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Original Article

Wing Shape in the Taxonomic Identification of Genera and Species of the Subfamily Dolichopodinae (Dolichopodidae, Diptera)

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Abstract

Key words: Diptera, Dolichopodidae, wing shape, geometric morphometric analysis, interspecific variation, taxonomy.

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Characters of the wing morphology have significant importance in the systematics and taxonomy of the family Dolichopodidae, but there are only a few studies concerning the variation in wing shape of dolichopodid flies. The detailed analysis of interspecific and generic wing shape variation can provide data for the taxonomic studies, and understanding of the selective forces shaping wing morphometric characters is important for studying of their pattern of evolutionary change. A geometric morphometric analysis was carried out on 72 species belonging to 5 genera of the subfamily Dolichopodinae in order to determine whether wing shape can be successfully used as a character for taxonomic discrimination of morphologically similar genera and species. Canonical variate analysis based on wing shape data showed significant differences among the studied genera and species. Discriminant analysis allowed for the correct genera identification from 74.50% to 91.58% specimens. The overall success for the reassignment of specimens to their a priori species group was on average 84.04%. The detailed analysis of the variation in wing shape in the subfamily and outgroup taxa revealed evolutionary trends, the functional significance of which is discussed.

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Introduction

The Dolichopodinae species have a wide geographical distribution; they particularly abundant in humid forest, shores of water bodies and others wet habitats. The largest genera of the subfamily are *Dolichopus* Latreille, 1796 (about 600 species), *Hercostomus* Loew, 1857 (about 500 species) and *Gymnopternus* Loew, 1857 (about 100 species) (Grichanov, 2018).

Although reliable information on the phylogeny of the subfamily Dolichopodinae is limited, recent studies confirmed monophyly of a clade, consisting of *Dolichopus* and *Gymnopternus*, and their separate systematic position were supported (Brooks, 2005; Germann *et al*., 2011; Pollet, 2003). The genera *Hercostomus*, *Poecilobothrus* Mik, 1878 and *Sybistroma* Meigen, 1824 have been placed in a sister clade. However, before that was shown that *Gymnopternus* is an evolutionary independent entity, European and Russian dipterologists considered the genus *Gymnopternus* as a subgenus of *Hercostomus* (Stackelberg, 1933). A strong dorsal seta on the first segment of hind tarsi can be used as discriminator between *Hercostomus* and *Dolichopus* species; however *Poecilobothrus* and *Gymnopternus* species are not clearly different from *Hercostomus*.