

The unknown brachypterous morph of *Polhemovelina* ZETTEL & SEHNAL, 2000 (Insecta: Heteroptera: Veliidae)

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Abstract

The genus *Polhemovelina* ZETTEL & SEHNAL, 2000 is known from three species from Borneo. Hitherto only the macropterous morph was known. A brachypterous male of *P. septuaginta* ZETTEL & SEHNAL, 2000 is described.

Key words: Heteroptera, Veliidae, *Polhemovelina septuaginta*, brachyptery, wing polymorphism

Zusammenfassung

Die Gattung *Polhemovelina* ZETTEL & SEHNAL, 2000 umfasst drei Arten aus Borneo und war bisher nur in der makropteren Form bekannt. Ein brachypteres Männchen der Art *P. septuaginta* ZETTEL & SEHNAL, 2000 wird beschrieben.

Introduction, material and methods

This short note reports on the finding of a short-winged male of *Polhemovelina septuaginta* ZETTEL & SEHNAL, 2000 in unsorted material of the collection in the Natural History Museum Vienna. When ZETTEL & SEHNAL (2000) described the genus *Polhemovelina* from numerous macropterous individuals belonging to three species in Sabah, northern Borneo, this specimen was overlooked. Because brachypterous individuals are rare in Veliidae, and wing polymorphism and wing autotomy often reflect phylogenetic relationships of higher taxa of Gerromorpha (see Discussion), this specimen is described and illustrated here.

Terminology follows ZETTEL & SEHNAL (2000). The digital photograph was taken with a Leica DFC490 camera attached to a Leica MZ16 binocular microscope with the help of Image Manager IM50 and processed with Auto-Montage Pro and Adobe Photoshop 7.0 programmes.

Polhemovelina septuaginta ZETTEL & SEHNAL, 2000

Material examined: One brachypterous male, labelled "MALAYSIA: Sabah\ Danum Valley, Water\ Pool, 11.2.1997\ leg. H. Zettel (13)", in the Natural History Museum Vienna.

Description of brachypterous morph (Fig. 1): Slightly smaller than macropterous males, body length 2.3 mm; head width 0.55 mm; pronotum width (= maximum body width) 0.81 mm. Colour, most structural characteristics, and genitalia (dissected) similar to those of macropterous males. Pronotum slightly smaller, ratio pronotum width head width = 1.47 vs. 1.59 - 1.64, and with humeri slightly less developed than in macropterous males, but with similar ratio pronotum width pronotum length (1.22 vs. 1.22 - 1.27). Forewing distinctly shortened, posteriorly reaching base of tergite 7, and narrow, leaving approximately lateral half of lateraltergites 3 - 6 uncovered. Forewing cells similarly developed as in fully winged individuals, but proportionally smaller; and white spots on forewing similarly distributed, but those situated in the distal cells very small. Erect setae on forewings and also on head and pronotum reduced, but eventually rubbed off during preparation.

Discussion

The adaptive significance of wing polymorphism in Gerromorpha has been discussed and confirmed by many authors (earlier studies summarized in ANDERSEN 1982; for Gerridae see also ANDERSEN 1993, 2000), and in Gerridae flightless individuals are known in all genera (ANDERSEN 2000 and pers. observations). The modes of wing polymorphism or dimorphism and the ability of wing autotomy at a certain position of the wing are important, group-specific characteristics (see e.g. ANDERSEN 1982: tab 15; 2000). Interestingly, these features (and also characteristics related with wing polymorphism like the design of thoracic nota) seem to be mostly evolutionarily old traits, and therefore they are useful for understanding the phylogenetic system of higher taxa (subfamilies, tribes, genera, subgenera, species groups) in Gerromorpha. Most Gerromorpha individuals are fully winged (macropterous) or wingless (apterous), while short-winged (micropterous, brachypterous) specimens are only known in six subfamilies: Hebridae: Hebrinae; Hydrometridae: Hydrometrinae; Veliidae: Ocelloveliinae, Microveliinae, Veliinae; Gerridae: Gerrinae (ANDERSEN 1982). In some of these groups, however, brachyptery is restricted to a small number of taxa; for example, in *Velia* only the nominotypical subgenus with the single species *Velia rivulorum* (FABRICIUS, 1775) has short-winged individuals. Wing autotomy in macropterous morphs is also group-specific: For example, in the subfamily Ptilomerinae of the Gerridae the wings are mutilated at the wing base, but in freshwater Halobatinae (Metrocorini) the wings are broken off distal of the fore wing's cells (at about apical third); in *Rhagovelia* (Veliidae: Rhagoveliinae) the ability to mutilate their wings, either at the base or at mid-length, is restricted to certain species groups (POLHEMUS & POLHEMUS 1988, NIESER & al. 1997, ZETTEL 2003); and the length of the wing pads or wing straps in flightless individuals is useful to define certain species groups of *Hydrometra* (Hydrometridae) (YANG & ZETTEL 2005). Most species of Microveliinae have a wing dimorphism with macropterous and apterous individuals, or only one of these two morphs is known (macroptery more common than aptery). A wing polymorphism with more than two morphs is unknown in Microveliinae, and a wing dimorphism with fully winged and short-winged specimens is rare: Micropterous individuals (with small wing pads) are known in *Tarsovelia* POLHEMUS & POLHEMUS, 1994 from New Guinea (POLHEMUS & POLHEMUS 1994) and in a few species of the apparently not monophyletic genus *Microvelia* s.l., e.g.



Fig. 1: Brachypterous male of *Polhemovelina septuaginta*, dorsal aspect.

in the Neotropical *M. laesslei* group and in *M. karunaratnei* POLHEMUS, 1999 from Sri Lanka (POLHEMUS 1999). The author has examined brachypterous individuals of an unidentified species of *Tarsoveloides* ANDERSEN & WEIR, 2001 from New Guinea (specimens in NHMW; unpublished), and now also a brachypterous male of *Polhemovelina*. As the phylogeny of Microveliinae is still very unclear, brachyptery (and wing autotomy, too) may also be a mosaic piece to improve our knowledge on the relationships of microveliine genera in the future.

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