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A molecular phylogenetic analysis of genus *Anevrina* (Diptera: Phoridae), with the description of a new species and updated world key

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Abstract

Here we report on the first molecular phylogenetic study of the phorid genus *Anevrina* using a combination of nuclear (28S) and mitochondrial (12S, ND1 and CO1) genes for a total of 2220bp. Both maximum parsimony and Bayesian analyses recovered *Anevrina* as a monophyletic lineage within a broad sampling of phorid taxa that included 13 genera from 4 subfamilies. The higher-level relationships of phorid taxa based on the molecular tree were (Sciadocerinae + ((Hypocerinae + Phorinae) + Metopininae))). Relationships of species within *Anevrina* were also fully resolved with strong branch support in the form of posterior probabilities, bootstrap values, and decay indices. Two major clades were identified within *Anevrina*: ((*A. luggeri* + *A. macateei*) + (*A. curvinervis* + *A. unispinosa*)), which was joined as a sister group to ((*A. variabilis* + *A. thoracica*) + (*A. olympiae* + *A. urbana*)). A new and first Neotropical species, *A. neotropica*, from Costa Rica is described, illustrated, and included in an updated world key. *Anevrina setigera* (Loew, 1874) is synonymized with *A. urbana* (Meigen, 1830), new synonymy.

Key words: Diptera, Phoridae, *Anevrina*, new species, phylogeny

The genus *Anevrina* Lioy is a small group of large, mostly dark colored, phorid flies that are distributed throughout the northern hemisphere. Several species have been reported to visit the corpses of small mammals (Wood 1906; Lundbeck 1922; Disney et al. 1981) and/or have been collected from small mammal burrows, including gophers, *Thomomys talpoides*, (Hackman, 1963, 1967; Borgmeier 1963; Brown 1992), moles, *Talpa europea*, (Malloch 1908; Falcoz 1912; Lundbeck 1922), groundhogs, *Marmota monax*, (Borgmeier 1963; Brown 1992), and ground squirrels, *Spermophilus pygmaeus* (M. Mostovski, personal communication). In addition, Lundbeck (1922) observed *A. unispinosa* (Zetterstedt) mating while on the corpse of a sparrow (Passeridae), indicating that some species may be opportunistic on non-mammalian vertebrates. Although the life history of some *Anevrina* species is poorly known, the larvae of all species are probably scavengers or necrophagous on small vertebrates (Brown 1992, 1995; Disney 1994).

The most recent taxonomic revision of *Anevrina* is that of Brown (1995), who recognized 11 extant species and one fossil species, the extinct *A. oligocaenica* (Brues 1939) from Baltic amber. Brown (1995) also hypothesized species-level relationships using morphological characters, especially chaetotaxy of the legs and male genitalia, and provided a key to species. Since Brown's (1995) revision, four additional species have been described: *A. capillata* (Michailovskaya 1999), *A. wyatti* (Disney 2006), *A. microcilia* (Liu & Fang 2006) and *A. glabrata* (Liu & Zhu 2006). In this paper, a new species from Costa Rica, the first known from the Neotropical Region, is described and illustrated and an updated checklist and world key is provided. Furthermore, we report on a preliminary molecular phylogenetic study of 21 phorid taxa, representing 13 genera in 4 subfamilies, including 8 species of *Anevrina*.

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