

# A second species of legless scuttle fly (Diptera: Phoridae) associated with ants (Hymenoptera: Formicidae)

R. H. L. Disney<sup>1</sup>, A. Weissflog<sup>2</sup> and U. Maschwitz<sup>2</sup>

<sup>1</sup>Field Studies Council, University Department of Zoology, Cambridge CB2 3EJ, U.K. E-mail: rhld2@cam.ac.uk

<sup>2</sup>Zoologisches Institut, Johann Wolfgang Goethe-Universität, 60054 Frankfurt am Main, Germany

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## Abstract

*Vestigipoda maschwitzi* Disney sp. nov. is described from females and larvae collected from a colony of *Aenictus gracilis* in Malaysia. It is the second species in this remarkable genus, the type species being associated with a different species of *Aenictus* in Malaysia.

**Key words:** Diptera, Phoridae, new species, myrmecophile, Oriental Region

## INTRODUCTION

The initial report and detailed description of the type species of the remarkable genus *Vestigipoda* Disney (Weissflog *et al.*, 1995; Disney, 1996), whose females have vestigial wings and legs and mimic the larvae of their ant host, aroused unprecedented interest from the media worldwide. Two of the less misleading reports were those of Adler (1995) and Biggar (1997). In this paper we report a second species of *Vestigipoda* associated with a related species of *Aenictus* Shuckard in Malaysia.

## FIELD OBSERVATIONS

(by A. Weissflog and U. Maschwitz)

On 5 December 1996 at Ulu Gombak, Selangor, Malaysia, we encountered a colony of *Aenictus gracilis* Emery hanging in a bush, beneath the leaves, about 0.5 m above the ground. The ants appeared to be aggregating before selecting a suitable nest site. We observed some Drosophilidae flying in the vicinity of the ants. When the last ant had joined the rest, at 15:00 the entire colony was secured in a plastic bag. Subsequent analysis revealed the size of the colony to be one with about 80 000 worker ants. The myrmecophiles present included *Vestigipoda* females, larvae of this species, a male of an undescribed species of *Megaselia* Rondani (Phoridae), a typical phorid larva, at least nine species of myrmecophilous beetles (Coleoptera), adult Sphaeroceridae and presumed larvae of the same species, larvae of at least three species of Cecidomyiidae, larvae of at least two species of Mycetophiloidea, larval Chironomidae and a larval Empidoidea. The 106

*Vestigipoda* females represented a ratio of about one fly for every 1500 ant larvae, i.e. 6–7% of the 'larvae' being transported by the ants were the interloper female flies that mimic the host's larvae.

## SYSTEMATICS

(by R. H. L. Disney)

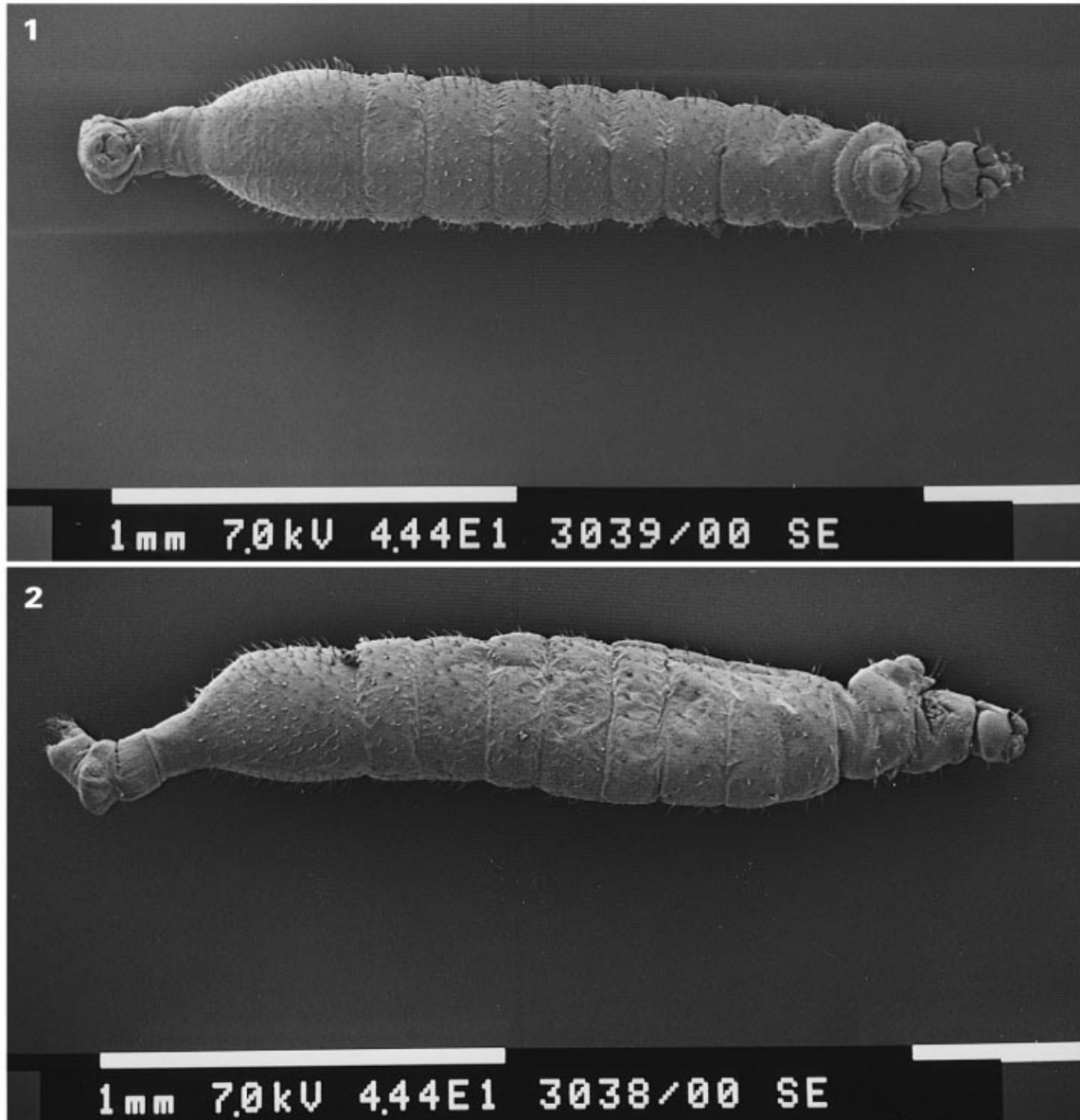
The undescribed species of *Megaselia* runs to couplet 18 of the key by Borgmeier (1967: 206). It runs out to 'semicrocea', a misprint for *M. subcrocea* Borgmeier. The latter, however, has much paler wing veins.

The new species of *Vestigipoda* is described below.

### *Vestigipoda maschwitzi* Disney sp. nov.

#### *Female*

Head as Figs 4–6. Frons brown with a broad unpigmented median band, with a posterior pair of arms embracing ocellar triangle, and unpigmented orbits. Antennae pale brown and palps (Fig. 3) almost colourless. Labrum brown. Labella almost colourless. Thorax (Figs 4–6) brown but weakly sclerotized, being unpigmented in places; especially dorso-laterally on scutum and a band either side of the broad brown median band, scutellum brown with a pair of bristles (Fig. 4). Vestiges of legs as Fig. 6. The pale creamy yellow abdomen as Figs 1–2, the first segment (Figs 4–6) being unpigmented like the rest of the segments. This segment has a distensible dome-shaped region antero-dorsally and is fluted at rear dorsal margin (Fig. 4). In a few specimens a narrow, antero-median, dorsal strip is orange brown;



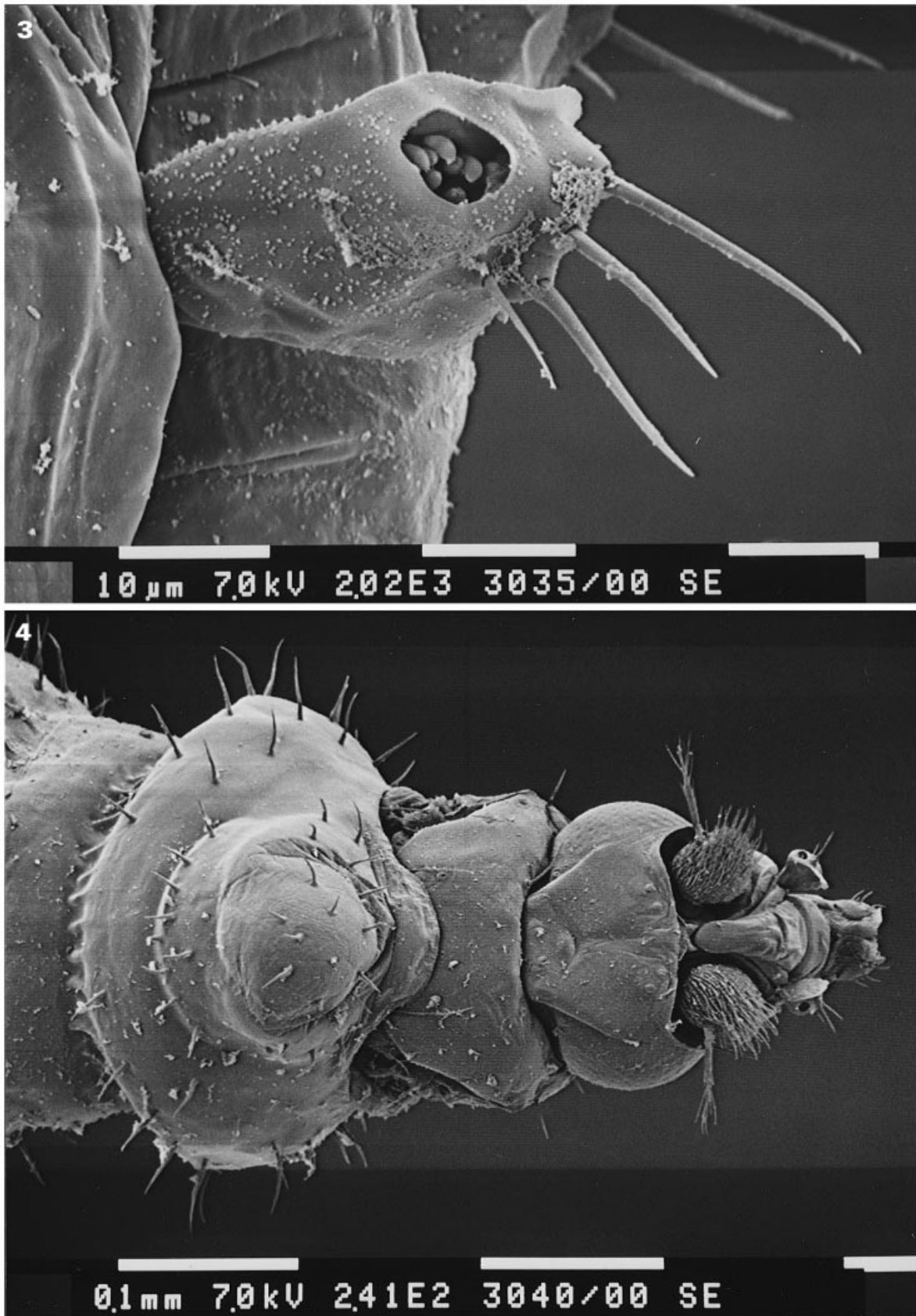
**Figs 1–2.** *Vestigipoda maschwitzi* female: Fig. 1, from above; Fig. 2, from right side.

and this strip is rotated forwards and inverted, so that its rear end points forwards, when the dome-shaped region is fully distended. Segments 1–5 with an anterior and a posterior pair of transverse rows of dark brown bristles, but segment 6 with numerous bristles all over (Fig. 1). These bristles with small projections (Fig. 8). Irregular transverse rows of smaller, almost colourless, hair-like bristles at front and rear of each half segment on 2–5 and at front of segment 6, but with some of these colourless setae replaced by fan-shaped wicks (Fig. 7). Bilobed putative sex-pheromone gland, beneath tergum at rear of segment 5, with the two lobes divergent and variably directed antero-laterad. Rear margin of segment 7 encircled by a row of dark brown, simple, hairs. Tergites 8 and 10 pale brown, the latter with a pair of anteriorly directed apodemes. Small, subcircular to oval, epiproct brown and with six bristles. The

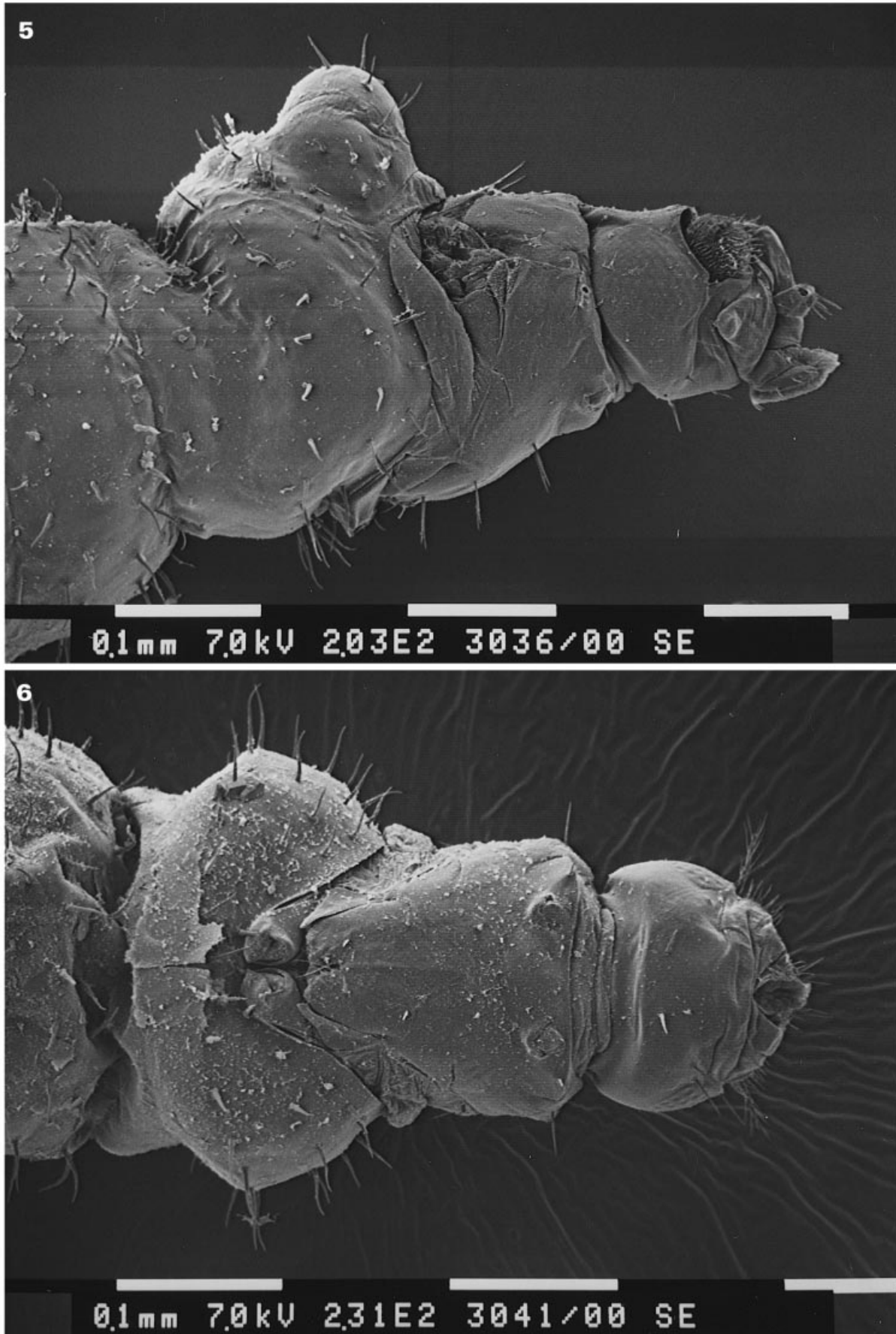
brown, cylindrical, cerci with numerous bristles along inner faces and at tips. Rear of sternum 8 with a pair of sclerotized plates, each bearing two small bristles. Hypoproct with a tuft of closely crowded bristles. Internally with two rectal papillae. As in *V. myrmolarvoidea*, the pre-terminal region of each spermatheca is surrounded by a lightly sclerotized collar, which is widest at its rear margin. Gravid females carry 10–12 mature eggs.

#### *Larva*

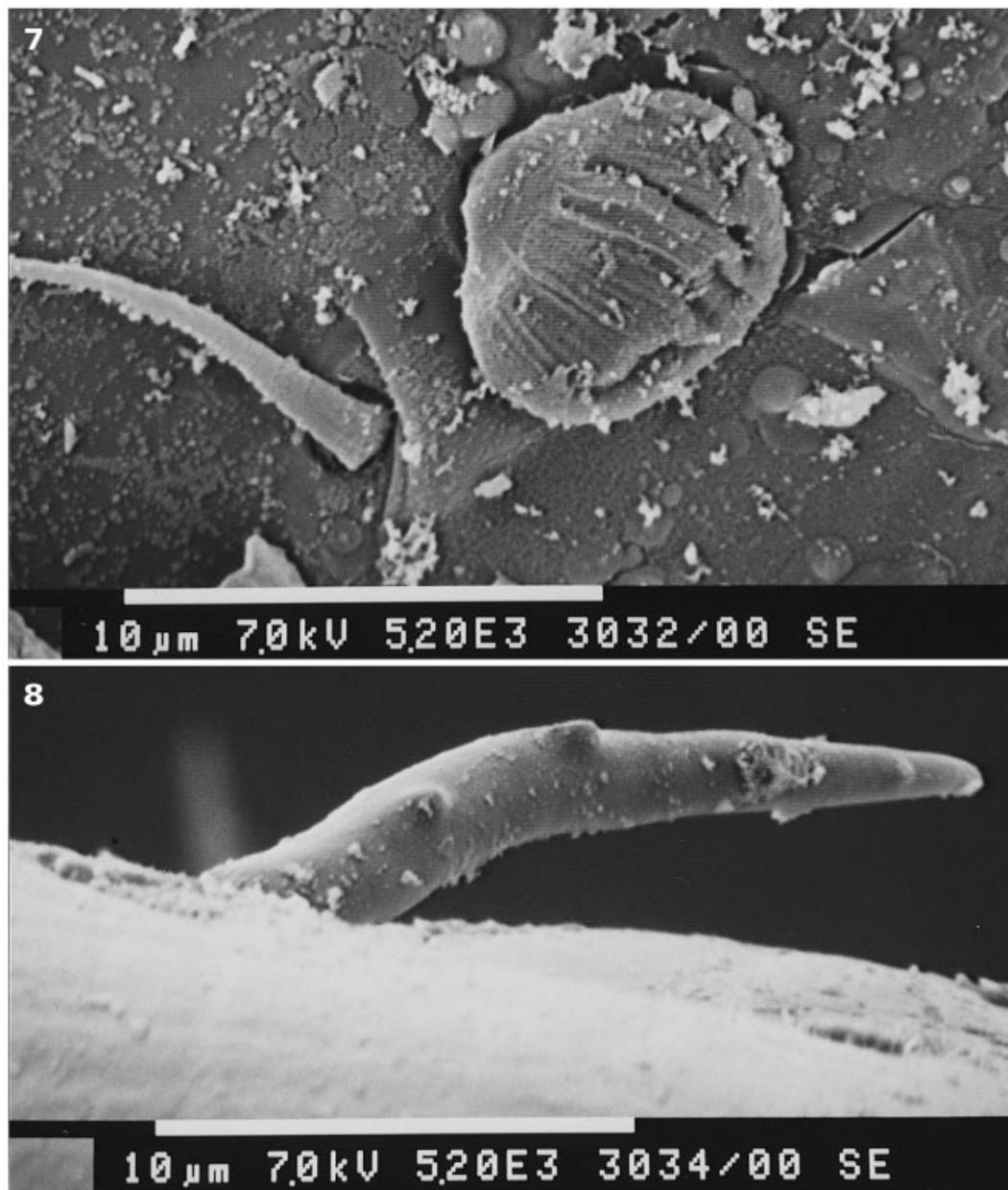
Almost indistinguishable from that of *V. myrmolarvoidea*, except the paired lobes at rear end are smaller and the mound organs, the presumed homologues of the adult's fan-shaped wicks, are more sparse.



**Figs 3-4.** *Vestigipoda maschwitzii* female: Fig. 3, right palp; Fig. 4, head, thorax and first abdominal segment from above.



**Figs 5–6.** *Vestigipoda maschwitzi* female: head, thorax and front of abdomen: Fig. 5, from right side; Fig. 6, from below.



**Figs 7–8.** *Vestigipoda maschwitzi* female, abdominal features: Fig. 7, fan-shaped wick; Fig. 8, bristle.

### **Holotype**

(♀), MALAYSIA, Selangor, Ulu Gombak, in colony of *Aenictus gracilis*, 5. XII. 1996 (Weissflog, Maschwitz) (deposited in University Museum of Zoology, Cambridge, England). *Paratypes*. 76(♀), same data as holotype, except many deposited in Staatliches Museum für Naturkunde, Karlsruhe, D-76042, Germany.

### **Etymology**

The name honours Professor Ulrich Maschwitz, who has contributed much to our knowledge of ant biology.

### **Affinities**

The new species differs from the type species, *V. myrmolarvoidea* Disney, in being smaller (fully extended length <3 mm, whereas the type species is >3 mm); the head and thorax are less completely sclerotized; the first abdominal segment lacks the brown pigment of *V. myrmolarvoidea* and dorsally it has an inflatable dome-like expansion of the antero-median region and a fluted rear margin; the fan-shaped wicks of the abdomen are not restricted to the anterior regions of the segments but some are also located at the rear margins of both the segmental and the intersegmental bristle bands; the two lobes of the putative sex-pheromone gland of abdominal segment 5 are more divergent.

## DISCUSSION

The location of the fan-shaped wicks on the abdomen of the female and their relationship to the adjacent pale setae tends to confirm the hypothesis, advanced for those of the type species of the genus (Disney, 1996), that these structures evolved from mutant bristles.

The genus *Aenictus* extends from South Africa to the Mediterranean Region of the Palaearctic Region, the Oriental Region, and northern Australia; and includes > 100 species (Bolton, 1995). In general all species of *Aenictus* are presumed to be predators of other ants. However, according to Chapman (1964) and Schneirla & Reyes (1966), the epigeic forager species *A. gracilis* also feeds on other prey (spiders, wasps, and earthworms) in the Philippines. In our investigations of South East Asian army ants in West Malaysia, we found this species showed a preference for small ants of the subfamilies Myrmicinae and Dolichoderinae (A. Weissflog, pers. obs.). Most of the other species of *Aenictus*, however, are hypogeic foragers that hunt beneath roots and in other cavities within the soil, only appearing on the surface for short distances.

The knowledge that two species in Malaysia are hosts to two different species of *Vestigipoda* suggests that other species of this ant genus may be harbouring the females and larvae of further undescribed species that mimic the larvae of their ant hosts. It is probably not significant that these two ant species are both epigeic foragers, although it is easier to investigate these colonies rather than those of hypogeic foragers.

Flightless females of other genera of Phoridae have been collected in *Aenictus* colonies. These include species of *Aenictacantha* Disney, *Aenictomyia* Brues, *Aenigmatopoeus* Schmitz, *Maculiphora* Disney and *Rhynchomicropteron* Annandale. In addition fully-winged females of species of *Dohrniphora* Dahl are abundant. In colonies of *Aenictus gracilis* the previously recorded Phoridae are *Aenictomyia chapmani* (Brues), *Dohrniphora kistneri* Disney and *Dohrniphora* sp. N (from Malaysia) (Disney, 1994; Disney & Kistner, 1998).

RHLD would welcome further specimens of Phoridae from *Aenictus* colonies, especially samples of legless species, along with details of the ant hosts (or specimens of the same). All such specimens should be preserved in 70–80% alcohol.

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