

Introduction

The family Bombyliidae, whose members are commonly called bee flies, constitutes one of the largest families of orthorrhaphous Brachycera. Over 5,00 nominal species are known worldwide (Evenhuis, 1983), and many undescribed taxa await description, especially from lesser-studied areas of the world including Australia, South America, and southern and eastern Asia. The family is distributed worldwide, but is most diverse and abundant in arid and semi-arid areas. Larval stages are parasitic or predaceous on various orders of insects, primarily ground-dwelling species (DuMerle, 1975). Adults commonly frequent wildflowers in search of nectar and pollen and are primary pollinators of some plant species (Schmitt, 1983).

Two 'sections' of the family have been proposed (Bezzi, 1924) to group like elements of the family: essentially these are taxa possessing tubular proboscides and lacking a bisected hind margin of the compound eyes (Homoeophthalmae), and taxa with fleshy proboscides and an indented, bisected hind margin of the eyes (Tomophthalmae). These sections correspond roughly to the early concepts of Bombyliidae and Anthracidae, respectively. These two families were considered distinct by authors such as Latreille, Fallén, Zetterstedt, and Macquart, but were united into the Bombyliidae by Meigen (1820) and have been treated as such by most workers since then. Though recent workers contend that these two sections do not correspond to true phylogenetic lineages in the family (Mühlenberg, 1971; Theodor, 1983) (i.e., the section Homoeophthalmae probably represents a polyphyletic group), they are retained in this study as convenient points of reference. Preliminary cladistic analysis (Evenhuis, unpubl.) shows that the section Tomophthalmae is monophyletic and that the Homoeophthalmae is polyphyletic. However, a more detailed phylogenetic analysis at the subfamily level (beyond the scope of this study), comprising groups within and outside of the Bombyliidae, including the Therevidae, Empididae (s. lat.), Hilarimorphidae, Scenopinidae, and Acroceridae, is needed before any conclusions can be drawn as to phylogenetic relationships among the subfamilies of Bombyliidae.

The Cythereinae, formerly treated in the Homoeophthalmae, are placed in the Tomophthalmae following the findings of Theodor (1983). His study showed that members of the Tomophthalmae have a double-chambered occipital foramen, whereas taxa belonging to the Homoeophthalmae have a single-chambered occipital foramen. The double chamber is most likely correlated with the articulation of the head with the second cervical sclerite of the prothorax, resulting in a more maneuverable head in tomophthalmines versus a tightly fitting head in homoeophthalmines. The subfamily Oniromyiinae, previously considered to be a member of the Homoeophthalmae (Hull, 1973), is here transferred to the Tomophthalmae based on the presence of a double-chambered occipital foramen.

The subfamilies treated in this study, Phthiriinae and Usiinae, constitute a fairly homogeneous group of genera in the Homoeophthalmae that are easily distinguished from other bombyliids by the attachment of the clypeus to the bases of the antennae (i.e., the antennae are placed at the upper portion of the oral margin, resulting in the absence of a face below the antennae) and by the presence of an apical or subapical sulcus on the third antennal segment containing a sensillum. Despite the relative homogeneity of the two subfamilies, their generic composition has varied considerably from author to author. Further complicating the taxonomic and phylogenetic status of the two subfamilies is Rohdendorf's (1964, 1977) proposal that the Usiinae be treated as a separate family.

The Usiinae and Phthiriinae were chosen for study to clarify their generic composition, determine the validity and scope of their subfamilial status, and examine Rohdendorf's (1964, 1977) proposal mentioned above. The relative homogeneity of many of the genera in these subfamilies provide a challenge for cladistic analysis to determine their phylogenetic relationships. Results obtained herein will augment observations reported in an ongoing monographic treatment of the family in the Nearctic Region by Hall & Evenhuis (1980–1987) and should be useful in future revisions of the genera of the Phthiriinae in the New World.