

**Description of *Potophila verrucosa*, gen. n. et sp. n. (Diptera:  
Psychodidae: Psychodinae) from the West  
Usambara mountains, Tanzania**

**Gunnar M. Kvifte**

Department of Natural History, University Museum of Bergen, P.O. Box 7800, University of Bergen,  
5400 Bergen, Norway, and Department of Limnology, Institute of Biology, University of Kassel,  
Heinrich-Plett-Straße 40, 34132 Kassel Oberzwehren, Germany; [gunnar.kvifte@um.uib.no](mailto:gunnar.kvifte@um.uib.no)

ABSTRACT

*Potophila verrucosa* gen. n. et sp. n. is described based on a male from the West Usambara mountains, Tanzania. The genus and species are characterised by an elongate first flagellomere with the node more than three times as long as the internode, an asymmetrical aedeagus and two parameres carrying rugose morphoventral appendages. *Potophila verrucosa* cannot be placed in a systematic context with certainty, but several characters are consistent with a relationship to the tribe Psychodini.

KEY WORDS: Afrotropical, *Potophila*, Psychodidae, West Usambara Mountains, taxonomy, new genus, new species.

INTRODUCTION

The Psychodid fauna of Africa is still poorly known. In the catalogue by Kvifte (2012), 174 described species in 27 genera are listed; however, large parts of the continent remain largely unsampled for moth flies. Even small collections frequently yield undescribed species, and often also genera not previously recorded from Africa (Wagner & Andersen 2007; Kvifte 2011; Ježek & Tkoč 2012).

The Eastern Arc mountain chain in Tanzania and Kenya forms one of the most important global hotspots of biodiversity conservation due to its high levels of endemism (Burgess *et al.* 2007). Very little is known of the Psychodidae from this ecoregion; a total of 18 species are known from the Ulunguru area near Morogoro and from the West Usambara mountains (Duckhouse 1987; Wagner & Andersen 2007). In the present paper, one further species is described based on a specimen collected in the West Usambara mountains, Tanzania. With the present paper, the African moth fly fauna now stands at 176 species in 29 genera.

MATERIAL AND METHODS

The specimen was collected using a sweep net during the Zoological Museum of Bergen's (ZMB) 1990 expedition to the West Usambara mountains (see Wagner & Andersen 2007). Prior to examination, it was macerated in KOH and mounted in Canada balsam. The specimen is kept in the natural history collections at the University Museum of Bergen.

All measurements are in micrometres ( $\mu\text{m}$ ), except wing length, which is given in millimetres (mm). Measurements are given with an accuracy of 3  $\mu\text{m}$ , except wing length, which is given with an accuracy of 0.03 mm.

Morphological terminology is according to Quate and Brown (2004), with the following exceptions: the surstyli (often wrongly referred to as cercopodia or cerci)

are called “epandrial claspers” following Santos and Curler (2014), and the gonocoxal apodemes are called “gonocoxal condyles” to more accurately describe their morphology.

#### TAXONOMY

##### *Potophila* gen. n.

Etymology: From Greek *poton* (πότος), “drinking-bout”, and *philos* (φίλος), “friend”, referring to the first flagellomere, whose shape resembles a wine bottle. The gender of the new genus is feminine.

Type species: *Potophila verrucosa* sp.n.

Diagnosis: Eyebridge of three rows of facets, flagellomeres nodiform with paired ascoids, first flagellomere with nodal part strongly elongated, more than three times length of internode (Fig. 1A). Wing ovoid with costal node swollen (Fig. 1B). Aedeagus asymmetrical through 90° inversion of distiphallus; with two parameres, and these carrying a rugose morphoventral projection (Fig. 1C).

##### *Potophila verrucosa* sp.n.

#### Fig. 1

Etymology: From Latin *verruca* (wart), referring to the rugose field on the paramere.

Diagnostic characters: As for genus.

Description:

Male.

*Head* (Fig. 1A): Wider than long; vertex long, *c.* 0.4 of total head length, tapering towards anterior end, with small lateral knobs (fig. 1A); eyebridge of three rows of facets, separated by one-facet diameter width; interocular suture present, obtuse; ocular bristles absent; frontal scar patch crown-shaped with median band of alveoli reaching interocular suture; labellum bulbous, setose; only first palp segment present on specimen, 71 μm long; scape cylindrical, pedicel spherical, 0.8 × length of scape; flagellomeres elongate, symmetrically nodiform; first flagellomere with node very elongate, more than three times as long as internode; other flagellomeres with internode as long as node; each flagellomere with two ascoid attachment points, ascoids missing from specimen; some flagellomeres with spiniform sensillae.

*Thorax*: Anepisternum and dorsum densely setose; anepisternum with anterior spiracle present; anepimeron triangular without additional sclerite; laterotergite bare around margins; katepisternum and katepimeron bare; pronotum setose; metathoracal spiracle densely setose; coxae with longitudinal row of setae; legs missing.

*Wing* (Fig. 1B): 3.135 mm long × 1.26 mm wide; ovoid; basal costal node enlarged; membrane unpatterned, without vestiture; Sc terminating blind in the wing, reaching origin of R<sub>5</sub>; R<sub>2+3</sub> not connected to R<sub>4</sub>; radial fork in distal half of the wing, medial fork in basal half; basal part of M<sub>2</sub> weakened; r-m and m-cu faint; R<sub>5</sub> terminating slightly below apex of wing; CuA<sub>2</sub> terminating slightly distally to middle of wing but basal to radial fork; bases of M<sub>1+2</sub> and CuA<sub>2</sub> expanded; basal cells terminating close to base of wing.

*Abdomen* without special features.

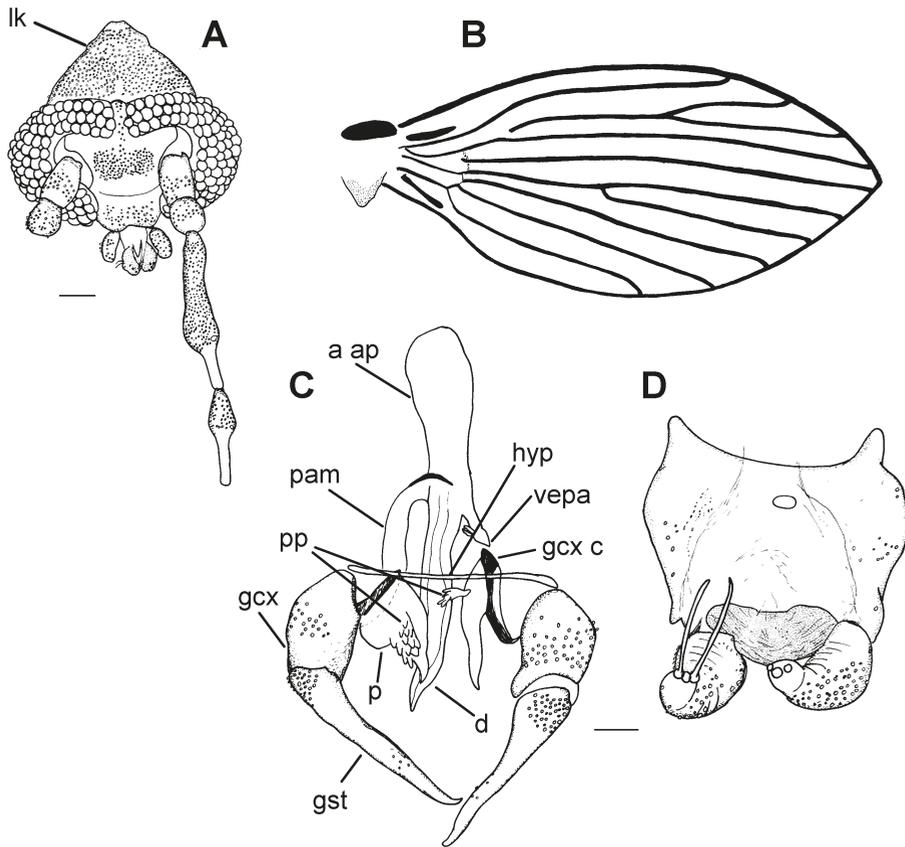


Fig. 1. *Potophila verrucosa*, gen. n et sp. n, holotype ♂: (A) head (dorsal view); (B) wing; (C) terminalia (laterodorsal view); (D) epandrium and proctiger (laterodorsal view). Abbreviations: a ap – aedeagal apodeme; d – distiphallus; gcox – gonocoxite; gcox c – gonocoxal condyles; gst – gonostyle; hyp – hypandrium; lk – lateral knob; p – paramere; pam – parameral-aedeagal membrane; pp – parameral projections; vepa – ventral epandrial plate/aedeagal connection. Scale bars: 100  $\mu$ m (A), 40  $\mu$ m (C & D).

**Terminalia** (Fig. 1C, D): With hypandrium narrow, straight; gonostyle 1.5  $\times$  length of gonocoxite; gonostyle basally with a cluster of lateral setae, with scattered spiniform sensilla along length; gonocoxal condyles triangular in dorsal and ventral views; aedeagus asymmetrical; basiphallus broad in dorsal view, connected laterally to parameres by parameral-aedeagal membrane, medially to distiphallus, morphodorsally with pointed connection to ventral epandrial plate; distiphallus comprised of two lateral phallomeres and morphodorsal phallic membrane forming duct; distiphallus twisted 90° to the left; parameres triangular with a morphoventral projection carrying small, verruca-like rugae; epandrium (Fig. 1D) broader than long; with single pseudospiracular opening; subepandrial plate large, semicircular in dorsal view; hypoproct broadly U-shaped, densely pilose, covering bases of epandrial claspers; epiproct small, oval; epandrial claspers curved, carrying three distal tenacula in one row; tenacula spatulate, 87  $\mu$ m long, tips slightly expanded.

Holotype: ♂ TANZANIA: Tanga region, West Usambara Mts, Mazumbai forest reserve, 1440 m, 23.xi.1990, Tanzania Expedition leg, sweep net (ZMB).

#### DISCUSSION

*Potophila verrucosa* cannot easily be placed systematically within Psychodinae, both because of its enigmatic morphology and the poor preservation of the specimen. Systematically important characters such as the ascoid shape, the terminal flagellomeres and the palps are not available for examination. Still, some speculations can be made based on the available evidence.

The head characters of *Potophila* lack any unambiguous phylogenetic signals. Symmetrical nodiform flagellomeres are known from Psychodini, Paramormiini, Brunettiina and Maruinini, while an eyebridge of three rows is present in Brunettiina, Mormiina, some *Philosepedon* Eaton (Psychodini) and some Maruinini/Setomimini. The spiniform sensillae on some of the flagellomeres have hitherto only been recorded from Psychodini (Fauchaux & Gibernau 2010); however, this character has not been sufficiently explored within Psychodinae. Elongation of flagellomeres occurs in several clades, including the genus *Satoba* Ježek (Paramormiini), *Abcharis* Tkoč & Ježek (tribal placement uncertain) and to some degree *Threticus* Eaton (Psychodini).

The genitalia of *Potophila verrucosa* consist of a slightly asymmetrical elongate aedeagus with two parameres, the aedeagus being twisted 90° to the left. Paired parameres that are symmetrical or asymmetrical are likely to be part of the ground-plan for Psychodinae (cf. Vaillant 1982). Twisted aedeagi are present in several Psychodini taxa such as *Trichopsychoda* Tonnoir, *Threticus* Eaton and *Psychoda* Latreille, as well as in two species of Brunettiina (Wagner & Vaillant 1983) and in the currently unplaced taxa *Saximormia* Ježek and *Bryopharsos* Quate. A uniseriate distal row of tenacula is present in Psychodini and most Maruinini/Setomimini, but also in Brunettiina and in the Pericomaini genera *Berdeniella* Vaillant and *Szaboiella* Vaillant.

Overall, the characters of *Potophila* are consistent with a placement near or within Psychodini (in the sense of Quate (1959) and Duckhouse (1985)); and the shape of the genitalia and flagellomeres suggest it to be close to *Threticus*. This must, however, be confirmed with new material and further characters.

#### ACKNOWLEDGEMENTS

I am grateful to Trond Andersen, who made the material from the Zoological Museum of Bergen's 1990 expedition available for me to study, and to all the participants on this expedition for their collection efforts. Furthermore I am indebted to Rüdiger Wagner for assistance with the preparation of figures, and to him and Burgert Muller for useful comments on an earlier version of the manuscript.

#### REFERENCES

- BURGESS, N. D., BUTYNSKI, T. M., CORDEIRO, N. J., DOGGART, N. H., FJELDSÅ, J., HOWELL, K. M., KILAHAMA, F.B., LOADER, S.P., LOVETT, J.C., MBILINYI, B., MENEGON, M., MOYER, D.C., NASHANDA, E., PERKIN, A., ROVERO, F., STANLEY, W.T. & STUART, S.N. 2007. The biological importance of the Eastern Arc Mountains of Tanzania and Kenya. *Biological Conservation* **134**: 209–231.
- DUCKHOUSE, D. A. 1985. A re-examination of *Neomaruina* (Diptera, Psychodidae), with observations on its life-history and affinities and redefinition of the tribe Psychodini. *Annals of the Natal Museum* **26**: 601–620.
- 1987. A revision of Afrotropical *Setomima*, elucidation of their genealogical relationships and descriptions of other Afrotropical Psychodinae (Diptera: Psychodidae). *Annals of the Natal Museum* **28**: 231–281.

- FAUCHEUX, M. J. & GIBERNAU, M. 2010. Antennal sensilla in five Psychodini moth flies (Diptera: Psychodidae: Psychodinae) pollinators of *Arum* spp. (Araceae). *Annales de la Société Entomologique de France (N. S.)* **47**: 89–100.
- JEŽEK, J. & TKOČ, M. 2012. A new species of the genus *Gondwanoscurus*, and two new records of non-biting moth flies (Diptera: Psychodidae: Psychodinae) from Socotra Island. *Acta Entomologica Musei Nationalis Pragae* **52** (supplementum 2): 545–557.
- KVIFTE, G. M. 2011. *Biodiversity studies in Afrotropical moth flies (Diptera: Psychodidae)*. Thesis for partial completion of the M.Sc. degree, University of Bergen.
- 2012. Catalogue and bibliography of Afrotropical Psychodidae: Bruchomyiinae, Psychodinae, Sycoracinae and Trichomyiinae. *Zootaxa* **3231**: 29–52.
- QUATE, L. W. 1959. Classification of the Psychodini (Psychodidae: Diptera). *Annals of the Entomological Society of America* **52**: 444–451.
- QUATE, L. W. & BROWN, B. V. 2004. Revision of Neotropical Setomimini (Diptera: Psychodidae: Psychodinae). *Contributions in Science* **500**: 1–117.
- SANTOS, C. B. & CURLER, G. R. 2014. Four new species of *Tonnoira* Enderlein (Diptera: Psychodidae, Psychodinae) from the Brazilian Atlantic forest. *Zootaxa* **3760**: 463–470.
- VAILLANT, F. 1982. Homologies entre les pièces génitales mâles de quelques diptères nématoécères. *Annales de la Société Entomologique de France (N. S.)* **18**: 419–425.
- WAGNER, R. & ANDERSEN, T. 2007. Psychodidae (Diptera: Nematocera) from the West Usambara Mountains, Tanzania. In: *Contributions to the Systematics and Ecology of Aquatic Diptera — A Tribute to Ole A. Sæther* (ed. by T. Andersen). Caddis Press, Columbus, OH, pp. 287–307.
- WAGNER, R. & VAILLANT, F. 1983. The *Atrichobrunettia* (= *Mirousiella*) (Diptera, Psychodidea) from Europe. *Aquatic Insects* **5**: 157–162.

