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***Simulium hiroyukii*, a new species of the subgenus *Gomphostilbia* (Diptera: Simuliidae) from Mount Murud, Sarawak, Malaysia**

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Abstract

Simulium (Gomphostilbia) hiroyukii is described based on females, males, pupae and larvae collected in Mount Murud, Sarawak, Malaysia. This new species is assigned to the *Simulium darjeelingense* species-group of the subgenus *Gomphostilbia*, and is characterized by the darkened fore coxae and the pupal gill with eight long filaments, of which middle and dorsal triplets have elongated primary and secondary stalks, respectively.

Key words: black fly, *Simulium*, Malaysia, new species

Introduction

Black flies (Diptera: Simuliidae) are one of the biting insects of medical and veterinary importance. Females of certain species not only cause dermatoses like itching, rash and edema to men and cattle when they bite and take a blood but also play a role of vector of human and zoonotic onchocerciasis (Adler *et al.* 2004, Takaoka *et al.* 2012). In the Oriental Region, no such problems caused by black flies have been known except a few studies that reported the role of black flies in the transmission of zoonotic filariae in Thailand (Takaoka *et al.* 2003, Fukuda *et al.* 2003; Choochote *et al.* 2005; Ishii *et al.* 2008).

Black flies' roles in the filarial transmission are reliably studied based on the sufficient information of the fauna. In addition, faunal information is a prerequisite for studies of their ecological aspects, biodiversity, and phylogenetic relationships (Takaoka & Leh 2009).

In Sarawak, Malaysia, the black fly fauna was poorly known. Since Smart & Clifford (1969) recorded *Simulium (Simulium) sabahense* Smart & Clifford, no species was added until 1998, when we started to explore the fauna of black flies in Sarawak. In 1998, 2007 and 2008, our faunistic surveys of larvae and pupae of black flies in many streams and rivers of the four areas, Pueh, Borneo Highland, Bario, and Bakalalan, in Sarawak, yielded 17 species of the genus *Simulium* Latreille consisting of 11 new species, five known species (*S. (S.) sabahense* and four newly recorded species) and one undescribed species, of which 12 are in the subgenus *Gomphostilbia* Enderlein, one in the subgenus *Nevermannia* Enderlein and four in the subgenus *Simulium* (Takaoka 2001, 2008a,b, 2009, 2012; Takaoka & Leh, 2009). Morphological characters and taxonomic affinities for all but one species are summarized by Takaoka & Leh (2009).

In 2013, we also conducted surveys in several streams along the road from Bakalalan to Mount Murud and collected four new species (two of the subgenus *Gomphostilbia* and the other two of the subgenus *Simulium*), of which one *Gomphostilbia* species is described here based on females, males, pupae and mature larvae.

The methods of collection, description and illustration, and terms for morphological features used here, follow those of Takaoka (2003) and partially those of Adler *et al.* (2004).

The holotypes and paratypes of these new species are deposited in the Institute of Biological Sciences, Faculty of Science, University of Malaya, Kuala Lumpur, Malaysia.

Discussion. According to the key to species-groups of the subgenus *Gomphostilbia* (Takaoka 2012), this new species is placed in the *Simulium darjeelingense* species-group (five species included) based on the darkened fore coxa of the female and male adults, and the enlarged male hind basitarsus (Fig. 2C). This new species is readily distinguished from the related species of the group by the very long primary stalk of the dorsal triplet, and a similarly very long secondary stalk of the middle triplet (Fig. 3A, B and Fig. 4A, B), a character very rarely occurring in species of the subgenus *Gomphostilbia*.

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