



Tentative key to robber fly (Diptera: Asilidae) subfamilies based on pupal cases

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Abstract

Subfamily keys for pupal cases of Asilidae are currently based on 5 taxa, Asilinae, Dasypogoninae, Megapodinae, Laphriinae and Leptogastrinae. Analysis of recently published adult morphological data and DNA sequence data suggests that the family consists of 14 subfamilies. A tentative key based on known pupal cases is provided for 10 of these subfamilies: Asilinae, Brachyrhopalinae, Dasypogoninae, Dioctriinae, Laphriinae, Leptogastrinae, Ommatiinae, Stenopogoninae, Stichopogoninae and Willistoninae. It is difficult to distinguish between Brachyrhopalinae and Dasypogoninae pupal cases because so many characteristics overlap. There are no described pupal cases for 4 subfamilies: Bathypogoninae, Phellinae, Tillobromatinae and Trigonimiminae. Morphological data are available for only approximately 10% of the genera and 2% of the species of Asilidae.

Key words: Immature Diptera, Insecta, Brachycera, Asiloidea, Asilidae, robber fly, pupal cases, subfamily key

Introduction

According to Dikow (2003), Latreille (1802) established the family Asilidae in 1802. Since then the subfamily classification has changed considerably with the addition of new subfamilies and with tribes being elevated to subfamily status based primarily on morphological data. From the late 1830s through the mid 1960s, various authors subdivided the family into 2–5 subfamilies. In the early 1970s, Papavero (1973) proposed eight subfamilies: Apocleinae, Asilinae, Dasypogoninae, Laphriinae, Laphystiinae, Ommatiinae, Stenopogoninae, and Trigonimiminae. Depending on the taxonomist, up to an additional four subfamilies were added by the early 2000s: Atomosinae, Dioctriinae, Megapodinae and Stichopogoninae (Artigas & Papavero 1988; Bybee *et al.* 2004; Dikow & Geller-Grimm 2004; Geller-Grimm 2003, 2004; Lehr 1969, 1977, 1996).

Bybee *et al.* (2004) presented the first formal analysis of molecular evidence for phylogenetic relationships among the Asilidae and recognized 10 subfamilies: Apocleinae, Asilinae, Dasypogoninae, Laphriinae, Laphystiinae, Leptogastrinae, Ommatiinae, Stenopogoninae, Stichopogoninae and Trigonimiminae. Most recently Dikow (2009a, b) used both morphological and DNA sequence data to recognize 14 subfamilies: Asilinae, Bathypogoninae, Brachyrhopalinae, Dasypogoninae, Dioctriinae, Laphriinae, Leptogastrinae, Ommatiinae, Phellinae, Stenopogoninae, Stichopogoninae, Tillobromatiinae, Trigonimiminae and Willistoninae.

Because of the lack of detailed descriptions of asilid pupal cases, subfamily classification based on pupal cases has not kept up with that based on adults. Dennis *et al.* (2008a) commented that, for at least Nearctic pupal cases, a subfamily and subfamily-group classification was most useful. They used the subfamilies Laphriinae and Leptogastrinae and the groups Asilinae-group and Dasypogoninae-group.

In the present study, we evaluate known Asilidae pupal cases to develop a tentative key based on Dikow's (2009a, b) 14 subfamilies.