and Baker (1993: 229) note that Michener (1965: 146) incorrectly listed the NHMUK as the type depository for this species (type 17a, 2835). This specimen bears only a printed rectangular label reading "Dory", and was not labelled by Smith. It cannot therefore be regarded as a valid type specimen, lacking labels by either collector or describer. Baker (1993: 230) identified the OUMNH specimen as the holotype and stated that he labelled it, but we found no type label; this has now been rectified. Smith (1863: 45) notes that he forgot to describe this species in his 1860b paper, and so it joins *Megachile alecto* (Section 59) as the only other species described based on Wallacean material from Manokwari.

Current status

Palaeorhiza (*Hadrorhiza*) *imperialis* (Smith, 1863) (Hirashima 1980).

Distribution

Indonesia (Southwest Papua) and Papua New Guinea (Hirashima 1980; Ascher & Pickering 2024).

75. ***Nomia bidentata*** Smith, 1863
Fig. 74

Nomia bidentata Smith, 1863: 45, ♂.

Type material examined

Holotype

INDONESIA • ♂; M. [Mysol]; [probably 24 Feb.–1 Jul. 1860]; OUMNH, ENT-HYME2829.

Type locality

Mysol [= Misool].

Notes

Baker (1993: 230) wrote the following:

> "A ♂ in the UMO type collection, labelled 'M.' [Mysol; white disc] and '*Nomia bidentata* Smith' [Smith], is the HOLOTYPE of this species and it has now been labelled accordingly. It is intact, but for the loss of distitarsus R III, and in fair condition, but the R wings are torn and the mesosoma is split by the pinning.
>
> It should be noted that Michener's key (1965: 152) to the Australasian subgenera of *Nomia* is incorrect, at least in so far as this species is concerned: *bidentata* ♂ is not largely testaceous, and the ocellocular distance is considerably greater than the ocellar diameter".

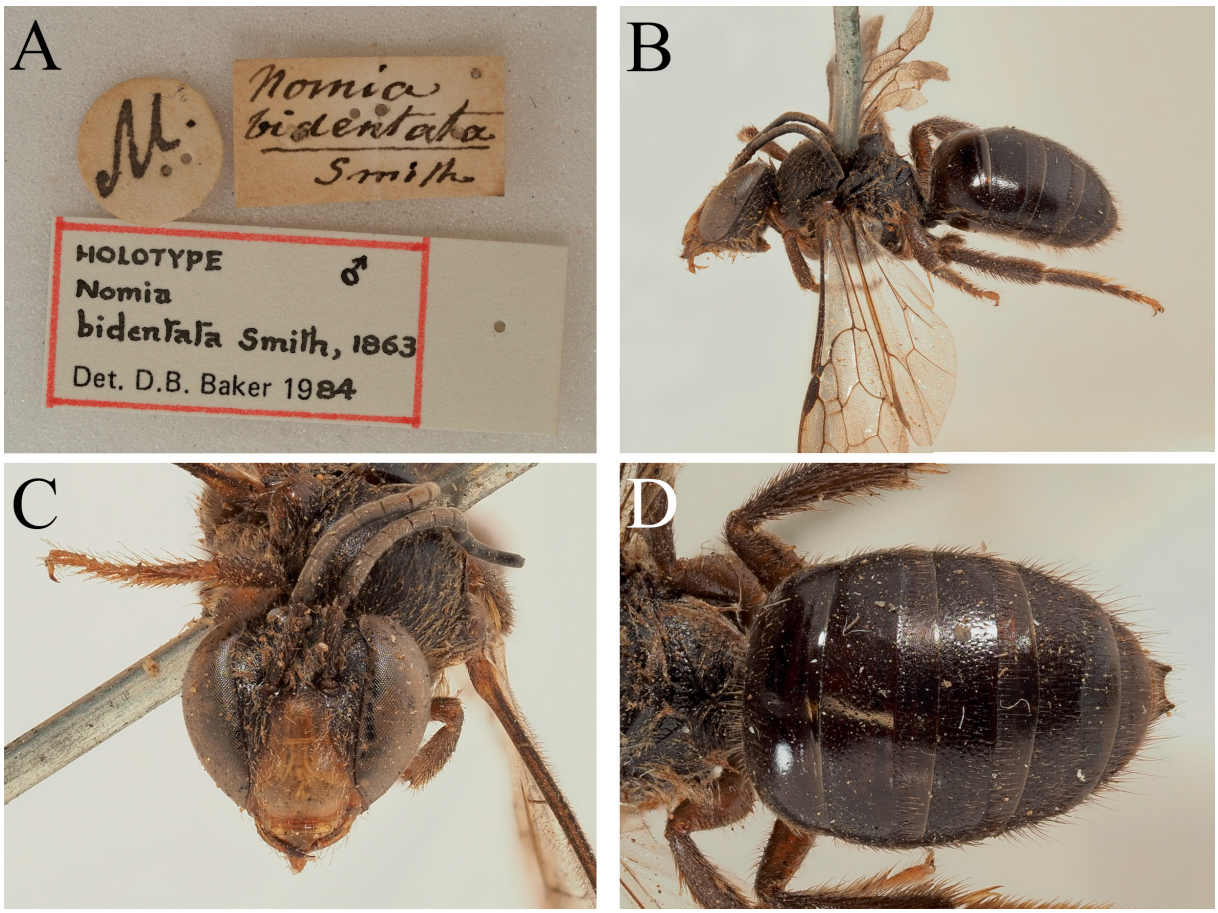

Fig. 74. *Nomia bidentata* Smith, 1863, holotype, ♂ (OUMNH, ENT-HYME2829). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Michener (2007: 343) notes that the 11 taxa placed in this genus (see also Michener 1965) are likely to represent a smaller number of species, perhaps 2–3, a comment echoed by Pauly (2009). Pauly (2024a) goes even further and notes that all taxa may simply be colour variations of one single species. Revisionary study is required (see also Bossert & Tierney 2025). For collecting date, see discussion in Section 72.

Current status

Reepenia bidentata (Smith, 1863).

Distribution

Indonesia (South Papua: Misool) (Smith 1863; Michener 1965; Ascher & Pickering 2024).

76. ***Nomia florea*** Smith, 1863
Fig. 75

Nomia florea Smith, 1863: 45, ♂.

Type material examined

Holotype

INDONESIA • ♂; M. [Mysol]; [probably 24 Feb.–1 Jul. 1860]; OUMNH, ENT-HYME2830.

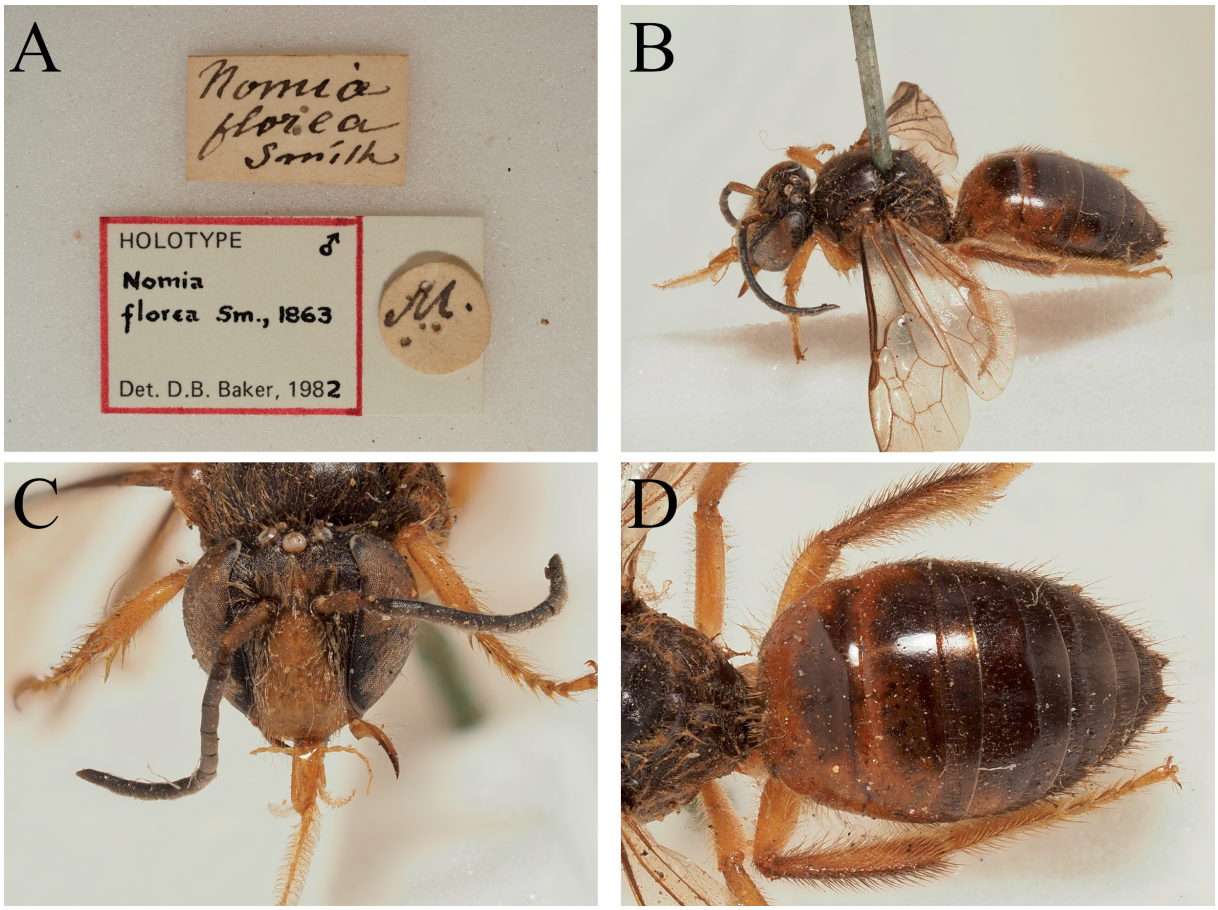

Fig. 75. *Nomia florea* Smith, 1863, holotype, ♂ (OUMNH, ENT-HYME2830). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Type locality

Mysol [= Misool].

Notes

Baker (1993: 230) wrote the following:

> "A ♂ in the UMO type collection, labelled 'M' [Mysol] and '*Nomia florea* Smith' [Smith], is the HOLOTYPE of this species and it has now been labelled accordingly. A second ♂, probably not conspecific, in the same collection, labelled 'S' [probably Salwatty] and '*Nomia florea* Sm.' [blue paper; Smith], has been labelled as of no type status".

As for *R. bidentata*, revisionary study of the genus *Reepenia* Friese, 1909 is required (Pauly 2024a). For collecting date, see discussion in Section 72.

Current status

Reepenia florea (Smith, 1863).

Distribution

Indonesia (South Papua: Misool) (Smith 1863; Michener 1965; Ascher & Pickering 2024).

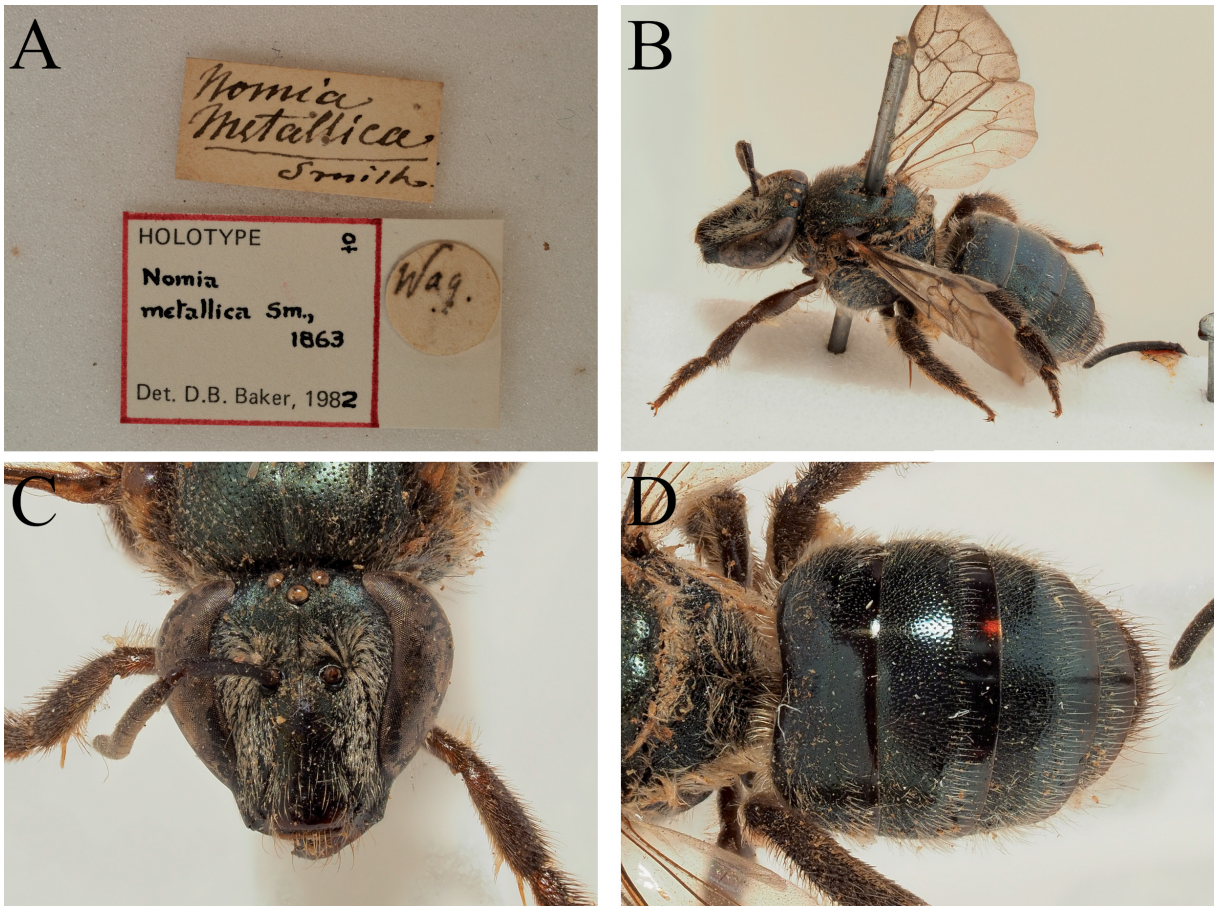

Fig. 76. *Nomia metallica* Smith, 1863, holotype, ♀ (OUMNH, ENT-HYME2831). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

77. ***Nomia metallica*** Smith, 1863
Fig. 76

Nomia metallica Smith, 1863: 45–46, ♀.

Type material examined

Holotype
INDONESIA • ♀; Wag. [Waigiou]; [4 Jul.–29 Sep. 1860]; OUMNH, ENT-HYME2831.

Type locality

Waigiou [= Waigeo].

Notes

Baker (1993: 230) wrote the following:

> "A ♀ in the UMO type collection, labelled 'Wag' [Waigiou] and '*Nomia metallica* Smith' [Smith], is the HOLOTYPE of this species and it has now been labelled accordingly".

The type was not revised by Hirashima (1967) or Pauly (2009), but Pauly (2024b) presents photographs of the OUMNH type material and treats *Mellitidia aeraria* (Hirashima, 1967) that was described from Papua New Guinea as a junior synonym. This synonymy must be considered as provisional until formal publication.

Current status

Mellitidia metallica (Smith, 1863).

Distribution

Indonesia (Southwest Papua: Waigeo) (Smith 1863; Michener 1965; Ascher & Pickering 2024) and Papua New Guinea if including *M. aeraria* as a junior synonym (Pauly 2024b).

78. ***Nomia simillima*** Smith, 1863
Fig. 77

Nomia simillima Smith, 1863: 46, ♀.

Type material examined

Holotype
INDONESIA • ♀; Cer. [Ceram]; [either 31 Oct.–28. Dec. 1859 or 26 Feb.–17 Jun. 1860]; OUMNH, ENT-HYME2832.

Other material examined

INDONESIA • 29 ♂♂, 12 ♀♀; N Moluccas, S Batjan [Bacan]; 0 m a.s.l.; 1 Jun.–31 Jul. 1952; A.M.R. Wegner leg.; T.J. Wood det.; RMNH, RMNH.INS.1714068 to RMNH.INS.1714108 • 1 ♀; Araucaria Camp. [West Papua]; [-3.5000° S, 139.1836° E]; 800 m a.s.l.; 2 Apr. 1939; L. Toxopeus leg.; [3rd Archibold Expedition]; T.J. Wood det.; RMNH, RMNH.INS.1714066 • 1 ♀; S Moluccas, Ambon; 1 Jan.–31 Dec. 1962; A.M.R. Wegner leg.; T.J. Wood det.; RMNH, RMNH.INS.1714067.

Type locality

Ceram [= Seram].

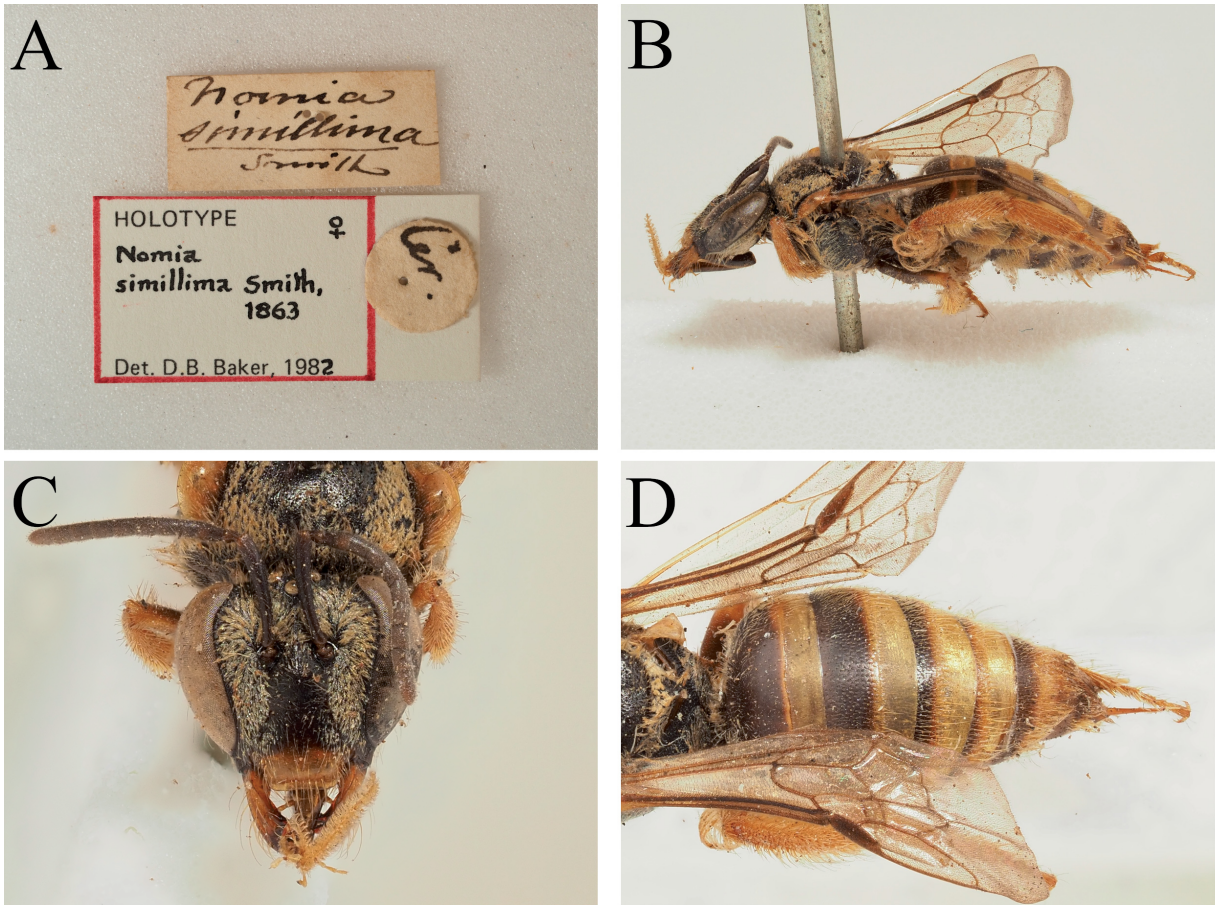

Fig. 77. *Nomia simillima* Smith, 1863, holotype, ♀ (OUMNH, ENT-HYME2832). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsolateral view.

Notes

Baker (1993: 230) wrote the following:

> "A ♀ labelled 'Cer.' [Ceram] and '*Nomia simillima* Smith' [Smith], standing over the drawer-label '*similata* [sic] Sm.' in the UMO type collection, is the HOLOTYPE of this species and it has now been labelled accordingly".

Co-ordinates for the Araucaria Camp were taken with reference to Toxopeus (1940).

Current status

Mellitidia simillima (Smith, 1863).

Distribution

Indonesia (Maluku: Seram, Bacan; West Papua) (Smith 1863; Michener 1965; Ascher & Pickering 2024).

79. ***Megachile funeraria*** Smith, 1863
Fig. 78

Megachile funeraria Smith, 1863: 46–47, ♀.

Type material examined

Lectotype

INDONESIA • ♀; Booru [Bouru]; [4 May–3 Jul. 1861]; OUMNH, ENT-HYME2833-01 (lectotype indicated by Baker 1993, de facto lectotype by present designation)

Paralectotype

INDONESIA • 1 ♀; ?Booru [no locality label]; OUMNH, ENT-HYME2833-02 (not labelled as paralectotype by Baker).

Type locality

Bouru [= Buru].

Notes

Baker (1993: 230–231) wrote the following:

> "Of two ♀♀ standing as *funeraria* in the UMO type collection, one is labelled 'Booro.' [blue paper], the other *'Megachile funeraria* Smith.' [blue paper; Smith], Although the latter bears no data label, there is no reason to suppose it to be other than a syntype of *funeraria*, for which Smith gave no locality other than Bouru in his subsequent catalogue (1873: 390). The 'Booro' specimen is now designated as LECTOTYPE of *funeraria* and it has been labelled accordingly;

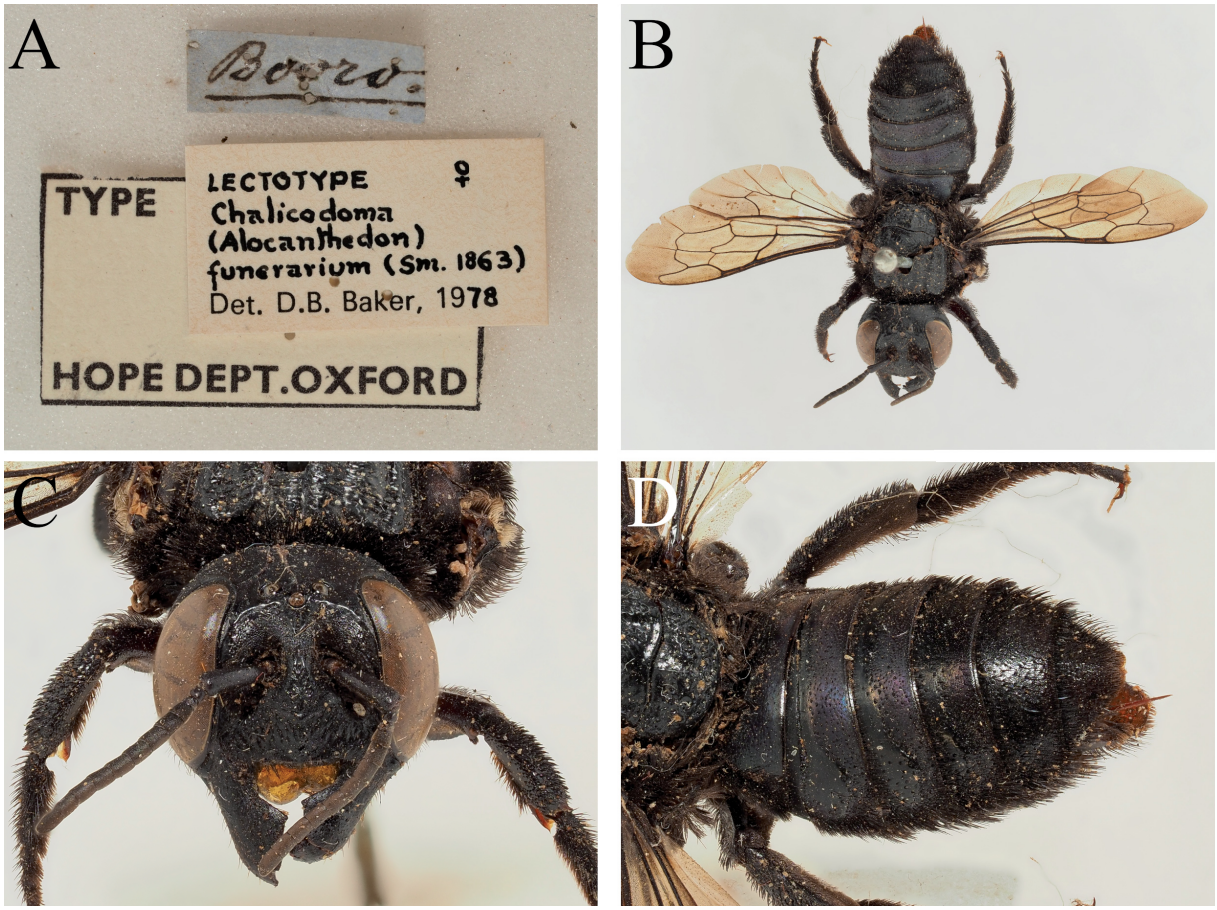

Fig. 78. *Megachile funeraria* Smith, 1863, lectotype, ♀ (OUMNH, ENT-HYME2833-01). **A**. Label information. **B**. Habitus, dorsal view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

the specimen with Smith's determination label has been labelled as a paralectotype. The lectotype has lost leg L II and tarsus R II, and the mesosoma is crushed.

The sculpture of vertex and mesonotum in this species is much as in *bicanaliculatum* (Cameron, 1901) [Sarawak: Matang. Type ♀ B.M. Type Hym. 17 a 2052]. The terga are glossy, with mixed larger and smaller punctures, not at all dense".

Baker's indicated specimen is here formally published as the lectotype.

Current status

Megachile (*Alocanthedon*) *funeraria* Smith, 1863. Baker (1993: 230) indicated that the species belonged to the subgenus *Alocanthedon* and labelled it as such (Fig. 78A), but the species was not included in the revision of Engel & Gonzalez (2011) at the time of the formal description of this subgenus. This increases the number of species in the subgenus to eight (Engel & Gonzalez 2011; Engel & Schwarz 2011), but revisionary work is required due to overlooked names such as *M. funeraria* as well as *Megachile bicanaliculata* Cameron, 1901 which belongs to this subgenus and was described from Sarawak in the female sex, the same *terra typicus* as *Megachile* (*Alocanthedon*) *trusanica* Engel, 2011. Further study is required.



Fig. 79. *Nomada insularis* Smith, 1863, lectotype, ♀ (OUMNH, ENT-HYME2834). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Distribution

Indonesia (Maluku: Buru) (Smith 1863). Ascher & Pickering (2024) list also Java; the underlying source data are not currently available.

80. ***Nomada insularis*** Smith, 1863
Fig. 79

Nomada insularis Smith, 1863: 47, ♀.

Type material examined

Lectotype
INDONESIA • ♀; Cer. [Ceram]; [either 31 Oct.–28. Dec. 1859 or 26 Feb.–17 Jun. 1860]; OUMNH, ENT-HYME2834 (lectotype designated by Schwarz & Gusenleitner 2004).

Type locality

Ceram [= Seram].

Notes

Baker (1993: 231) identified this specimen as the holotype and stated that he labelled it, but we found no type label. Schwarz & Gusenleitner (2004: 1418) published the specimen as a lectotype (giving the year of publication as 1864) and we see no reason to relabel the specimen as the holotype (cf. ICZN recommendation 73F).

Current status

Nomada (*Mininomada*) *insularis* Smith, 1863. Part of the *furva* group considered by Alexander & Schwarz (1994) which is now described as subgenus *Mininomada* Straka, 2024 (Straka *et al*. 2024). *Lasioglossum* (Halictidae) are the likely hosts due to the small body size and complete absence of species of *Andrena* Fabricius, 1775 (Andrenidae) in the Southeast Asian islands (Straka *et al*. 2024).

Distribution

Indonesia (Maluku: Seram) (Smith 1863; Ascher & Pickering 2024).

81. ***Nomada conspicua*** Smith, 1863
Fig. 80

Nomada conspicua Smith, 1863: 47, ♂.

Type material examined

Lectotype
TIMOR-LESTE • ♂; Tim. [Timor]; [probably 7 Jan.–25 Apr. 1861]; OUMNH, ENT-HYME2835 (lectotype designated by Schwarz & Gusenleitner 2004).

Type locality

Timor [= Dili, Timor-Leste].

Notes

Baker (1993: 231) identified this specimen as the holotype and stated that he labelled it, but we found no type label. Schwarz & Gusenleitner (2004: 1422) published the specimen as a lectotype (giving the year of publication as 1864) and we see no reason to relabel the specimen as the holotype (cf. ICZN 1999 recommendation 73F).

As discussed above for *X. perforator* (see Section 71), Wallace visited Timor multiple times. However, after 1860 he visited it just once, between 7 Jan.–25 Apr. 1861, collecting around Dili before departing to Buru on 25 Apr. 1861. The terra typica can therefore be considered to be within the modern country of Timor-Leste.



Fig. 80. *Nomada conspicua* Smith, 1863, lectotype, ♂ (OUMNH, ENT-HYME2835). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Labrum and mandibles, ventral view. **E**. Propodeum, posterior view. **F**. Metasoma, dorsal view.

Current status

Nomada (*Mininomada*) *conspicua* Smith, 1863. Part of the *furva* group considered by Alexander & Schwarz (1994) which is now described as subgenus *Mininomada* Straka, 2024 (Straka *et al*. 2024).

Distribution

Timor-Leste (Smith 1863; Schwarz & Gusenleitner 2004), almost certainly also Indonesia (East Nusa Tenggara).

82. ***Xylocopa provida*** Smith, 1863
Fig. 81

Xylocopa provida Smith, 1863: 48, ♀♂.

Type material examined

Lectotype

INDONESIA • ♀; M. [probably Mysol]; [probably 24 Feb.–1 Jul. 1860]; OUMNH, ENT-HYME2836-01 (lectotype designated by Lieftinck 1957).

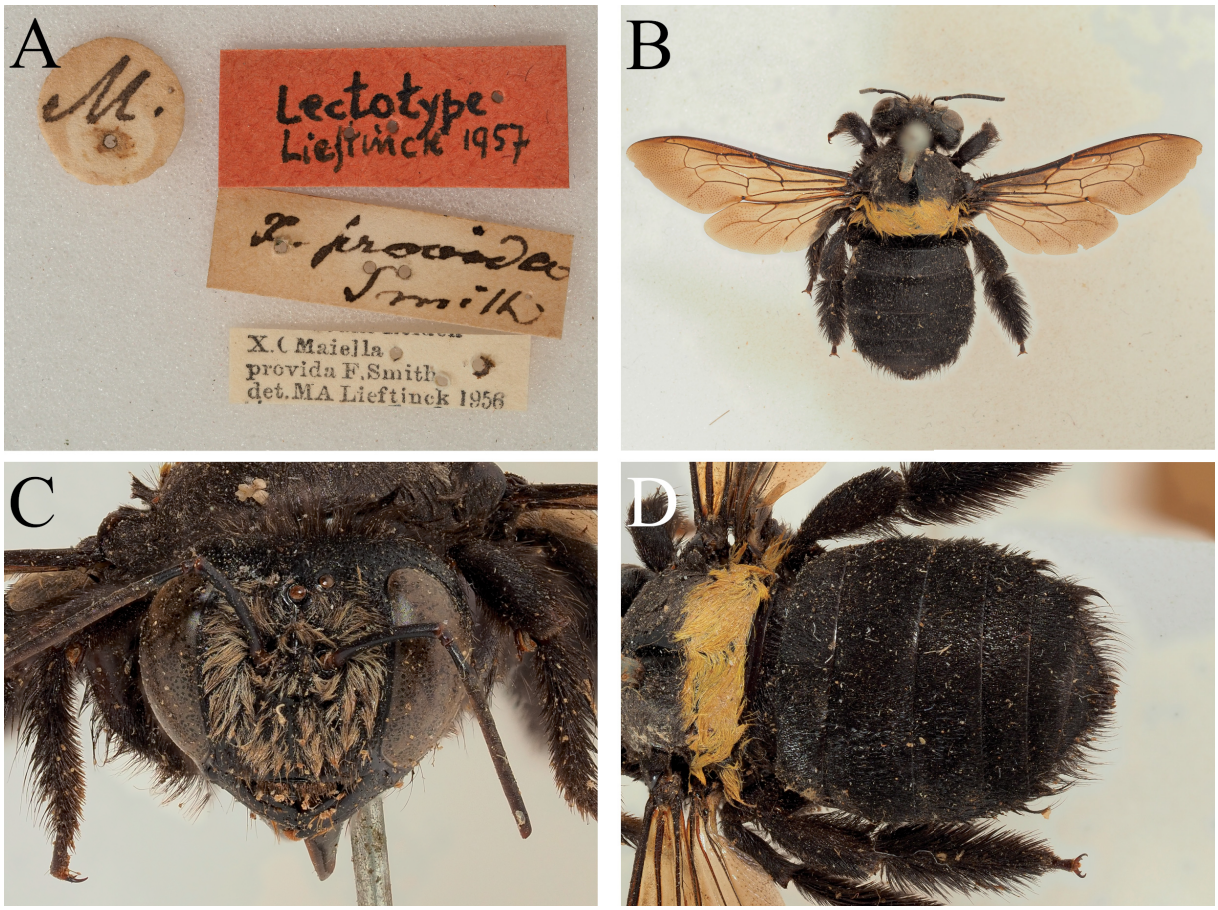

Fig. 81. *Xylocopa provida* Smith, 1863, lectotype, ♀ (OUMNH, ENT-HYME2836-01). **A**. Label information. **B**. Habitus, dorsal view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Paralectotypes

INDONESIA • 1 ♂; M. [probably Mysol]; [probably 24 Feb.–1 Jul. 1860]; OUMNH, ENT-HYME2836-02 • 1 ♀; Wag. [Waigiou]; [4 Jul.–29 Sep. 1860]; OUMNH, ENT-HYME2836-03.

Type locality

Mysol [= Misool], Waigiou [= Waigiou]. Fixed as Misool by lectotype designation.

Notes

Smith (1863) described the species, citing Mysol (= Misool) and Waigiou (= Waigeo) as the collecting localities. Lieftinck (1957: 345) selected a female nominally from Misool and designated it as the lectotype.

However, Baker (1993: 231) wrote the following:

> "Four specimens standing as *provida* in the UMO type collection are labelled:-
> a) ♀, 'M.' [Mysol or Morty ?; white disc], *'X. provida* Smith', '*X.* (*Maiella*) *provida* F. Smith det. MA Lieftinck 1956' [print, = XM], and 'lectotype Lieftinck 1957'. In fair condition and intact but for loss of apical segments of R II.
> b) ♂ (diss.), 'M.' [Mysol or Morty ?; white disc], *'Xylocopa provida* Smith', XM, and 'Lectoallotype Lieftinck 1957' [red paper].
> c) ♀, 'Wag' [Waigiou; white disc], *'X. provida* Smith', *'divisa* Klug Abyss ♀ agrees with this' [hand ?], and 'Paratype' [print, red].
> d) ♀, 'N' [New Guinea (Allen); white disc], *'Xylocopa provida* ♂ Smith' [blue paper], XM, and 'Paratype' [print, red].
>
> Lieftinck's 'The two Smithian types are a pair from Misool' (1957: 345) is clearly incorrect since Smith had syntypes from both Mysol and Waigiou. Lieftinck's labelling of the New Guinea ♂, (d), as a paratype is also clearly incorrect. Since the labels 'M.' on specimens (a) and (b) cannot be definitely identified with either Mysol or Morty, and since, therefore, it cannot be known which specimen may have been one of Smith's syntypes and which the basis of his 1865 record from Morty, Lieftinck's proper course would have been to select as lectotype the one syntype of unquestionable origin, the ♀ 'Wag', (c). A submission to ICZN proposing redesignation may seem preferable to having as 'lectotype' a specimen that is neither of known origin nor certainly a syntype".

Whilst Baker's reasoning is sound, we do not consider it a priority to resolve the validity of Lieftinck's lectotype. As part of Lieftinck's broader revision, he examined many specimens of *X. provida* and developed an explicit published morphological species concept. The chosen lectotype is morphologically consistent with the one specimen known for certain to be syntypic (Baker's (c) specimen), and so Lieftinck (1957) is considered to have treated the species in a manner consistent with Smith's original species concept. For probable collecting date, see discussion in Section 72.

Current status

Xylocopa (*Koptortosoma*) *provida* Smith, 1863.

Distribution

Indonesia (North Maluku: Morotai; Southwest Papua: Misool, Waigeo, Doberai Peninsula; Papua) and Papua New Guinea (Smith 1863, 1865; Lieftinck 1957).

Species described by Smith (1865) from Morotai Island and the island of New Guinea

83. ***Prosopis elegans*** Smith, 1865
Fig. 82

Prosopis elegans Smith, 1865: 91, ♀.

Type material examined

Holotype

INDONESIA • ♀; N. [New Guinea]; [1861]; OUMNH, ENT-HYME2837.

Type locality

New Guinea. Allen visited the area around Sorong in West Papua (probably) in the first half of 1861 (Wallace 1869; Baker 1993), and so the type locality can be considered to be Indonesia (West Papua).

Notes

Baker (1993: 235) identified this specimen as the holotype and stated that he labelled it, but we found no type label; this has now been rectified.

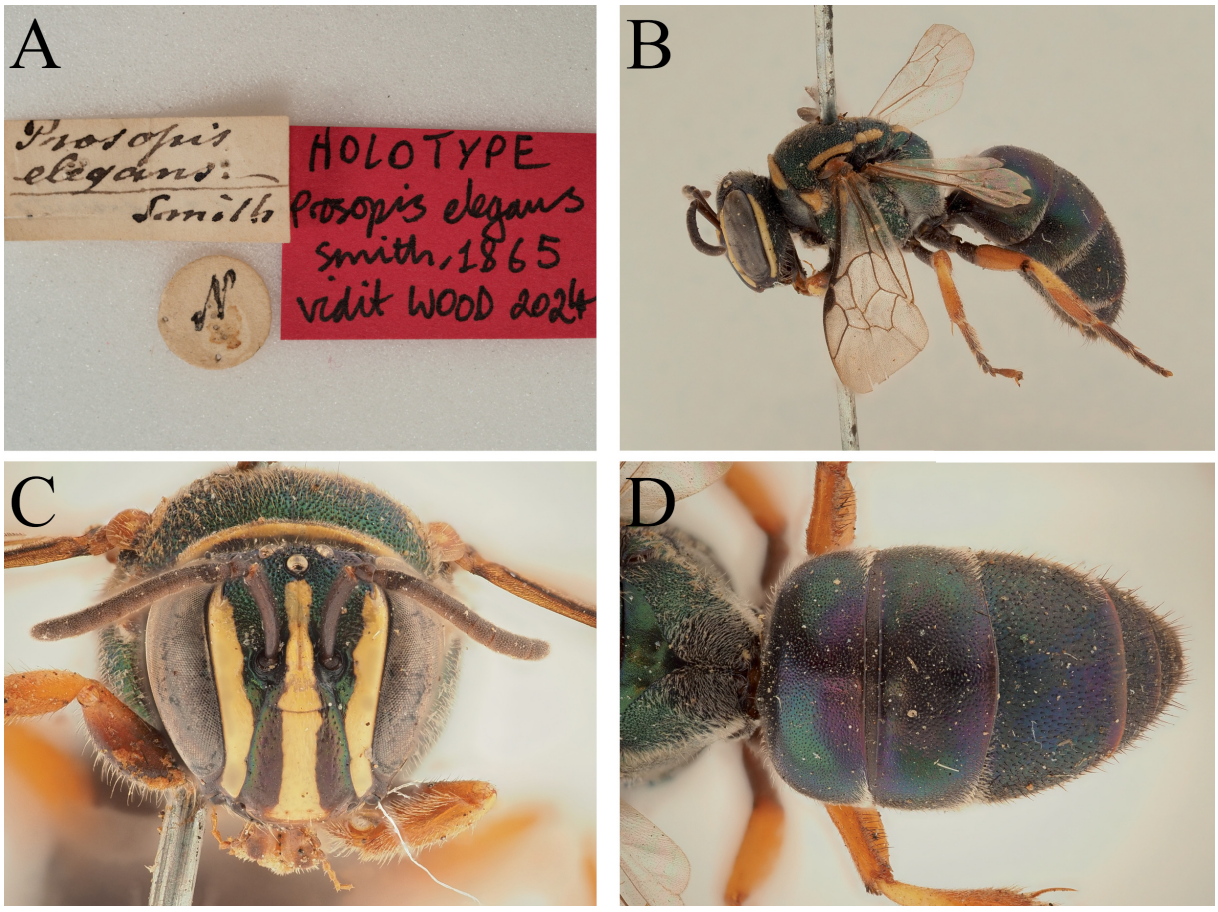

Fig. 82. *Prosopis elegans* Smith, 1865, holotype, ♀ (OUMNH, ENT-HYME2837). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Current status

Palaeorhiza (*Cnemidorhiza*) *elegantissima* (Dalla Torre, 1896). *Prosopis elegans* Smith, 1865 is a junior primary homonym of *Prosopis elegans* Smith, 1853 (described from Australia). Dalla Torre (1896: 22) noticed this, and provided a replacement name.

Distribution

Indonesia (West Papua, Southwest Papua: Misool) (Hirashima & Lieftinck 1982).

84. ***Nomia opulenta*** Smith, 1865
Fig. 83

Nomia opulenta Smith, 1865: 91–92, ♂.

Type material examined

Lectotype

INDONESIA • ♂; M. [Morty]; [probably between 1 Oct. 1860–31 Jan. 1861]; OUMNH, ENT-HYME2838-01 (lectotype indicated by Baker 1993, de facto lectotype designated by Pauly 2009).

Paralectotype

INDONESIA • 1 ♂; Morty Isl.; [probably between 1 Oct. 1860–31 Jan. 1861]; OUMNH, ENT-HYME2838-02.

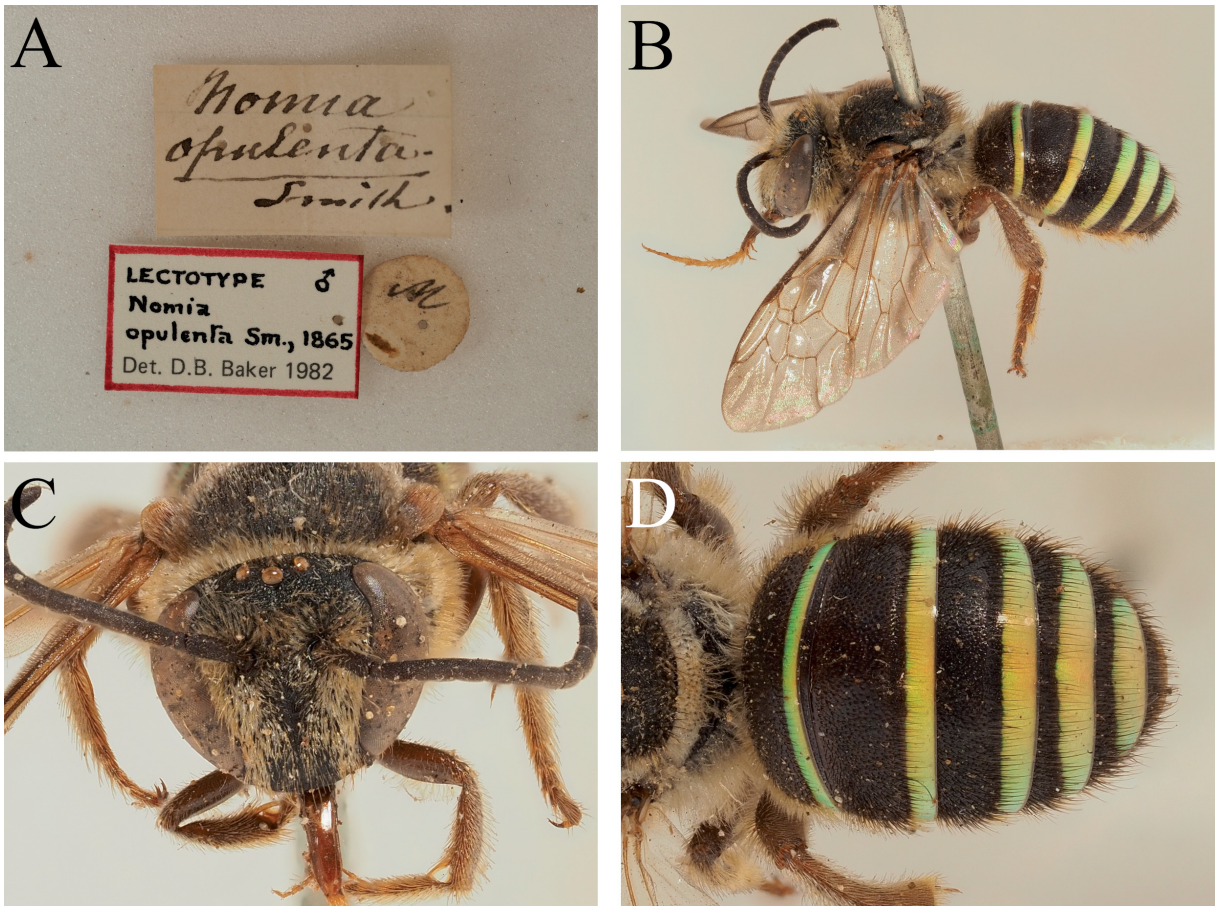

Fig. 83. *Nomia opulenta* Smith, 1865, lectotype, ♂ (OUMNH, ENT-HYME2838-01). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Type locality

Morty Island [= Morotai].

Notes

Baker (1993: 235) wrote the following:

> "Two ♂♂ in the UMO type collection, one labelled 'Morty Isl.', the other 'M' [Morty: Moluccas, Morotai] and *'Nomia opulenta* Smith', are conspecific and apparently not specifically distinct from *fulvata*. The smaller ♂, that bearing Smith's determination label, is now designated as LECTOTYPE, the larger as paralectotype. A ♀ from Smith's collection in NHM (Morty Isl., labelled by Smith as *opulenta*), found misplaced under *quadridentata* Smith (a species of *Hoplonomia*), is conspecific, and probably formed part of Allen's original series, but is not a syntype".

Pauly (2009: 159) noted Baker's lectotype, and therefore acted as the first publisher of this designation. Wallace never visited Morotai (Wallace 1869), and this material was collected by his assistant Charles Allen. Baker (1993: 174–175) estimated that this would have occurred after Allen's return to Ternate (October/November 1860) and departure to Sorong (?Jan 1861).

Current status

Curvinomia fulvata (Fabricius, 1804) (Pauly 2009).

Distribution

Indonesia (Sulawesi, North Maluku) (Michener 1965; Pauly 2009).

85. ***Megachile nidulator*** Smith, 1865
Fig. 84

Megachile nidulator Smith, 1865: 92, ♀.

Type material examined

Holotype

INDONESIA • ♀; N. [New Guinea]; [1861]; OUMNH, ENT-HYME2839.

Type locality

New Guinea. Allen visited the area around Sorong in West Papua (probably) in the first half of 1861 (Wallace 1869; Baker 1993), and so the type locality can be considered to be Indonesia (West Papua).

Notes

Baker (1993: 235) identified this specimen as the holotype and stated that he labelled it, but we found no type label; this has now been rectified.

Current status

Megachile (*Callomegachile*) *nidulator* Smith, 1865 (Ascher & Pickering 2024).

Distribution

Indonesia (West Papua) (Smith 1865; Ascher & Pickering 2024).



Fig. 84. *Megachile nidulator* Smith, 1865, holotype, ♀ (OUMNH). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

86. ***Megachile senex*** Smith, 1865
Fig. 85

Megachile senex Smith, 1865: 92, ♀.

Type material examined

Holotype

INDONESIA • ♀; N. [New Guinea]; [1861]; OUMNH, ENT-HYME2840.

Type locality

New Guinea. Allen visited the area around Sorong in West Papua (probably) in the first half of 1861 (Wallace 1869; Baker 1993), and so the type locality can be considered to be Indonesia (West Papua).

Notes

Baker (1993: 236) identified this specimen as the holotype and stated that he labelled it, but we found no type label; this has now been rectified.

Current status

Megachile (*Callomegachile*) *tertia* Dalla Torre, 1896. *Megachile senex* Smith, 1865 is a junior primary homonym of *Megachile senex* Smith, 1853 (described from South Africa, although this was a mislabelled

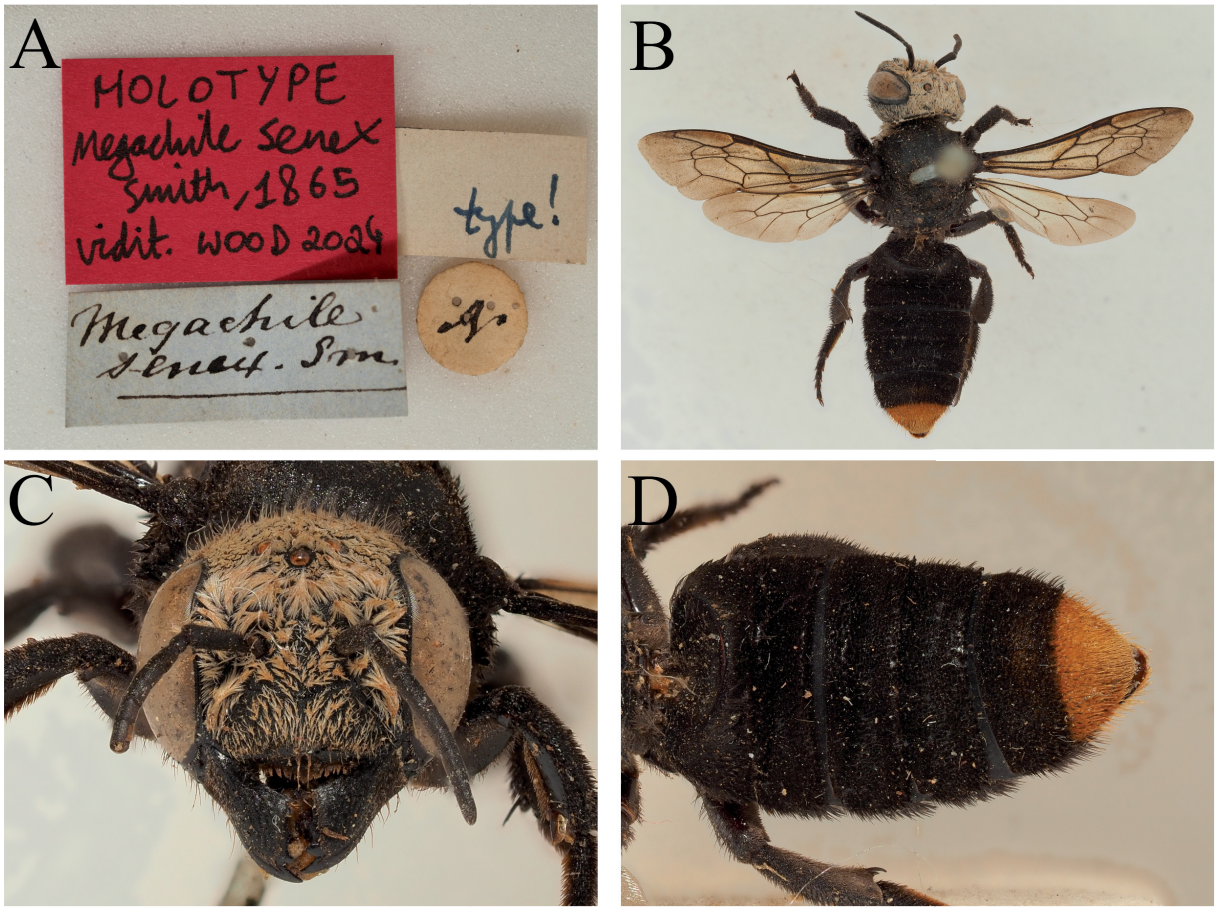

Fig. 85. *Megachile senex* Smith, 1865, holotype, ♀ (OUMNH, ENT-HYME2840). **A**. Label information. **B**. Habitus, dorsal view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

specimen) and *Megachile senex* Smith, 1862 (described from Australia). Dalla Torre (1896: 450) noticed this, and provided a replacement name.

Distribution

Indonesia (Maluku, West Papua) (Smith 1865; Ascher & Pickering 2024).

87. ***Megachile apicata*** Smith, 1865
Fig. 86

Megachile apicata Smith, 1865: 93, ♂.

Type material examined

Holotype

INDONESIA • ♂; M. [Morty]; [probably between 1 Oct. 1860–31 Jan. 1861]; OUMNH, ENT-HYME2841.

Type locality

Morty Island [= Morotai].



Fig. 86. *Megachile apicata* Smith, 1865, holotype, ♂ (OUMNH, ENT-HYME2841). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Current status

Megachile (*Callomegachile*) *mortyana* Dalla Torre, 1896. *Megachile apicata* Smith, 1865 is a junior primary homonym of *Megachile apicata* Smith, 1853 (described from Australia). Dalla Torre (1896: 440) noticed this, and provided a replacement name. For collecting date, see Section 84.

Distribution

Indonesia (North Maluku: Morotai) (Smith 1865; Ascher & Pickering 2024).

88. ***Trigona planifrons*** Smith, 1865
Fig. 87

Trigona planifrons Smith, 1865: 93–94, ♀.

Type material examined

Holotype

INDONESIA • ♀ (worker); N. [New Guinea]; [1861]; OUMNH, ENT-HYME2842.

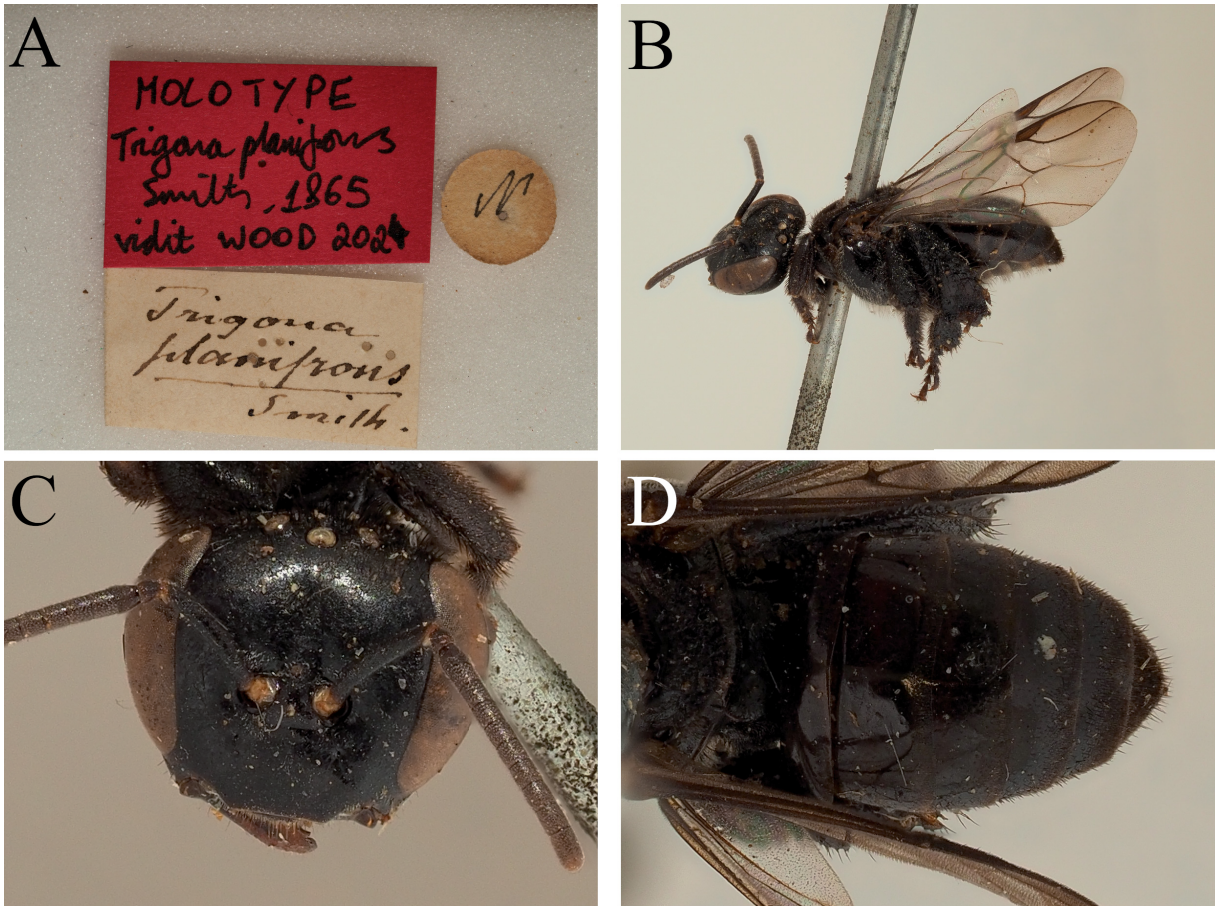

Fig. 87. *Trigona planifrons* Smith, 1865, holotype, ♀ (OUMNH, ENT-HYME2842). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Type locality

New Guinea. Allen visited the area around Sorong in West Papua (probably) in the first half of 1861 (Wallace 1869; Baker 1993), and so the type locality can be considered to be Indonesia (West Papua).

Notes

Baker (1993: 236) identified this specimen as the holotype and stated that he labelled it, but we found no type label; this has now been rectified.

Current status

Heterotrigona (*Platytrigona*) *planifrons* (Smith, 1865) (Engel & Rasmussen 2017).

Distribution

Indonesia (West Papua) and Papua New Guinea (Rasmussen 2008; Ascher & Pickering 2024).

89. ***Trigona atricornis*** Smith, 1865
Fig. 88

Trigona atricornis Smith, 1865: 94, ♀.

Type material examined

Holotype

INDONESIA • ♀ (worker); N. [New Guinea]; [1861]; OUMNH, ENT-HYME2843.

Type locality

New Guinea. Allen visited the area around Sorong in West Papua (probably) in the first half of 1861 (Wallace 1869; Baker 1993), and so the type locality can be considered to be Indonesia (West Papua).

Notes

Baker (1993: 236) identified this specimen as the holotype and stated that he labelled it, but we found no type label; this has now been rectified.

Current status

Heterotrigona (*Sahulotrigona*) *atricornis* (Smith, 1865) (Engel & Rasmussen 2017).

Distribution

Indonesia (West Papua) and Papua New Guinea (Rasmussen 2008; Engel & Rasmussen 2017; Ascher & Pickering 2024).



Fig. 88. *Trigona atricornis* Smith, 1865, holotype, ♀ (OUMNH, ENT-HYME2843). **A**. Label information. **B**. Habitus, profile view. **C**. Head, frontal view. **D**. Metasoma, dorsal view.

Discussion

The work of Wallace and Smith has left a lasting and important impression on Southeast Asian bee research. Across the eight publications summarised above, Smith described 89 bee names, of which 70 are currently treated as valid species, six being preoccupied names which were replaced (replacement name currently valid), and 13 are treated as junior synonyms or junior homonyms (invalid names). It is difficult to make detailed comparison to the magnitude of this study relative to other insect groups, but it is clear that 1) the bulk of Wallace's material was (unusually) studied and described soon after its arrival in the United Kingdom (see Polaszek & Earl of Cranbrook 2006), and 2) the contribution completely changed scientific understanding of insect diversity in Southeast Asia; more than 1000 species were described from Wallace's Sarawak material alone (Polaszek & Earl of Cranbrook 2006). Indeed, considering only the bees, the number of currently valid species described from the whole of Indonesia (modern borders) by the start of 1857 was just ten, following the works of Fabricius (1804), Wiedemann (1824), Guérin-Méneville (1831) (see Wood & Bossert 2025), Lepeletier (1836, 1841), and Smith (1853). By the end of 1865 this figure stood at 58, 50 of them described by Smith. Even considering the faunal knowledge of today, this expedition provided type material for 14.9% of the approximately 476 bee species recognised from Indonesia (Ascher & Pickering 2024), making this collection an essential part of the study of bees in Southeast Asia.

The effect of Wallace's collection is also (unsurprisingly) particularly apparent in the Wallacean region. Approximately 111 currently valid bee species have been described from Wallacea, with 34 of them described by Smith (38 when including taxa later replaced due to pre-occupation of the names, but which were otherwise clearly new for science) from Wallacean material (from the islands of Ambon, Bacan, Buru, Halmahera, Kai, Kajoa, Morotai, Seram, Sulawesi, Ternate, Timor, and Waigeo). This high percentage (34.2%) illustrates the extent to which Smith's work dominates description in this region, since it took until 1926 (a further 63 years from 1863) for an additional 38 currently valid species to be described from the Wallacean region.

Notably, the majority of descriptions have been from relatively accessible localities, especially settled areas, although at times this is difficult to discern due to imprecise labels. Although the region has seen great development of late, we expect that new species remain to be found in areas with lower levels of human disturbance (Papua, some of Wallacea), and their likely existence complicates the identification of difficult groups such as *Lasioglossum*, *Amegilla* (*Zonamegilla*), *Ceratina*, *Megachile*, and nomiine bees. Areas such as the island of Timor and the Lesser Sunda islands more generally are notable for displaying relatively dry habitats which are likely to prove of special interest for bees (Orr *et al*. 2021). There also remain many remote islands separated by deep water with little to no bee sampling, such as Taliabu, where new taxa have even recently been described for over-studied groups like birds (Rheindt *et al*. 2020). It would be unsurprising if such areas also held endemic bee species entirely new to science.

We hope that the production of this type catalogue will also stimulate further illustrations of Wallace's insect type material (Earl of Cranbrook & Mann 2016), since this is critical to the identification of species in this biodiverse region. Although some partial treatments exist (e.g., Rosa 2023a, 2023b), no works of similar scope to that presented here are currently available for other insect groups collected by Wallace. As these insect types are held outside of their country of origin, it is critical for them to be easily accessible through type photographs that are necessary to enable national researchers to properly attribute names, understand the species concepts, and integrate this information into their ongoing revisionary work (Warrit *et al*. 2023).

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