



Molecular systematics of the fishfly genus *Anachauliodes* Kimmins, 1954 (Megaloptera: Corydalidae: Chauliodinae)

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Abstract

The fishfly genus *Anachauliodes* Kimmins, 1954 is endemic to the Oriental region and currently includes two species, *Anachauliodes tonkinicus* Kimmins, 1954 and *A. sinensis* Yang & Yang, 1992. These species are similar morphologically. We sequenced three mitochondrial genes: COI, ND2 and 16S rRNA in order to clarify the specific identity of these two species. Our results do not support the separation of these two species. We were also not able to find any morphological characters during comparison of *Anachauliodes* specimens from various localities useful in distinguishing these two species. Based on these results, we synonymize *A. tonkinicus* and *A. sinensis* and recognize *A. laboissierei* (Navás, 1913), **comb. nov. & stat. rev.** as the only valid species of *Anachauliodes*.

Key words: fishfly, DNA barcoding, taxonomy, phylogeny

Introduction

The fishfly genus *Anachauliodes* Kimmins, 1954 belongs to the megalopteran subfamily Chauliodinae of the family Corydalidae. This genus is endemic to the Oriental region and currently comprised only two species, *Anachauliodes tonkinicus* Kimmins, 1954 and *A. sinensis* Yang & Yang, 1992. Adults of *Anachauliodes* are characterized by the sexually dimorphic antennae (pectinate in males, subserrate in females), the 3 or 4-branched 1A vein, and the forewing longitudinal veins with alternately black-yellow coloration. Previous phylogenetic analyses based on morphological data (Liu & Yang 2006; Liu *et al.* 2012) indicated that *Anachauliodes* is the sister group to the Nearctic genus *Chauliodes* Linnaeus, 1802. The genus *Chauliodes* originated no later than the Eocene based on the fossil evidence (Wichard 2003), *Anachauliodes*—the sister group of *Chauliodes* probably diverged after the Eocene.

The two currently recognized species of *Anachauliodes*, *A. tonkinicus* and *A. sinensis* are considered allopatric in distribution. *Anachauliodes tonkinicus*, the type species of the genus, is recorded from northern Vietnam and provinces of Guizhou and Guangxi in southwestern and southern China (Kimmins 1954; Yang & Liu 2010). However, *A. sinensis* is distributed only in Yunnan Province of southwestern China. The two *Anachauliodes* species are rather similar in morphology and apparently distinguished by the patterns of the forewings. As described in Yang & Liu (2010), in *A. tonkinicus*, the forewings have distinct brown markings, whereas in *A. sinensis*, these brown markings are reduced. However, the brown forewing markings can be indistinct or distinct in individuals of the two *Anachauliodes* species based on our present examination of additional material. Although wing markings is one of the important character to distinguish many fishfly species, it has been determined to be variable among conspecific individuals of some fishfly species, e.g. *Neochauliodes fraternus* (McLachlan, 1869) and *Ctenochauliodes nigrovenosus* (van der Weele, 1907) from East Asia (Liu & Yang 2005; Liu *et al.* 2011). Consequently, for all fishfly species, genitalia provide the only reliable diagnostic characters. For the two species of *Anachauliodes* studied here, the male genitalia are virtually morphologically identical, calling into question the identity and separation of these two species.

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