

NEW RECORDS OF *MELANOSTOMA FUMIVENOSUM* DOESBURG (DIPTERA: SYRPHIDAE) WITH THE DESCRIPTION OF THE MALE

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Abstract

The first records of *Melanostoma fumivenosum* Doesburg since its original description are given. The newly studied specimens, collected in Papua New Guinea, are new records for this country and include the first known males. A full re-description is provided as well as some images, including drawings of male genitalia.

Introduction

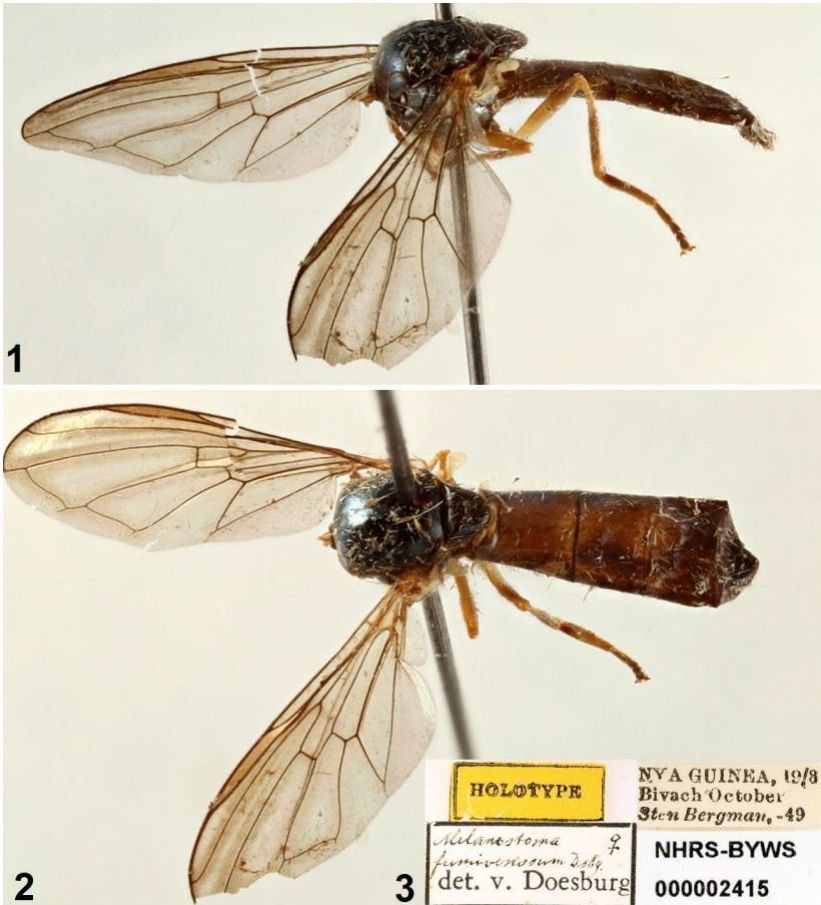
Flower flies are one of the richest families of Diptera in number of species, with more than 6,200 described valid species (Thompson 2013). Also known as hover flies in Europe, the adults are frequent and effective flower visitors and are considered important pollinators (Ssymank and Kearns 2009, Inouye *et al.* 2015) and they have been used as bioindicators to assess the loss of biodiversity and the efficiency of restoration and conservation policies (Sommaggio 1999, Tschardt *et al.* 2005, Ricarte *et al.* 2011, Sommaggio and Burgio 2014). Syrphid larvae play an important role as biological control agents of pests (Schmidt *et al.* 2004, Bergh and Short 2008, Nelson *et al.* 2012, Eckberg *et al.* 2015) and as decomposers of organic matter (Lardé 1989, Martínez-Falcón *et al.* 2012).

The genus *Melanostoma* Schiner comprises more than 50 valid species (Thompson 2013, Thompson *et al.* 2017, Ramage *et al.* in press), which are among the most abundant and conspicuous flower flies in the northern Palaearctic Region (Haarto and Ståhls 2014). Larvae of this genus have been found feeding on several prey, mostly aphids but also on mites, psyllids, plant bugs and larvae of beetles and other flies (Rojo *et al.* 2003). Despite their abundance, *Melanostoma* species are not easy to identify due to presence of melanic forms, coloration variability and taxonomic history with many synonyms (Haarto and Ståhls 2014). Moreover, recent DNA barcode studies have shown that different species may share haplotypes for the cytochrome c oxidase gene (COI) and additional molecular markers are needed to reliably identify the taxa based on molecules (Haarto and Ståhls 2014).

In the Australasian and Oceanic Regions five *Melanostoma* species occur (Ramage *et al.* 2018), namely *M. apicale* Bigot, 1884 (found in Australia, Fiji, New Caledonia, Papua New Guinea, Solomon Islands, Tonga and Samoa), *M. fasciatum* (Macquart, 1850) (New Zealand), *M. fumivenosum* Doesburg, 1966 (New Guinea Island), *M. polynesiotus* Mengual & Ramage, 2018 (French Polynesia) and *M. univittatum* (Wiedemann, 1824) (India, Sri Lanka, Thailand, Taiwan, Philippines, Borneo, Java and Central Moluccas).

Since the original description by Doesburg (1966), based on a single female (Figs 1-3), *M. fumivenosum* had not been recorded again until now. The citation of this species in the literature is almost non-existent, with the exception of Thompson *et al.* (2017). For example, this species is not listed in the Catalog of the Diptera of Australasia and Oceania (Thompson and Vockeroth 1989).

Herein, newly studied specimens from Papua New Guinea include the first known males of *M. fumivenosum*. We describe the male in full and provide images of the species, including drawings of the male genitalia.



Figs 1-3. *Melanostoma fumivenosum*, holotype female: (1) lateral view; (2) dorsal view; (3) labels.

Materials and methods

The terminology used follows Thompson (1999), except some terms used for the male genitalia that follow the terminology presented by Cumming and Wood (2009).

At the end of each record, between square brackets ([]) and separated by a comma, the number of specimens and sex, the holding institution and the unique identifier or number are given. The abbreviations used for collections are: RBINS – Royal Belgian Institute of Natural Sciences, Brussels, Belgium; MZH – Finnish Museum of Natural History, Helsinki, Finland; and ZFMK – Zoologisches Forschungsmuseum Alexander Koenig, Bonn, Germany.

Measurements in millimetres were taken using a reticule in a Leica[®] M165 C microscope. Photographs were composed using the software Zerene Stacker[®] 1.04 (Richland, Washington, USA), based on images of pinned specimens taken with a Canon EOS 7D[®] mounted on a P-51 Cam-Lift (Dun Inc., VA, USA) and with the help of Adobe Lightroom[®] (version 5.6). Simple-Mappr (Shorthouse 2010) was used to create Fig. 14. Body length was measured from the anterior oral margin to the posterior end of the abdomen, in lateral view. Wing length was measured from the wing tip to the basicosta.

Results

Melanostoma fumivenosum Doesburg, 1966

(Figs 1-12)

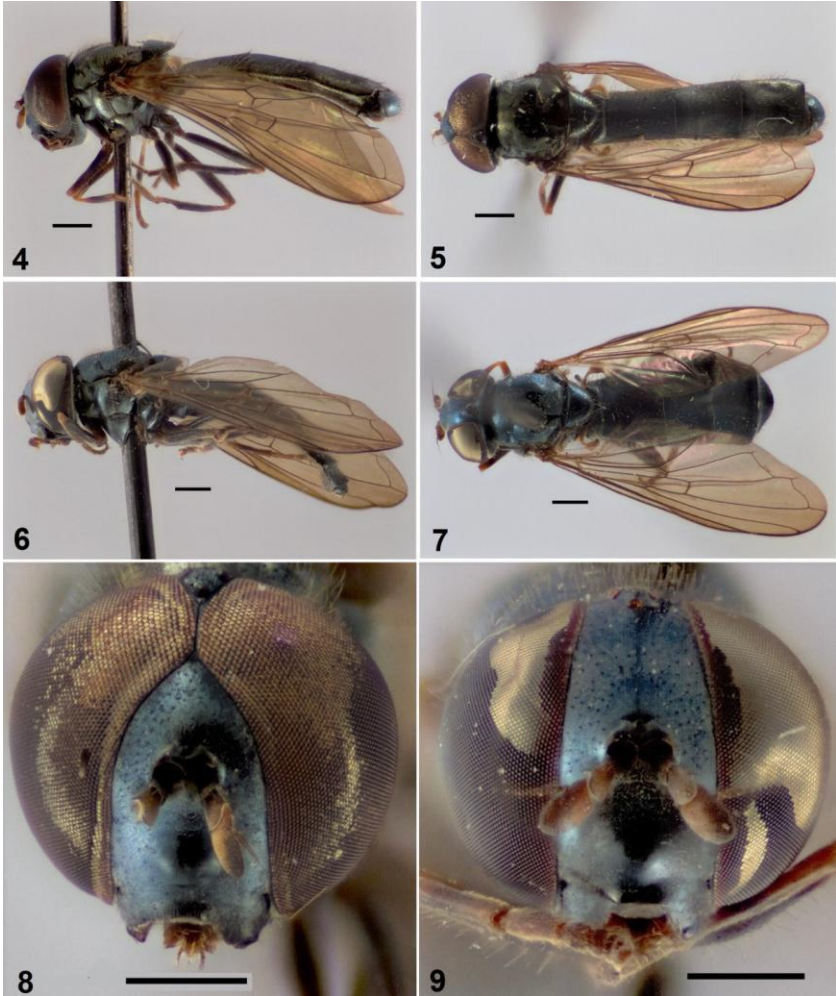
Type locality. Indonesia: Papua Province, Bivak (as Bivach), 05°01'S, 138°39'E (Jong 2000). Knight (2010) also placed this locality in Papua Province.

Material examined. PAPUA NEW GUINEA: 2 ♀♀, Morobe District, Wau, 6-14.iii.1974, H. Hippa & P.T. Lehtinen (MZH, <http://id.luomus.fi/GJ.527>; ZFMK, <http://id.luomus.fi/GJ.526>); 7 ♂♂, Morobe District, Mt. Kaindi, 1800 m, 7-13.iii.1974, H. Hippa & P.T. Lehtinen (MZH, <http://id.luomus.fi/GJ.532>, <http://id.luomus.fi/GJ.534>, <http://id.luomus.fi/GJ.535>, <http://id.luomus.fi/GJ.536>; ZFMK, <http://id.luomus.fi/GJ.530>, <http://id.luomus.fi/GJ.531>, <http://id.luomus.fi/GJ.533>); 1 ♂, 1 ♀, Morobe District, Mt. Kaindi, 2350 m, 7-13.iii.1974, H. Hippa & P.T. Lehtinen (MZH, <http://id.luomus.fi/GJ.528>, <http://id.luomus.fi/GJ.529>).

In addition, specimens of *M. apicale* from Papua New Guinea were also examined: PNG: Namig Creek, 1105 m., 25.v.1982, P. Grootaert (1 ♂, RBINS); PNG: Morobe District, Wau, 6-14.iii.1974, H. Hippa & P.T. Lehtinen (4 ♂♂, 7 ♀♀, MZH, <http://id.luomus.fi/GJ.541>, <http://id.luomus.fi/GJ.545>, <http://id.luomus.fi/GJ.554>, <http://id.luomus.fi/GJ.538>, <http://id.luomus.fi/GJ.539>, <http://id.luomus.fi/GJ.540>, <http://id.luomus.fi/GJ.543>, <http://id.luomus.fi/GJ.544>, <http://id.luomus.fi/GJ.553>; ZFMK, <http://id.luomus.fi/GJ.542>, <http://id.luomus.fi/GJ.546>).

Differential diagnosis. *Melanostoma fumivenosum* has an obvious facial tubercle (Figs 4, 6, 8-9) and male genitalia small (Figs 10-12). It is easily distinguishable from *M. fasciatum* by the entirely black abdominal terga (Figs 5, 7), often amply covered with dark pollinosity (*M. fasciatum* has three pairs of large yellow maculae on terga 2, 3 and 4). Moreover, *M. fasciatum* is

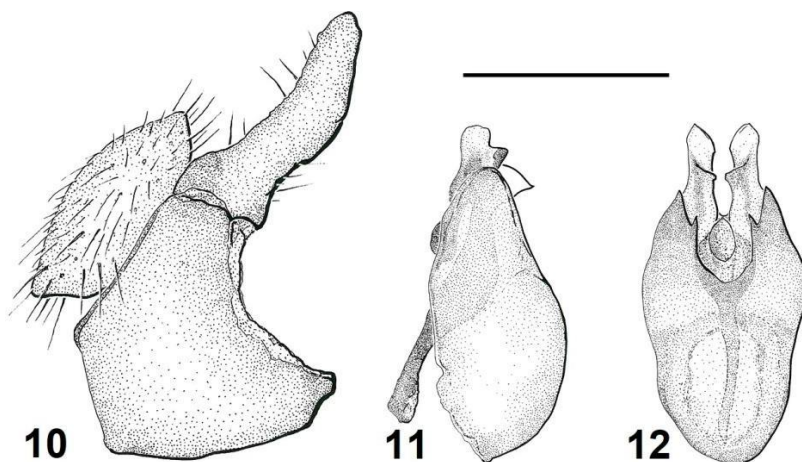
found in New Zealand and *M. fumivenosum* on the island of New Guinea. Other species, such as *M. univittatum*, *M. apicale* and *M. polynesiotes*, have face almost straight, with only a trace of facial tubercle, and enlarged male genitalia.



Figs 4-9. *Melanostoma fumivenosum*: (4-5) male, <http://id.luomus.fi/GJ.533>: (4) lateral view; (5) dorsal view; (6-7) female, <http://id.luomus.fi/GJ.526>: (6) lateral view; (7) dorsal view; (8-9) head showing face: (8) male, <http://id.luomus.fi/GJ.533>; (9) female, <http://id.luomus.fi/GJ.526>. Scale = 1 mm.

Description. Male. Head (Figs 4-5, 8): face black with a distinct facial tubercle, dark pilose, grey pollinose except shiny facial tubercle; gena black, dull, dark pilose; lunule black; frons black, dark pilose, grey pollinose laterally and dorsally with a medial shiny area; vertical triangle black, black pilose; eyes holoptic; scape and pedicel dark brown, black pilose, basoflagellomere dark brown except dark orange basoventrally; arista dark brown, pubescent with pile shorter than arista width; occiput black, grey pollinose, pale pilose on ventral 1/2 and dark pilose on dorsal 1/2.

Thorax (Figs 4-5): scutum black, shiny, with sparse grey pollinosity anteriorly and laterally, with erect, relatively long yellow pile; postalar callus brown; scutellum black with long, erect yellow pile, subscutellar fringe with yellow pile. Pleuron black, sparse pale pollinose, yellow pilose; metasternum bare, reduced, excavated; calypter yellow; plumula pale; halter yellow; posterior spiracular fringes yellow. Wing: lightly infusate, stigma dark yellow, entirely microtrichose. Legs: mostly yellow pilose; coxae dark; metatrochanters dark; femora dark brown with apices faded yellow; pro- and mesotibia dark with basal 1/4 yellow and also yellow apically; metatibia dark brown with basal 1/5 yellow; tarsomeres dark brown.



Figs 10-12. *Melanostoma fumivenosum*, male genitalia, <http://id.luomus.fi/GJ.533>: (10) epandrium, lateral view; (11) hypandrium, lateral view; (12) hypandrium, ventral view. Scale = 0.5 mm.

Abdomen: parallel-sided, unmarginated, entirely dark. Tergum 1 black, golden pollinose, yellow pilose. Terga 2-5 black with some purple iridescence laterally, medially entirely black pollinose, with short dark pile medially and longer yellow pile laterally; sterna dark with sparse, pale pile.

Male genitalia: small (Figs 10-12); surstylus elongate, tapering slightly at apex, mildly curved towards dorsal part; postgonites (superior lobes) elongate with slightly pointed apex, with a spur-like process medially in the ventral margin and another spur-like process dorsally pointed anteriorly; hypandrium with two arms each ending with two spur-like processes (one interior, small, and one exterior, larger); phallus unsegmented (Figs 11-12).

Female (Figs 6-7, 9). Similar to male except for normal sexual dimorphism and as follows: frons black, shiny with a broad fascia of pale pollinosity on ventral 1/2 (between antennae insertion and anterior ocellus); abdomen less parallel-sided, broadening from tergum 1 to posterior of tergum 3, sparsely pollinose medially. Eyes dichoptic.

Length (N = 4). Body, 7.5 mm; wing, 6.5 mm.

Geographical distribution. The species is known only from the island of New Guinea (Fig. 13).



Fig. 13. Map of New Guinea showing known distribution of *Melanostoma fumivenosum*. Black triangle: type locality; black circle: new material reported here.

Discussion

Eleven specimens of *M. fumivenosum* were collected in Papua New Guinea during 1974 by Heikki Hippa and Pekka T. Lehtinen. The specimens were found among unidentified material from New Guinea in the Finnish Museum of Natural History, Helsinki, Finland. Among them, we found the first male specimens of this species, endemic to the island of New Guinea, which are described here in full. This species is quite distinct from other *Melanostoma* species of the Australasian and Oceanic Regions in the distinct facial tubercle, overall dark coloration and small male genitalia.

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