



## Revision of the *Simulium* (*Simulium*) *melanopus* species-group (Diptera: Simuliidae) in Sabah, Malaysia

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### Abstract

Species of the *Simulium* (*Simulium*) *melanopus* species-group in Sabah are taxonomically revised by examining type specimens of *S. (S.) crassimanum*, *S. (S.) laterale*, and *S. (S.) nigripilosum*, all described from females by Edwards in 1933, and newly collected samples from the vicinity of Mt. Kinabalu. The females of these three species are redescribed, and their males and pupae are described for the first time based on adults reared from pupae. *Simulium (S.) liewi* Takaoka, 2007 and *S. (S.) kinabaluense* Smart & Clifford, 1969 are synonymized with *S. (S.) crassimanum* and *S. (S.) laterale*, respectively. *Simulium (S.) cheedhang* Takaoka, Sofian-Azirun & Ya'cob, 2015 is newly recorded from Sabah. Two new related species, *S. (S.) lardizabala* and *S. (S.) timpohonense*, are described from males reared from pupae. Keys to identify eight species of the *S. melanopus* species-group in Sabah are provided for females, males, pupae and mature larvae.

**Key words:** Black fly, *Simulium*, *melanopus* species-group, Sabah, Malaysia

### Introduction

The black flies (Diptera: Simuliidae) in Sabah, Malaysia, located in the northeastern part of Borneo Island, were first studied by Edwards (1933) who described four new species of the subgenus *Simulium* of the genus *Simulium*, *S. (S.) crassimanum*, *S. (S.) laterale*, *S. (S.) nigripilosum* and *S. (S.) aeneifacies*, from adult females, and one new species of the subgenus *Nevermannia*, *S. (N.) fuscineris*, from an adult male. All the species of the subgenus *Simulium* except *S. (S.) aeneifacies* were placed in the *Simulium melanopus* species-group (Takaoka 1983).

Smart and Clifford (1969) described six new species, *S. (Gomphostilbia) pegalanense*, *S. (G.) rayohense*, *S. (N.) tuaranense*, *S. (S.) kiuliense*, *S. (S.) kinabaluense*, and *S. (S.) sabaense*, based on reared adults, pupae and larvae, of which *S. (N.) tuaranense* and *S. (S.) kiuliense* were synonymized, respectively, with *S. (N.) aureohirtum* Brunetti, 1911 and *S. (S.) nobile* De Meijere, 1907 by Crosskey (1973). Smart and Clifford (1969) also examined the types of five species described by Edwards (1933) and described the males, pupae and larvae of *S. (S.) nigripilosum* and *S. (S.) laterale*. The species identified as *S. (S.) nigripilosum* by Smart and Clifford (1969) was found to be a different species and was described as a new species, *S. (S.) beludense*, by Takaoka (1996). It was later placed in the *S. argentipes* species-group (Takaoka and Saito 2007).

Takaoka (2001) described two new species, *S. (N.) borneoense* and *S. (G.) guniki*, and recorded three more species, *S. (G.) dentistylum* Takaoka & Davies, 1995, *S. (G.) parahiyangum* Takaoka & Sigit, 1992 and *S. (S.) sheilae* Takaoka & Davies, 1995, of which the species thought to be *S. (G.) dentistylum* was later described as a new species, *S. (G.) capillatum* (Takaoka 2009). Further, five new species, *S. (S.) liewi*, *S. (S.) maklarini* (both placed in the *S. melanopus* species-group), *S. (S.) alberti*, *S. (S.) keningauense* and *S. (S.) masilauense* (all three placed in the *S. tuberosum* species-group) were described by Takaoka (2007, 2008) and the male, pupa and larva of *S. (S.) aeneifacies* (*S. tuberosum* species-group) were described for the first time by Takaoka (2008).