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# Belgian Journal of Entomology

## ***Meganomia somalica* (Friese, 1915) comb. nov. and new records of Meganomiinae for East Africa (Hymenoptera: Apoidea: Melittidae)**

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Cover page: head of *Meganomia somalica*, female holotype.

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## Abstract

*Andrena somalica* Friese, 1915 is redescribed and reclassified as *Meganomia somalica* (Friese, 1915), comb. nov. New records are published for *Meganomia rossi* Michener, 1981 (Kenya), *Pseudophilanthus taeniatus* Alfken, 1939 (Kenya, Ethiopia), *Pseudophilanthus tsavoensis* (Strand, 1920) (Kenya) and *Uromonia stagei* Michener, 1981 (Kenya). The female of *Pseudophilanthus* (*Pseudophilanthus*) *taeniatus* Alfken, 1939 is discovered for the first time and compared with the female of *P. tsavoensis*. Habitus images of all the species are illustrated with color photographs, as are the habitats in which they were sampled.

**Key words:** Bees, East Africa, new records, *Andrena somalica*, *Meganomia*.

## Résumé

*Andrena somalica* Friese, 1915 est redécrite et reclassée en *Meganomia somalica* (Friese, 1915), comb. nov. De nouvelles données sont publiées pour *Meganomia rossi* Michener, 1981 (Kenya), *Pseudophilanthus taeniatus* Alfken, 1939 (Kenya, Éthiopie), *Pseudophilanthus tsavoensis* (Strand, 1920) (Kenya) et *Uromonia stagei* Michener, 1981 (Kenya). La femelle de *Pseudophilanthus* (*Pseudophilanthus*) *taeniatus* Alfken, 1939 est découverte pour la première fois et comparée avec celle de *P. tsavoensis*. Les habitus de toutes les espèces sont illustrés par des photographies en couleur ainsi que les habitats où les espèces ont été échantillonnées.

## Introduction

Bees of the subfamily Meganomiinae have long been confusing to taxonomists. The genus *Meganomia* was first described among the Halictidae of the subfamily Nomiinae by COCKERELL (1909), and later transferred to the Melittidae by STAGE (1971) and MICHENER (1981). Here we describe an atypical species of the genus *Meganomia* described by FRIESE (1915) as *Andrena somalica*. This species is so confusing that it was classified by WARNCKE (1967: 198, 309) as a *Melitta*, and EARDLEY (2006: 56) wrote: "The type of this species was examined in the present study. It is clearly an *Andrena* species, but distinct from *A. notophila* and *A. africana* (*A. somalica* is a black bee about 15 mm long)." Indeed, unlike other Meganomiinae that are medium to large-sized bees with yellow or cream-colored maculations (Figs 5-7), two combined characters which distinguish them from all other Melittidae (MICHENER, 2007: 426), *Meganomia somalica* is completely black (Figs 1a, b, 5f). The general appearance is that of a small species of *Xylocopa*. It has been compared by Friese with the Palaearctic species *Andrena morio* (Brullé, 1832). But having examined in the past nearly all the species of Meganomiinae, when we studied the type of *A. somalica* we immediately recognized it as a species of this subfamily. The characters we examined which led us to transfer *A. somalica* to *Meganomia* are discussed below.

We take this opportunity to publish some new records for other species of Meganomiinae, as well as colour illustrations and some additional descriptions.

### Material & methods

For anatomical terminology we follow Michener (2007). The photographs in figures 5c, 6c, f, 7f, 9a-f, and 11-18 are by RSC; those in 9g-h are by Laurence Packer, while Terry Griswold took the photographs in figures 10a-b; the others are by AP. The type of *Andrena somalica* is preserved in the Museum für Naturkunde an der Humboldt Universität, Berlin, Germany (MNHUB), other species are preserved at the International Centre of Insect Physiology and Ecology (ICIPE), the Packer collection, York University, Toronto, Canada (PCYU), the Natural History Museum, London, UK (NHMUK), and the Royal Belgium Institute of Natural Sciences (RBINS).

### Results

#### *Meganomia somalica* (Friese, 1915) comb. nov.

*Andrena somalica* FRIESE, 1915: 265 (list), 269 (locality), 283 (description). Female holotype: "Somali-Lande, im Mai fliegend" (MNHUB); FRIESE 1921: 1096 (list); EARDLEY 2006: 56 (confirmed as *Andrena*); RASMUSSEN & ASCHER, 2008: 100 (catalogue of the species described by Friese); EARDLEY & URBAN, 2010 (erroneously reported from Tanzania).

Family placement. The genus *Andrena* can be immediately excluded because *M. somalica* has only one subantennal suture, as well as no facial fovea and no specialized hairs on trochanters (flocculus). The labrum and the first two segments of the labial palpi are short, which eliminates both Apidae and Megachilidae. The family Halictidae is excluded by having the basal vein straight in Mellitidae and not curved as in Halictinae, and by virtue of the 2<sup>nd</sup> and 3<sup>rd</sup> submarginal cells being shorter than the 1st, thus excluding the halictine subfamily Nomiinae). The glossa is pointed and not bifid as in Colletidae.

Subfamily Placement. To distinguish *Meganomia somalica*, and other Meganomiinae, from other subfamilies of Melittidae, without reference to color, we examined characters such as the mandibles of the female which are simple or with a weak subapical tooth in the Meganomiinae (Figs 3b, c, 4a) while the Melittinae and Dasypodainae have a stronger subapical tooth (Fig. 4b), and the apex of the marginal cell, rounded and located well away from the margin of the wing in Meganomiinae (Fig. 2a) while pointed or terminating very close to the edge of the wing in the Melittinae and Dasypodainae (MICHENER, 2007: 415, key). Other characters that distinguish Meganomiinae from Melittinae are the piliferous paraglossae (Fig. 3a), the presence of three submarginal cells, the very reduced and linear stigma (Fig. 2b), the eyes more convex than those of *Melitta* (Fig. 1c) (in *Meganomia* the inner margin of the eyes convex while concave in *Melitta*), and the supraclypeal area being as long as the clypeus in Meganomiinae (Fig. 1c).

Generic position. Among the Meganomiinae, this species clearly belongs to the genus *Meganomia*. Claws of the tarsi have black barbed hairs but no arolia (Fig. 2e, f) (arolia present in all other genera of Meganomiinae) (MICHENER 2007: 426, key couplet 1). The hind basitibial plate is covered by setae and open at its extremity as in other *Meganomia* (Fig. 2d) (the basitibial plate is well defined in the genus *Ceratonomia* Michener, 1981).

Specific characters of the female. The species differs from all other *Meganomia* species by having the body completely black, without any pale or yellow maculations. The wings are completely fuscous and the pilosity of the legs is totally black. The punctation of the scutum, propodeum and metasoma differs from other species in size and density and are illustrated (Fig. 1d-f). Length 17 mm.



Fig. 1 – *Meganomia somalica*, female holotype. a, habitus in dorsal view; b, habitus in lateral view; c, head; d, thorax and vertex; e, metanotum and propodeum; f, metasoma.

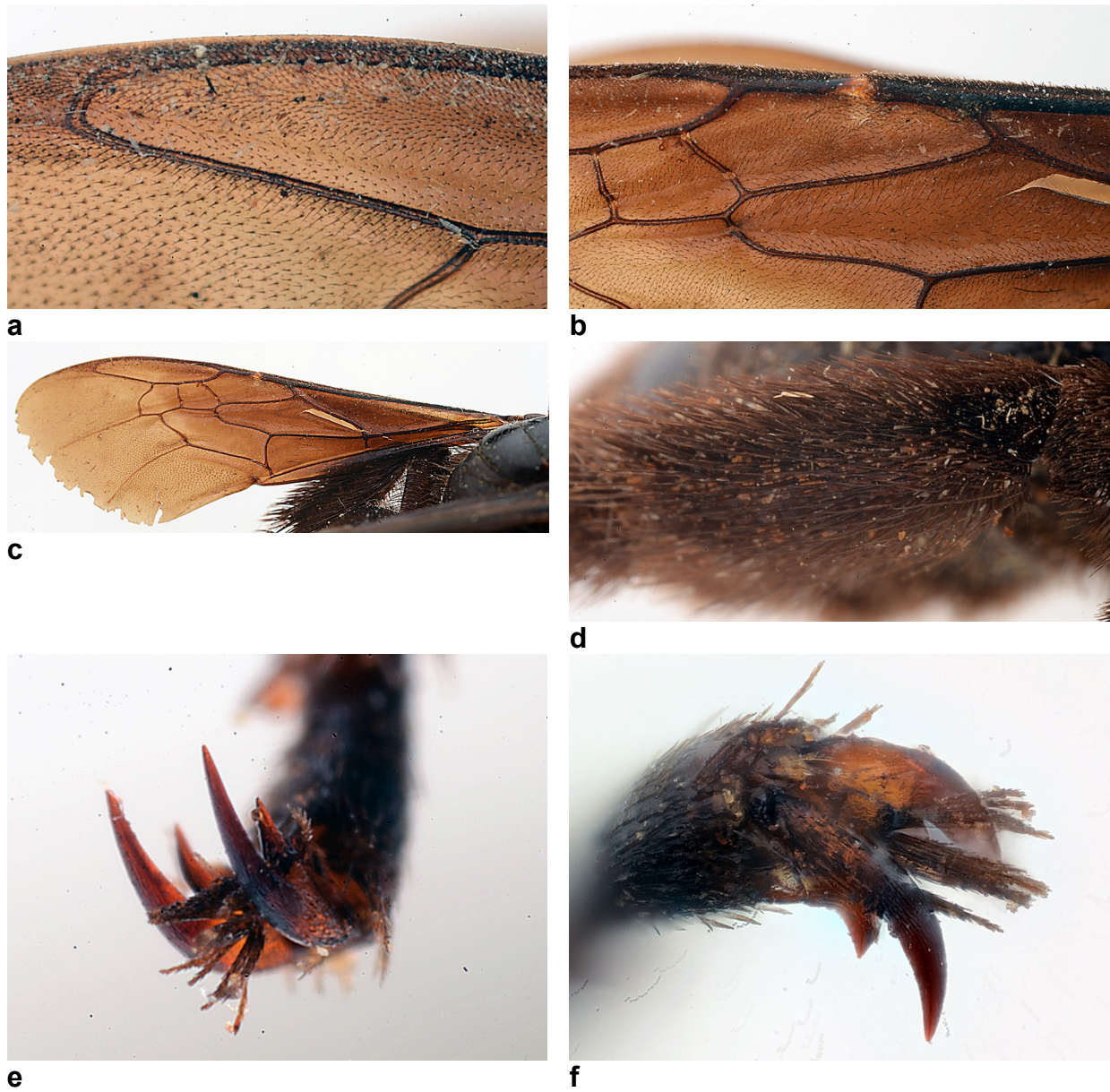


Fig. 2 – *Meganomia somalica*, female holotype. a, apex of the marginal cell rounded and located well away from the margin of the wing; b, stigma very slender; c, complete wing with venation; d, hind basitibial plate covered by setae; e, f, claws hairy but without arolia.

The species is known only by the female holotype. The unknown male bears probably more structural characters to be studied for a subgeneric placement, as the males of other Meganomiinae are rich in specialized features.

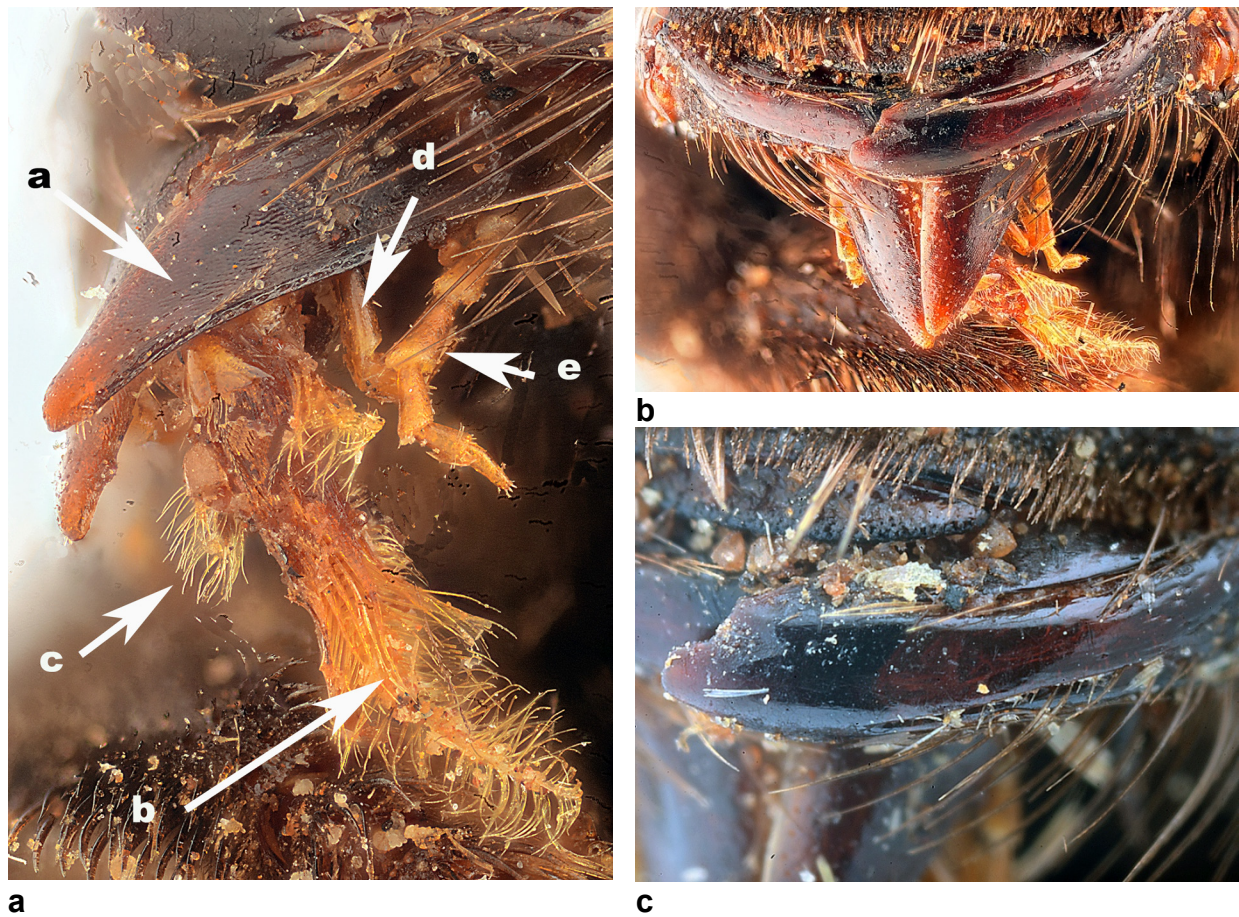


Fig. 3 – Proboscis of *Meganomia somalica*, female holotype; a, proboscis in lateral view (a, galea; b, glossa; c, piliferous paraglossa; d, labial palpus; e, maxillary palpus) ; b, proboscis in facial view; c, mandibles with a weak subapical tooth.

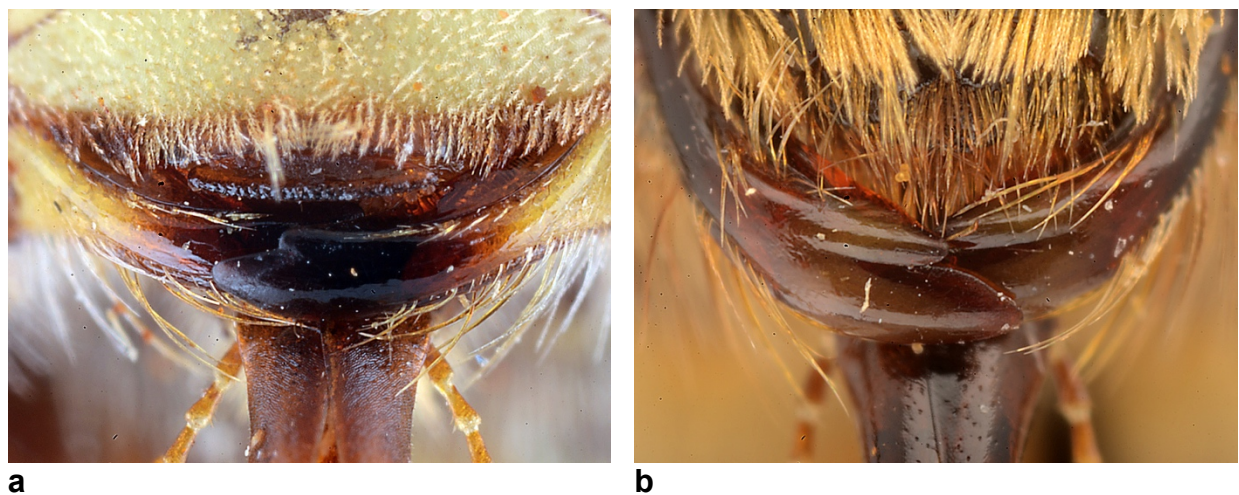


Fig. 4 – Mandibles, females; a, *Meganomia binghami*, mandible with weak subapical tooth; b, *Melitta* sp., mandible with stronger subapical tooth.

### New records of Meganomiinae

#### *Ceratonomia rozenorum* Michener, 1981 (Fig. 6a, b)

Nambibia, Erongo, Karibib District, 15km W Karibib, -21.9395S 15.7089E, 1052m, 28.ii.1990, 1♂, 1♀, leg. W.J. Pulawski (PCYU), 2♂, 2♀, leg. M. Schwarz (RBINS and col. Schwarz).

#### *Meganomia andersoni* (Meade-Waldo, 1916)

Kenya, Turkana, South Turkwel, Turkana Basin Institute, 8.V.2012, 1♀, leg. D. Lomosingo & D.J Martins (PCYU)

#### *Meganomia rossi* Michener, 1981 (Fig. 5c, d)

Kenya, Eastern Province, base of Ukasi Hill, -0.82103°S 38.54443°E, *Acacia/Commiphora* savanna, 613 m, Malaise trap, 5-10.XII.2011, 1♂, 1♀, 22-27.XII.2011, 1♂, 1♀, 27.XII.2011-1.I.2012, 1♂, 1♀, leg. R. Copeland (ICIPE, RBINS). – Kenya, Eastern Province, base of Ukasi Hill, -0.82002°S 38.54378°E, *Acacia/Commiphora* savanna, 615 m, Malaise trap, 12-19.V.2018, 1♀, 15-29.IV.2018, 1♂, 2♀, 29.IV-5.V.2018, 1♂, leg. R. Copeland (ICIPE). – Kenya, Eastern Province, base of Ukasi Hill, -0.821°S 38.5444°E, *Acacia/Commiphora* savanna, 613 m, sweep net, 6.XII-14.XII.2012, 3♀, leg. J. Bukhebi (ICIPE). – Eastern Province, Sosoma, Sosoma area, -0.86344°S 38.67907°E, 489 m, Malaise trap in *Acacia/Commiphora* savanna, 15-29.IV.2018, 1♀, leg. R. Copeland (ICIPE). – Eastern Province, Tsavo East National Park, Bank of Athi River, -2,6418°S 38.3663°E, 517 m, Riverine woodland, on sand, sweep net, 30.V.1997, 1♂, 2.I.1998, 1♂, Malaise trap, 10.VI.1998, 1♂, 2♀, leg. R. Copeland (ICIPE).

#### *Uromonia stagei* Michener, 1981 (Fig. 7c-d)

Kenya, Rift Valley, Olorgesailie, Olorgesailie Nat. Monument, -1.57930°S 36.44566°E, 982 m, Malaise trap in *Acacia/Commiphora* savanna, 18.IX-2.X.2011, 1♀, leg. R. Copeland (ICIPE). – Kenya, Eastern Province, Endau Forest, Bottom of forest, -1.30026°S 38.52805°E, 531 m, Malaise trap in indigenous forest at bottom of mountain, 18.V-1.VI.2018, 1♀, 15-29.VI.2018, 2♂, leg. R. Copeland (ICIPE). – Kenya, Eastern Province, Kasaala, Mulu Musingila farm, -2.11412°S 38.23989°E, 689 m, Malaise trap in farmland next to seasonally wet area, 27.XI-11.XII.2017, 1♀, leg. R. Copeland (ICIPE). – Kenya, Eastern Province, Kasaala area, 733 m, -2.07836°S 38.22517°E, Malaise trap, just inside isolated woodland patch, 23.XII.2016-6.I.2017, 1♂, leg. R. Copeland (ICIPE). – Mali, Mourdia, 14°28'N 7°28'W, 3.xi.1989, 1♂, leg. J. Passerini MT (PCYU).

Remark. Both orange and yellow colour forms of *U. stagei* have been found in Mali and Kenya. Laurence Packer (in litt.) compared the genitalia of the male of a specimen from Mali and they are indistinguishable from the drawings by Michener for the Kenyan one.



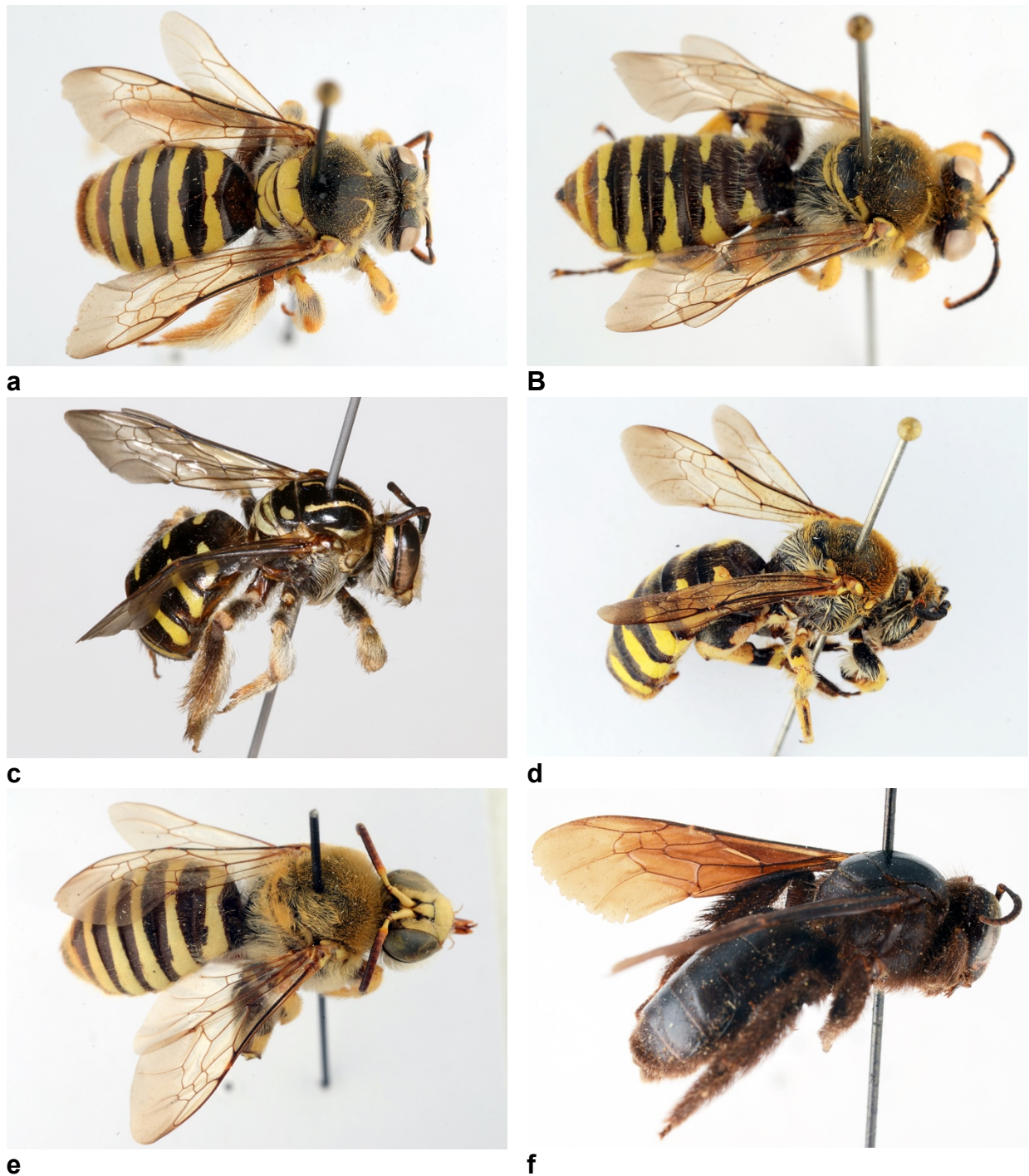


Fig. 5 – Megonomiinae; a, *Meganomia binghami*, female; b, *Meganomia binghami*, male; c, *Meganomia rossi*, female; d, *Meganomia rossi*, male; e, *Meganomia gigas*, male; f, *Meganomia somalica*, female.

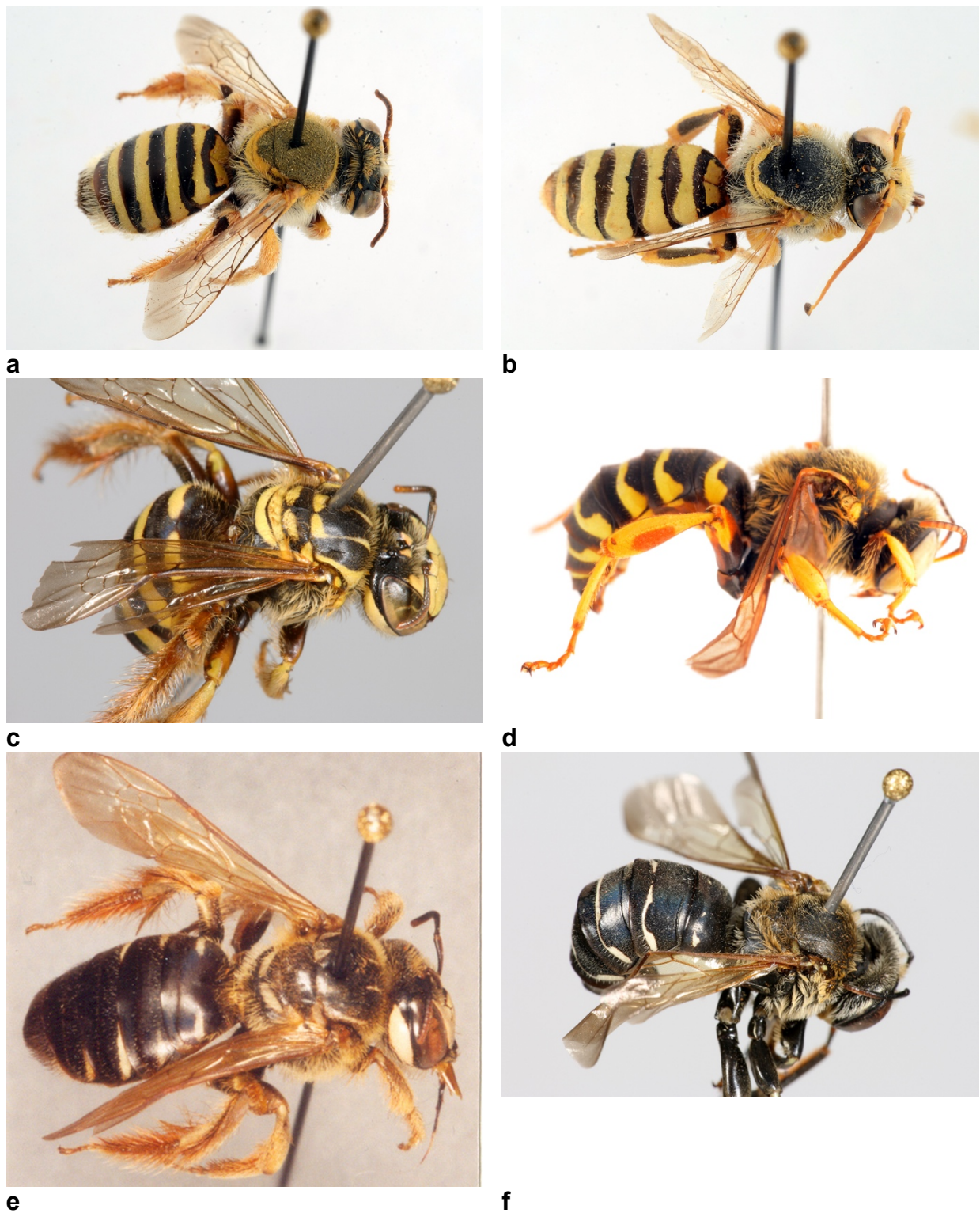


Fig. 6 – Meganomiinae; a, *Ceratonomia rozenorum*, female; b, *Ceratonomia rozenorum*, male; c, *Pseudophilanthus taeniatus*, female; d, *Pseudophilanthus taeniatus*, male; e, *Pseudophilanthus tsavoensis*, female holotype; f, *Pseudophilanthus tsavoensis*, male.



a



b



c



d



e



f

Fig. 7 – Meganomiinae; a, *Pseudophilanthus wenzeli*, male; b, *Uromonia flaviventris*, male; c, *Uromonia stagei*, female from Mali; d, *Uromonia stagei*, male from Mali; e, *Uromonia stagei*, female, orange form from Mali; f, *Uromonia stagei*, female, orange form from Kenya.

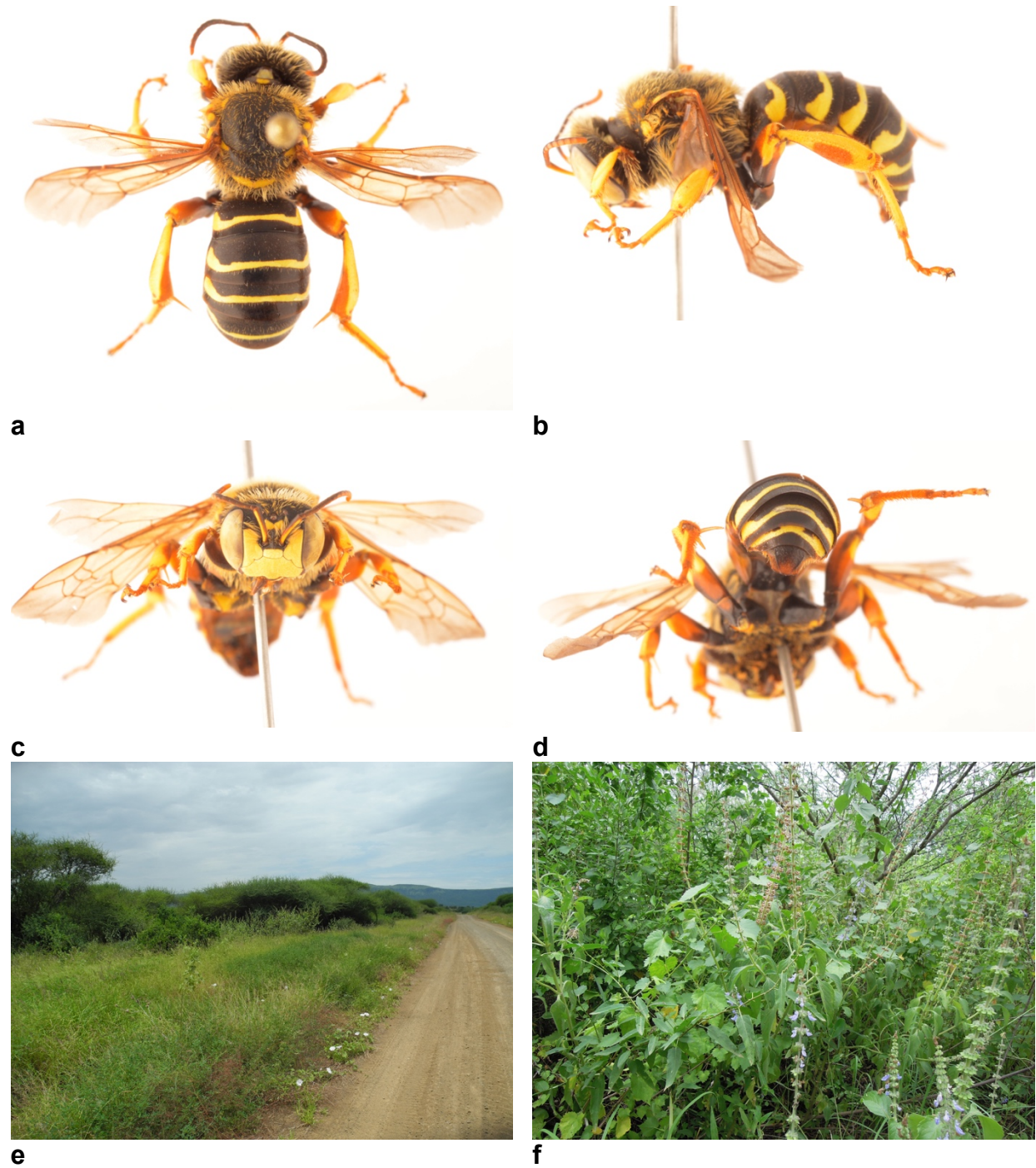


Fig. 8 – *Pseudophilanthus taeniatus*, male from southern Ethiopia; a, dorsal view; b, lateral view; c, facial view; d, posterior view; e, habitat in Mago National Park; f, visited flower, *Plectranthus* sp.



a



b



c



d



e



f



g



h

Fig. 9 – Maculations on *Pseudophilanthus*. a-d, *Pseudophilanthus taeniatus*, female (nov.) (Kenya, Ukasi); e, f, *Pseudophilanthus tsavoensis*, female (Kenya, Sarara camp); g, h, *Pseudophilanthus tsavoensis* female (Kenya, Kibwezi).



a



b

Fig. 10 – Vertex of *Pseudophilanthus*, females; a, *Pseudophilanthus taeniatus* (ICIPE 10390); b, *Pseudophilanthus tsavoensis* (ICIPE 10396) (note: the *P. taeniatus* specimen has the head quite tight to the thorax so we cannot get the same completely dorsal view of the vertex).

***Pseudophilanthus taeniatus*** Alfken, 1939 (Figs 6c, d; 8, 9a-d, 10a)

Ethiopia, Southern Region, Mago National Park, IX.2012, male flying around *Plectranthus* sp., leg. J.-L. Boevé & A. Pauly (RBINS). – Kenya, Eastern Province, Ukasi, base of Ukasi Hill, -0.82002°S 38.54378°E, 615 m, 2-9.VI.2018, Malaise trap in *Acacia/ Commiphora* savanna, 1♀, leg. R.S. Copeland (ICIPE).

Note. This species is very similar to *P. tsavoensis*. The males have been compared by MICHENER (1992). The female is new and both are compared in table 1. The type of *P. tavetensis* (Cockerell, 1934), preserved in NHMUK (Hym 17a.1781), has relatively broad yellow bands, only the first is broken, so it looks more like *P. taeniatus*, Fig. 9b (David Notton, in litt.). The type should be examined when more material is available for studying variations and barcoding.

***Pseudophilanthus tsavoensis*** (Strand, 1920) (Figs 6e, f; 9e-h, 10b)

Kenya, Rift Valley Province, Matthews Range, Sarara Campsite, 1.00661°N 37.38631°E, 1006 m, Malaise trap in shrubland, 12.IV.1998, 1♀, leg. R.S. Copeland (ICIPE). – Kenya, Eastern Province, Ukasi, base of Ukasi Hill, -0.82103°S 38.54443°E, 613 m, 6-11.I.2012, Malaise trap in *Acacia/ Commiphora* savanna, 1♀, leg. R.S. Copeland (ICIPE). – Kenya, Eastern Province, Ukasi, base of Ukasi Hill, -0.82002°S 38.54378°E, 615 m, 29.IV-5.V.2018, Malaise trap in *Acacia/ Commiphora* savanna, 2♀, leg. R.S. Copeland (ICIPE). – Kenya, Eastern Province, Sosoma, Sosoma area, -0.86344°S 38.67907°E, 489m, 5-12.V.2018, Malaise trap in *Acacia/ Commiphora* savanna, 1♂, leg. R.S. Copeland (ICIPE). – Kenya, Eastern Kenya, Kibwezi, 2.55067N 38.0365E, 880m, 14.VI.2007, 1♀, leg. M. Otieno (PCYU).

Table 1. Comparison of females of *Pseudophilanthus taeniatus* and *P. tsavoensis*.

Feature	<i>P. taeniatus</i>	<i>P. tsavoensis</i>
Inner orbits	parallel (Fig. 9c)	slightly diverging below (Fig. 9e,g)
Pale markings	strongly yellow (Fig. 9a-d)	pale yellow (Fig. 9e-h)
Yellow bands of T2-T4	large and complete (Fig. 9d)	narrow and broken medially (type Fig. 6e) or complete (Fig. 9f,h)
Yellow band on metanotum	large	narrow (type Fig. 6e) or large (Fig. 9h)
Scutellum	with yellow marks	totally black (type Figs 6e, 9f) or with yellow marks (Fig. 9h)
Fore and mid tibiae	yellow (Fig. 9b)	orange brown (Figs 6e, 9f)
Vertex	dull and with transverse obtusely angulate line (Fig. 10a)	polished and without angulate line (Fig. 10b)



Fig. 11 – Kenya, Ukasi, 8 November 2011, Malaise trap in habitat of *Meganomia rossi*, *Pseudophilanthus taeniatus* and *Pseudophilanthus tsavoensis*



Fig. 12 – Kenya, Kasaala, wet season, January 2016, Malaise trap in habitat of *Uromonia stagei*.





Fig. 13 – Kenya, Kasaala, dry season, 18 September 2014, Malaise trap in habitat of *Uromonia stagei*.



Fig. 14 – Kenya, Mulu Musingila farm, Malaise trap, habitat of *Uromonia stagei*.



Fig. 15 – Kenya, Olorgesailie July 2011, Malaise trap in habitat of *Uromonia stagei*.



Fig. 16 – Kenya, Rift Valley, Mathews Range, Sarara campsite, November 2015, habitat of *Pseudophilanthus tsavoensis* (Note: the collection was made in April 1998 during the “long rains”, but no image was captured at that time. This photo of the habitat was taken in November 2015 during the “short rains” when the site would have looked similar to that seen in 1998).



Fig. 17 – Kenya, Sosoma, 15 April 2018, Malaise trap in habitat of *Meganomia rossi* and *Pseudophilanthus tsavoensis*.



Fig. 18 – Kenya, Endau Forest, January 2016, Malaise trap in habitat of *Uromonia stagei*.

## List of genera, subgenera and species of Meganomiinae, with countries of distribution

Genus *Ceratonomia* Michener, 1981

*Ceratonomia rozenorum* Michener, 1981, male and female (Namibia) (Fig. 6a, b)

Genus *Meganomia* Cockerell, 1909

= *Maxschwarzia* Pagliano & Scaramozzino, 1990; syn. by Michener, 1992.

*Meganomia andersoni* (Meade-Waldo, 1916), male and female (Kenya, Tanzania)

*Meganomia binghami* (Cockerell, 1909), male and female (Botswana, Namibia, Zimbabwe, South-Africa) (Fig. 5a, b)

*Meganomia gigas* Michener, 1981, male and female (Namibia, South Africa) (Fig. 5e)

*Meganomia rossi* Michener, 1981, male and female (Kenya) (Fig. 5c, d)

*Meganomia somalica* (Friese, 1915), female, male unknown, **comb. nov.** (Somalia) (Fig. 5b)

*Meganomia* sp. (Yemen)

Genus *Pseudophilanthus* Alfken, 1939

Sub-genus *Pseudophilanthus* Alfken, 1939

= *Agemmonia* Michener, 1981; syn. par Michener, 1992.

*Pseudophilanthus (Pseudophilanthus) taeniatus* Alfken, 1939, male, female **nov.** (Kenya, Ethiopia) (Fig. 6c, d)

*Pseudophilanthus (Pseudophilanthus) tsavoensis* (Strand, 1920), male and female (Kenya) (Fig. 6e, f)

*Pseudophilanthus (Pseudophilanthus) tavetensis* (Cockerell, 1934), female (Kenya)

Sub-genus *Dicromonia* Michener & Brooks, 1987

*Pseudophilanthus (Dicromonia) wenzeli* (Michener & Brooks, 1987), male, female unknown (Madagascar) (Fig. 7a)

Genus *Uromonia* Michener, 1981

Sub-genus *Uromonia* Michener, 1981

*Uromonia (Uromonia) stagei* Michener, 1981, male and female (Kenya, Mali) (Fig. 7c-d)

Sub-genus *Nesomonina* Michener, Brooks & Pauly, 1990.

*Uromonia (Nesomonina) flaviventris* (Benoist, 1963) male, female unknown (Madagascar) (Fig. 7b)

## Discussion and conclusions

Melittidae is a small, enigmatic family of strictly solitary, mostly oligolectic and ground nesting bees, with a widespread geographic distribution but absent from tropical America, Australia and the Indo-Malayan area except for some species of *Melitta* that occur in the Himalayas (MICHENER, 2007, MICHEZ *et al.* 2009). They have a lower diversification rate than other bee clades (MURRAY *et al.*, 2018). The subfamily Meganomiinae is composed of only 13 species, all very rare and localized in Africa (MICHEZ & PAULY, 2019). Their discovery is always interesting because little information is available on their biology and distribution. These bees are found in savannas in Eastern and Southern Africa, especially in the eastern Sahel that extends as far south as northeastern Tanzania, and also in Yemen and Madagascar (MICHENER & BROOKS 1987, MICHENER *et al.*, 1990, PAULY *et al.*, 2001). The occurrence of

*Uromonia stagei* is confirmed in western Sahel by a new record from Mali. Both species from Madagascar are known only from male specimens, and *Meganomia somalica* is known only from the female. More material and barcoding is needed in the genus *Pseudophilanthus* to establish synonyms or confirm validity of the three described species. Visited plants already reported in the literature are *Cleome* sp., *Tribulus* sp., *Crotalaria* sp., *Indigofera* sp., and *Plectranthus* sp. (ROZEN, 1977, GESS & GESS, 2004, 2006, MICHEZ *et al.*, 2010). We recommend that surveys should be undertaken in normally dry savannas when these plants are flowering. In Kenya, Meganomiinae are sometimes caught in Malaise traps, the collection data for which provide evidence that these bees are active only after the onset of seasonal rains (normally April-June and October-December) where conditions at a site are markedly different than during the dry months of the year (compare, for example, Figs 12 and 13).

### Acknowledgments

Erwin Scheuchl (Ergolding, Germany) was the first to bring this species to attention in 2012 during a review of the *Andrena* of Ethiopia, mentioning that *A. somalica* was probably a genus close to *Melitta* and not an *Andrena*. The material was examined by the first author during a visit to the Berlin Museum in 2016, thanks to the courtesy of the curators, Frank Koch and Viola Richter. Laurence Packer provided us with some new records of the Meganomiine bees from his collection preserved at York University, as well as pictures of his specimen of *Pseudophilanthus* (Fig. 9g-h). Terry Griswold (Utah University) took pictures of the vertex of two species of *Pseudophilanthus* (Fig. 10a-b) and sent diagnostic comments. David Notton sent comments on the type of *Pseudophilanthus tavetensis* preserved in NHMUK. Laurence Packer and Terry Griswold provided constructive comments to improve the manuscript.

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### References

- COCKERELL T.D.A., 1909. - Descriptions and records of bees - XXIII. *Annals and Magazine of Natural History*, 8(4): 393-404.
- EARDLEY C.D., 2006. - The southern Africa species of *Andrena* Fabricius (Apoidea: Andrenidae). *Africa Plant Protection*, 12: 1-57.
- EARDLEY C. & URBAN R., 2010. - Catalogue of afrotropical bees (Hymenoptera: Apoidea: Apiformes). *Zootaxa*, 2455: 1-548.
- FRIESE H., 1915. - Zur Bienenfauna von Abessinien (Hym.). *Deutsche Entomologische Zeitschrift*, 1915: 265-298.
- FRIESE H., 1921. - Apidae. In: *Ergebnisse der zweiten deutschen Zentral-Afrika-Expedition, 1910-1911, unter Führung Adolfs Friedrichs, Herzogs zu Mecklenburg*. Band 1: 1091-1112, Leipzig.
- GESS S. K. & GESS F.W., 2004. - A comparative overview of flower visiting by non-Apis bees in the semiarid to arid areas of Southern Africa. *Journal of the Kansas entomological Society*, 77: 602-618.

- GESS S. K. & GESS F.W., 2006. - Survey of flower visiting by aculeata wasps and bees in the semi-arid to arid areas of Southern Africa. *Annals of the Eastern Cape Museums*, 5: 1–51.
- MICHENER C.D., 1981. - Classification of the bee family Melittidae with a review of species of Meganomiinae. *Contribution of the American Entomological Institute*, 18: 1–135.
- MICHENER C.D., 1992. - Nomenclatural problems in the Meganomiinae and a review of the genus *Pseudophilanthus* (Hymenoptera, Melittidae). *Journal of the Kansas entomological Society*, 65 (2): 146–150.
- MICHENER C.D. 2007. - *The Bees of the World*, 2nd edn. The Johns Hopkins University Press, Baltimore.
- MICHENER C.D. & BROOKS R.W., 1987. - The family Melittidae in Madagascar. *Annales de la Société entomologique de France*, 23: 99–103.
- MICHENER C.D., BROOKS R.W. & PAULY A., 1990. - Little-known meganomiine bees with a key to the genera (Hymenoptera: Melittidae). *Journal of African Zoology*, 104: 135–140.
- MICHEZ D., PATINY S. & DANFORTH B., 2009. - Phylogeny of the bee family Melittidae (Hymenoptera: Anthophila) based on combined molecular and morphological data. *Systematic Entomology*, 34: 574–597.
- MICHEZ D., EARDLEY C.D., TIMMERMANN K., & DANFORTH B.N., 2010. - Unexpected Polylecty in the Bee Genus *Meganomia* (Hymenoptera: Apoidea: Melittidae). *Journal of the Kansas entomological Society*, 83(3): 221–230.
- MICHEZ D. & PAULY A., 2019. - Genus *Meganomia*.  
<http://www.atlashymenoptera.net/page.asp?id=122> [last access March 23, 2019].
- MURRAY E.A., BOSSERT S. & DANFORTH B.N., 2018. - Pollinivory and the diversification dynamics of bees. *Biology letters*, 14: 20180530.
- PAULY A., BROOKS R.W., NILSSON L.A., PESENKO Y.A., EARDLEY C.D., TERZO M., GRISWOLD T., SCHWARZ M., PATINY S., MUNZINGER J. & BARBIER Y., 2001. - Hymenoptera Apoidea de Madagascar et des îles voisines. *Annales Sciences zoologiques, Musée royal de l'Afrique centrale, Tervuren*, 286: 390 pp + 16 pl. couleurs.
- RASMUSSEN C. & ASCHER J.S., 2008. - Heinrich Friese (1860–1948): Names proposed and notes on a pioneer melittologist (Hymenoptera, Anthophila). *Zootaxa*, 1833: 1-118.
- ROZEN J.G. Jr, 1977. - Biology and immature stages of the bee genus *Meganomia* (Hymenoptera, Melittidae). *American Museum Novitates*, 2630: 1–27.
- STAGE G.I., 1971. - Family placement of the African genus *Meganomia* Cockerell with a review of the included species (Hymenoptera: Apoidea). *Proceeding Entomological Society Washington*, 73: 306–313.
- WARNCKE K., 1967. - Beitrag zur Klärung paläarktischer *Andrena*-Arten (Hym. Apidae). *Eos*, 43: 171–318.