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Systematics of *Indobaetis* Müller-Liebenau & Morihara 1982, and related implications for some other Baetidae genera (Ephemeroptera)

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Abstract

Imagoes, subimagoes and eggs of *Indobaetis costai* Müller-Liebenau & Morihara 1982 are described for the first time; additional larval characters of *I. costai* and *I. starmuehlneri* Müller-Liebenau & Morihara 1982 are reported. A new species *Indobaetis microfolius* sp.n. is described based on larvae, a male subimago reared from larva and a female subimago extracted from a mature larva. *Baetis michaelohubbardi* (Selva-kumar *et al.* 2012) **comb.n.** is proposed for a species originally attributed to *Indobaetis*, based on the presence of hind protoptera, three maxillary dentisetae and other characteristics. Newly discovered diversity within the holophyletic taxon *Indobaetis* disproves a formerly erected idea about the close relationship of *Indobaetis* and the *muticus*-group. Thus, the senior genus-group name for the holophylum including the *muticus*-group is *Takobia*/g1; in rank-based nomenclature the names *Alainites* Waltz & McCafferty (in Waltz *et al.*) 1994 and *Acerbaetis* Kang & Yang (in Kang *et al.*) 1994 should be junior synonyms of *Takobia* Novikova & Kluge 1987 (**new synonymy**). The Neotropical taxon *Caribaetis* Kluge 1992 is accepted as genus (**stat.n.**), rather than a synonym of *Fallceon*, based on the original diagnosis of the subgenus *Caribaetis* and taking into account the significance of such character as presence of a posterior seta on the claw, shared with *Indobaetis*, *Baetodes* and some other taxa; resultant new combinations are proposed: *Caribaetis planifrons* (Kluge 1992) **comb.n.**, *Caribaetis alcarrazae* (Kluge 1992) **comb.n.** and *Caribaetis grandis* (Gonzalez-Lazo & Salles 2007) **comb.n.** A new species synonymy in *Fallceon* is proposed, based on the presence of a hind wing costal hook in both species: *Fallceon poeyi* (Eaton 1995) = *F. nikitai* McCafferty & Lugo-Ortiz 1994 **syn.n.**

Key words: mayflies, Ephemeroptera, Baetidae, *Indobaetis*, *Nigrobaetis*, *Takobia*, *Alainites*, *Labiobaetis*, *Caribaetis*, *Fallceon*, systematics, new species.

Introduction

Müller-Liebenau & Morihara (1982) established the genus *Indobaetis* for two species from Sri Lanka. These authors accepted the genus *Baetis* in a wide sense, including species later placed to the genera *Nigrobaetis* Kazlauskas (in Novikova & Kluge) 1987, *Takobia* Novikova & Kluge 1987, *Alainites* Waltz & McCafferty (in Waltz *et al.*) 1994, *Labiobaetis* Novikova & Kluge 1987 and others. According to the original description, the genus *Indobaetis* was regarded to be a sister taxon of the *muticus*-group of the genus *Baetis*, so the genus *Baetis* was accepted as a paraphyletic taxon. Other authors placed the *muticus*-group either to the genus *Nigrobaetis* (e.g., Kazlauskas 1972), or to the subgenus *Nigrobaetis* of the genus *Baetis* (e.g., Novikova & Kluge 1987, 1994), or to the genus *Alainites* (e.g., Waltz *et al.* 1994). In its turn, *Alainites* is regarded to be a plesiomorphon, belonging to the holophylum with the senior name *Takobia* Novikova & Kluge 1987 (Novikova & Kluge 1994); the same was stated by Waltz *et al.* (1994), who separated the genus *Alainites* from *Takobia* by plesiomorphies only (see Discussion, 1.3). Hereafter this taxon is referred to as *Takobia*/g1, following the system of rank-free hierarchical nomenclature based on the Code (Kluge 2004). Till recently, the assumption about relationship between *Indobaetis*, *Nigrobaetis*, *Takobia* and *Alainites* remained generally accepted, and some authors refer to this assemblage as the "*Indobaetis*-complex" (Lugo-Ortiz & De Moor 2000; Gattolliat *et al.* 2008)

blunt ones (Figs 5–8, 11–17). Texture of subimaginal tarsi can be examined either from subimagoes, or from subimaginal exuviae, or from mature nymphs ready to molt to subimago (Fig. 4). Texture of fore legs of male, fore legs of female and other legs can be different, while texture of middle and hind legs of both sexes is usually identical. In the case when the majority of the tarsal segment is covered by blunt microlepidies, its basal and/or apical parts can be covered by pointed microlepidies (Figs 5, 12). In some mayfly taxa all tarsal segments are covered by microtrichiae, like tibia and other parts of leg. Imaginal tarsus can have texture different from the subimaginal one; often imaginal texture is poorly expressed.

In all Baetidae subimaginal tarsi are covered by microlepidies; microtrichiae can be present on first tarsomere only. In Baetidae other than Baetungulata (Protopatellata, Cloeoninae and others) all microlepidies are pointed. Various taxa of Baetungulata usually have either all tarsomeres covered by pointed microlepidies, or terminal tarsomere covered by pointed microlepidies and other tarsomeres covered by blunt microlepidies, or all tarsomeres covered by blunt microlepidies.

Texture of subimaginal tarsi of *Indobaetis* is similar to that of some species of *Nigrobaetis*/g1 and *Labiobaetis*. In all examined Baetungulata-Baetofemorata all tarsomeres of all legs of both sexes are covered by blunt microlepidies; pointed microlepidies can be present only on basal and/or apical parts of some tarsomeres.

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