Journal *of* Melittology
Bee Biology, Ecology, Evolution, & Systematics
No. 146, 1–7 22 May 2026

New data on resin bees belonging to *Trachusa* (Hymenoptera: Megachilidae) from eastern Africa

Max Kasparek[1] & Robert S. Copeland[2]

Abstract. The resin bee *Trachusa massauahensis* Pasteels, 1984, previously known only from the female holotype collected in Massawa on the Eritrean Red Sea coast, is newly reported from Kenya and a small Red Sea island. The previously undescribed male of the species is described here for the first time. The morphological characters observed as well as genetic barcoding support the species' placement within the subgenus *Trachusa* (*Paraanthidium*). Additionally, new material of *Trachusa eburneomaculata* Pasteels, 1984 is presented from Kenya, expanding the known range of this species, which had also been known only from the type locality. Additional diagnostic characters are provided.

INTRODUCTION

The genus *Trachusa* Panzer comprises robust and relatively large anthidiine bees. Thirty-three species are recognized in the Palaearctic, Indomalayan and Afrotropical realms (Kasparek, 2017, 2019; Niu *et al.*, 2019; Flaminio *et al.*, 2021) and about 25 species in the Nearctic realm (Michener, 2007; Kasparek, 2017). The greatest species diversity is found in the eastern Mediterranean, specifically in Turkey and adjacent countries, which suggests that this area may be an evolutionary centre for the Old World species (Kasparek, 2018b, 2020). The Old World species are divided into six subgenera (Kasparek, 2017, 2018a). While the subgenus *Congotrachusa* Pasteels is endemic to central Africa, all other African species are regarded as members of the subgenus *Paraanthidium* Friese. The subgenus *Massanthidium* Pasteels is no longer regarded as a valid taxonomic entity and its members have been transferred to *Paraanthidium* Friese (Kasparek, 2018a).

The diversity of *Trachusa* in Africa is limited. One species, belonging to the subgenus *Congotrachusa*, is found in central and south-western Africa, two species occur in southern Africa, and three species are known from eastern Africa (Kasparek, 2017, 2018a). All of these species are known from only a few specimens, often limited to the type material. Given the large size and conspicuous appearance of these bees, it is unlikely they have simply been overlooked; rather, they are considered genuinely rare. Consequently, any new record of these species is of particular significance. In newly collected material from Eritrea and Kenya, we have discovered and describe

[1] Mönchhofstr. 16, 69120 Heidelberg, Germany (Kasparek@t-online.de)
[2] International Centre of Insect Physiology and Ecology, P.O. Box 30772, 00100 Nairobi, Kenya (rcopeland@icipe.org)

Copyright © M. Kasparek & R. S. Copeland
Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0).
ISSN 2325-4467

herein the previously unknown male of one of these species. Additionally, we provide new distribution records that contribute to a better understanding of the species' geographic ranges.

MATERIAL AND METHODS

Some of the material was collected in Malaise traps in Acacia/Commiphora savanna in the Eastern Province of Kenya. The traps have been established in a long-term insect monitoring programme of the International Centre of Insect Physiology and Ecology, Nairobi, Kenya. The photographs were taken with a Canon MP-E65/2.8 lens mounted on a Canon EOS 6D camera. A Canon Twin Lite MT24EX Macro Flash was used. The camera was moved between the shots with a Cognisys StackShot Rail and usually between 20 and 30 photographs were taken at different focal distances, to give a resulting image with a greater depth of field than any of the individual source images. Subsequently, the photographs were stacked using Helicon Focus (version 6.1.7). Postprocessing of the images was made in Photoshop Elements 15 (Adobe Systems, USA).

DNA extraction of the barcoding sequence of the mitochondrial cytochrome c oxidase subunit 1 gene (COI), PCR amplification, and DNA sequencing were conducted by the Canadian Centre for DNA Barcoding (CCDB), Guelph, using standardised high-throughput protocols (http://ccdb.ca/resources). The results were submitted to Barcode of Life Data System (BOLD; Ratnasingham & Hebert, 2007), a cloud-based data storage and analysis platform developed by CCDB (www.barcodinglife.com).

Material studied is deposited in the following collections: Hungarian Natural History Museum, Budapest, Hungary (HNHM); International Centre of Insect Physiology and Ecology, Nairobi, Kenya (ICIPE); Royal Museum for Central Africa, Tervuren, Belgium (MRAC); Naturalis Biodiversity Center, Leiden, The Netherlands (NBC); Snow Entomological Collection, University of Kansas, Kansas, USA (SEMC). The abbreviations S and T are used for metasomal sternum and tergum.

RESULTS

Trachusa (*Paraanthidium*) *massauahensis* Pasteels, 1984
(Figs. 1–8)

Trachusa (*Massanthidium*) *massauahensis* Pasteels, 1984
Trachusa (*Paraanthidium*) *massauahensis* Pasteels, 1984. Transferred to the subgenus *Paraanthidium* by Kasparek (2018a)
Barcode Identification Number (BIN): BOLD:ACG9152

MATERIAL EXAMINED. 1♀ (Holotype). ERITREA: Massawa ("Massaouah"), without date (HNHM) (Pasteels, 1984; Kasparek, 2017); 1♂, ERITREA: Dahlak Archipelago, Entedebir Island [15°41'N 39°54'E]; 20.iii.1962; leg. J. H. Stock; ZMA.INS 849631 (NBC); 1♂, KENYA: Eastern Province, Sosoma area (0.86269°S 38.67851°E), 491 m.a.s.l.; 24.iv.-08.v.2024; R. Copeland leg. (Malaise trap) (ICIPE, No. 79120); 1♂, KENYA: Kitui County, Base of Ukasi Hill (0.82103°S 38.54443°E), 613 m.a.s.l.; 05.-10.xii.2011; R. Copeland leg. (Malaise trap) (ICIPE, No. 10303).

IDENTIFICATION. Omaulus distinctly carinate, with carina extending onto the ventral surface of mesosoma near the middle coxa. Females share this feature with *T. aquifila* (Strand), *T. eburneomaculata* Pasteels, *T. flavorufula* Pasteels, and *T. namibiensis* Kasparek. A key to the females is provided in Kasparek (2017, 2018a). Males share this characteristic with *T. namibiensis* and *T. aquifila* (the males of *T. eburneomaculata* and *T. flavorufula* are still unknown). The male of *T. massauahensis* is readily distinguished from these species by the unique colour pattern of the terga: it displays bright lemon-yellow



Figures 1–4. Male of *Trachusa massauahensis* Pasteels from Kenya. **1, 2**. Habitus of the two examined specimens (ICIPE, 79120, 10303). **3**. Frontal view (ICIPE 10303). **4**. Lateral view of omaulus with arrows indicating the carina that extends onto the ventral surface of the mesosoma (ICIPE 79120).

bands on T1–T4, which are broad laterally and attenuated from anterior medially and mediolaterally. The bands on T1–T3 are slightly interrupted in the middle (Fig. 1, 2). In contrast, *T. namibiensis* has broad orange-yellow bands on T1–T4, interrupted on T1–T2 and featuring a median wedge on T3 (Kasparek, 2018a: figure 1), while *T. aquifila* exhibits broad, uninterrupted orange-yellow bands (Kasparek, 2017: figure p. 95).

Description. Female: In addition to Pasteels' (1984) original description, a detailed re-description of the female holotype supported by line drawings and photographs was provided by Kasparek (2017) and is not repeated here.

Male: Measurements: Body 9–10 mm long. Length of marginal cell: 1.87, 1.92, and 2.22 mm; intertegular length: 3.17, 3.23, and 3.65 mm (the specimen from Eritrea is the smallest one); distance between hind ocellus and preoccipital ridge: 0.78 mm =

3.39 ocellus diameters, 0.85 mm = 3.86 ocellus diameters; and 0.9 mm = 4.0 ocellus diameters. Head (Figs. 3, 4): Black with yellow clypeus, supraclypeal area, and lower paraocular area. Preoccipital band between eyes yellow, but with tinge of red. Clypeus about 1.7 × as broad as long, evenly punctate; apical margin shallowly emarginate, resulting in undulate margin; apical rim narrow, brown. Vertex long, 3.4–4.0× as long as diameter of posterior ocellus, finely punctate; subantennal suture straight, slightly curved inwards at lower end; antenna brown, front side of scape yellow. Mesosoma: Scutum black with boomerang-shaped anterolateral yellow bands, densely punctate, with distances between punctures about one fourth puncture diameter, interstices smooth and shiny, with some irregular minute punctures; scutellum and axilla swollen, overhanging propodeum, median emargination in dorsal view, yellow spot on scutellum and axilla posteriorly; pronotal lobe large with high lamella at anterior margin, outer side yellow, inner side brown (entirely brown in paratype); omaulus carinate (Fig. 4), carina or low lamella extending onto ventral surface of thorax close to the middle coxa, front side smooth and shiny in lower half and finely punctate in upper half; mesepisternum black in two specimens, and with a dark yellow spot on another specimen; legs yellow, tibiae broad; arolia small and inconspicuous; wing brownish infuscate, second recurrent vein distal to second submarginal crossvein. Metasoma: T1–T5 with yellow transverse bands, narrowly interrupted on T1 and T2, attenuated from anterior in central part; T6 yellow with a small black wedge-shaped maculation anteromedially (Fig. 5), apex with slight bulge on each side of the middle, bearing a brown lamella; T7 small, curled under T6; S2 very large, covering ventral side of metasoma almost entirely, with dense fringe of long, off-white hairs on apical margin; S3 with median longitudinal groove with haired projection; S4 with submedian and lateral black combs; S5 with lateral black comb, each with about 10–15 setae; gonostylus bifid, penis valves small (Fig. 8), one of the two arms protruding from body and visible in ventral body view (indicated by red arrows in Fig. 6).

SUBGENERIC CLASSIFICATION. The carinate omaulus, whose carina extends onto ventral surface of the thorax close to the middle coxa, matches the characterisation of the former subgenus *Trachusa* (*Massanthidium*), which has been merged with *Trachusa* (*Paraanthidium*). Other characters are typical for *Paraanthidium*, such as the bifid gonostylus of the male genitalia (Fig. 8). As in other species of the subgenus, one of the two arms of the gonostylus extends beyond the integumental surface and is visible as thin, yellow filament even when the genitalia are not everted. Also, the size of the arolia and the shape of the subantennal suture are consistent with the subgenus *Paraanthidium*.

GENETIC ANALYSIS. The two specimens from which genetic barcodes (COI gene) were derived, cluster in the phylogenetic tree with the members of the subgenus *Paraanthidium* Friese, however as a distinct branch. The cluster is sister to a cluster to which *T. larreae* from North America (subgenus *Heteranthidium*) and *T. vietnamensis* from Asia belong.

BIOLOGY. The two specimens from Kenya were collected in Malaise traps in Acacia-Commiphora bushland in May and December. The specimen from Entedebir Island in the Red Sea was collected in March.

DISTRIBUTION. Eritrea and Kenya. The female described by Pasteels (1984) was collected at Massawa on the Eritrean coast, the male on the Red Sea island of Entedebir, a small, uninhabited island of the Dahlak Archipelago, about 50 km off Massawa. The two Kenyan males reported herein are new country records.

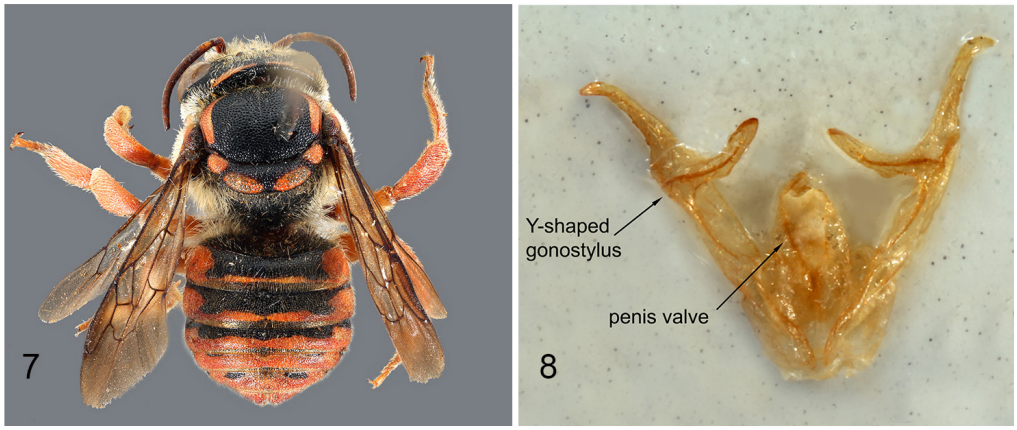
REMARKS. The species was originally described from a single female specimen more than 40 years ago (Pasteels, 1984), and no additional material has been reported since. Herein, we described the male for the first time. New records of *T. massauahensis* have been documented from Ukasi Hill and the nearby area of Sosoma, both located in the arid eastern region of Kenya. These sites fall within the southeastern extension of the Sahel, which stretches southward into northern Tanzania (Coe, 1999). The

dominant vegetation in this region consists of savanna with dry scrub and scattered trees (Greenway, 1973). Ukasi Hill is an inselberg formed from ancient basement rock, while Sosoma is a flat plain characterized by reddish soil. The broader area receives an average annual rainfall of approximately 780 mm, with a main rainy season ("masika" in Swahili) from April to June and a secondary rainy season ("vuli" in Swahili) between October and December. The mean annual temperature is around 24.5°C, based on data from Kaningo (source: www.weather-atlas.com). In recent years, both locations have experienced recurrent rainfall deficits. These climatic conditions have had significant impacts on agriculture, with frequent maize crop failures reported.

The Malaise trap programme conducted at Sosoma and Ukasi by ICIPE already revealed several interesting and new insect species. Among the bees reported from there are three rare species of Meganomiinae (*Uromonia stagei* Michener; *Pseudophilanthus tsavoensis* (Strand); and *Meganomia rossi* Michener), and the recently described *Cyphanthidium eardleyi* Griswold & Copeland, 2026 (Pauly & Copeland, 2019; Griswold & Copeland, 2026). Finally, in the specimen from Eritrea, all yellow colours are red, apparently because of treatment with cyanide.



Figures 5, 6. Male of *Trachusa massauahensis* Pasteels from Kenya. **5**. Posterior view of apical terga (ICIPE 79120). **6**. Apical sterna with arrows indicating the emarginate apical margin of T6 (black arrows), the protruding arm of the gonostylus (red arrows), and the black combs of S4–S6 (blue arrows) (ICIPE 79120).



Figures 7, 8. Male of *Trachusa massauahensis* Pasteels from Entedebir Island in the Red Sea, Eritrea (NBC: ZMA.INS 849631). **7**. Dorsal habitus. Note that the reddish discolouration is apparently due to cyanide exposure. **8**. Genitalia with bifid gonostylus.



Figure 9. Female of *Trachusa eburneomaculata* Pasteels from Kenya in lateral view (ICIPE 79094).

Trachusa (*Paraanthidium*) *eburneomaculata* Pasteels, 1984
(Fig. 9)

Trachusa (*Massanthidium*) *eburneomaculata* Pasteels, 1984
Trachusa (*Paraanthidium*) *eburneomaculata* Pasteels, 1984. Transferred to the subgenus *Paraanthidium* by Kasparek (2018a)

MATERIAL EXAMINED. ♀ (Holotype) and 5♀ (Paratypes); KENYA: Kajiado County, 8 Miles N.E. Magadi, 2,500 ft. [762 m]; 16.vi.1967; leg. Michener; holotype and 4 paratypes in SEMC, 1 paratype in MRAC. 1♀, KENYA: Kitui county, Acacia-Commiphora bushland at Musili Ranch (0.41999°S 38.25871°E), 766 m.a.s.l.; 09.-23.v.2024; leg. R. Copeland (Malaise trap) (ICIPE 79094).

BIOLOGY. Collected in Kenya in May and June.

DISTRIBUTION. Only known from Kenya.

REMARKS. In addition to the original description by Pasteels (1984) and the redescription by Kasparek (2017), which includes photographs and line drawings, the following differences were noted in the ICIPE specimen (Fig. 9): Axillae are black in the specimen from the Kitui county, ivory-coloured spots are absent. Mandible with one large and four smaller teeth (vs. five smaller teeth). Apical margin of clypeus shallowly emarginate medially (vs. straight); scopa entirely black (not red in the middle).

ACKNOWLEDGEMENTS

We wish to thank Naturalis Biodiversity Center, Leiden, the Netherlands (Wendy van Bohemen), for the loan of material. The authors also gratefully acknowledge the financial support for this research by the following organizations and agencies:

Swedish International Development Cooperation Agency (Sida); the Swiss Agency for Development and Cooperation (SDC); the Australian Centre for International Agricultural Research (ACIAR); the Government of Norway; the German Federal Ministry for Economic Cooperation and Development (BMZ); and the Government of the Republic of Kenya. The views expressed herein do not necessarily reflect the official opinion of the donors.

REFERENCES

Coe, M. 1999. Introduction. In: Coe, M., N. McWilliam, G. Stone, & M. Parker (Eds.), *Mkomazi: The Ecology, Biodiversity and Conservation of a Tanzanian Savanna*: 5–13. Royal Geographic Society with the Institute of British Geographers; London; 608 pp.

Flaminio, S., P. Nalinrachatakan, N. Warrit, G. Cilia, & G. Quaranta. 2021. *Trachusa vietnamensis*, a new species from Vietnam (Hymenoptera Apoidea Megachilidae). *Bulletin of Insectology* 74(2): 307–310.

Greenway, P.J. 1973. A classification of the vegetation of East Africa. *Kirkia* 9: 1–68.

Griswold, T., & R.S. Copeland. 2026. New *Cyphanthidium* (Hymenoptera: Megachilidae): Highly modified female hind tibial spurs and convergence in East African drylands. *Journal of Melittology* 145: 1–10. https://doi.org/10.17161/jom.vi145.24084

Kasparek, M. 2017. Resin bees of the anthidiine genus *Trachusa.* Identification, taxonomy, distribution and biology of the Old World species. *Entomofauna Supplement* 21: 1–152.

Kasparek, M. 2018a. A new species of *Trachusa* Panzer, 1804 (Megachilidae: Anthidiini) from southern Africa, with notes on the subgeneric classification and a key to the Afrotropical species. *Zootaxa* 4399(3): 329–340. https://doi.org/10.11646/zootaxa.4399.3.3

Kasparek, M. 2018b. Taxonomic revision proves *Trachusa pubescens* (Morawitz, 1872) sensu lato to be a complex of allopatric and sympatric species in South-Eastern Europe and Western Asia (Hymenoptera, Apoidea, Anthidiini). *ZooKeys* 764: 111–144. https://doi.org/10.3897/zookeys.764.24581

Kasparek, M. 2019. A new species in the *Trachusa ovata* species group (Hymenoptera: Apoidea) from Peninsular Malaysia with an overview of the Old World species within the genus *Trachusa. Journal of Natural History* 53: 1079–1094. https://doi.org/10.1080/00222933.2019.1632953

Kasparek, M. 2020. Revision of the West Palaearctic *Trachusa interrupta* species complex (Apoidea: Anthidiini) with description of four new species. *Zootaxa* 4728(1): 1–48. https://doi.org/10.11646/zootaxa.4728.1.1

Michener, D.C. 2007. *The Bees of the World* [2nd Edition]. Johns Hopkins University Press; Baltimore, MD; xvi+[i]+953 pp., +20 pls.

Niu, Z.-Q., J.S. Ascher, M.C. Orr, T. Griswold, & C.-D. Zhu. 2019. Overview of the bee genus *Trachusa* Panzer, 1804 (Hymenoptera: Apoidea: Megachilidae: Anthidiini) from China with description of three new species. *Zootaxa* 4646(2): 251–270. https://doi.org/10.11646/zootaxa.4646.2.3

Pasteels, J.J. 1984. Révision des Anthidiinae (Hymenoptera, Apoidea, Megachilidae) de l'Afrique subsaharienne. *Académie Royale de Belgique, Mémoires de la Classe des Sciences, Collection in-4° - 2e série*, 19(1): 1–165.

Pauly, A., & R.S. Copeland. 2019. *Meganomia somalica* (Friese, 1915) comb. nov. and new records of Meganomiinae for East Africa (Hymenoptera: Apoidea: Melittidae). *Belgian Journal of Entomology* 89: 1–22.

Ratnasingham, S., & P.D.N. Hebert. 2007. BOLD: the barcoding of life data system (www.barcodinglife.org). *Molecular Ecology Notes* 7: 355–364. https://doi.org/10.1111/j.1471-8286.2007.01678.x



Journal of Melittology

A Journal of Bee Biology, Ecology, Evolution, & Systematics

The *Journal of Melittology* is an international, open access journal that seeks to rapidly disseminate the results of research conducted on bees (Apoidea: Anthophila) in their broadest sense. Our mission is to promote the understanding and conservation of wild and managed bees and to facilitate communication and collaboration among researchers and the public worldwide. The *Journal* covers all aspects of bee research including but not limited to: anatomy, behavioral ecology, biodiversity, biogeography, chemical ecology, comparative morphology, conservation, cultural aspects, cytogenetics, ecology, ethnobiology, history, identification (keys), invasion ecology, management, melittopalynology, molecular ecology, neurobiology, occurrence data, paleontology, parasitism, phenology, phylogeny, physiology, pollination biology, sociobiology, systematics, and taxonomy.

The *Journal of Melittology* was established at the University of Kansas through the efforts of Michael S. Engel, Victor H. Gonzalez, Ismael A. Hinojosa-Díaz, and Charles D. Michener in 2013 and each article is published as its own number, with issues appearing online as soon as they are ready. Papers are composed using Microsoft Word® and Adobe InDesign® in Lawrence, Kansas, USA.

Editor-in-Chief
Victor H. Gonzalez
University of Kansas

Layout Editor
Eric Bader
University of Kansas

Journal of Melittology is registered in ZooBank (www.zoobank.org), and archived at the University of Kansas and in Portico (www.portico.org).

http://journals.ku.edu/melittology
ISSN 2325-4467