



## The problems with *Polypedilum* Kieffer (Diptera: Chironomidae), with the description of *Probolum* subgen. n.

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## Abstract

A phylogenetic analysis of the genus *Polypedilum* Kieffer utilizing only species with known larvae, and including one additional species presumed to belong to a new subgenus was performed. The subgenera *Tripodura* Townes, 1945, *Pentapedilum* Kieffer, 1913 and *Cerobregma* Sæther et Sundal, 1999, were all monophyletic, while *Uresipedilum* Oyewo et Sæther, 1998 was monophyletic when the new subgenus *Probolum* was excluded. *Polypedilum s. str.* was never monophyletic even when excluding the atypical *P. nubifer* (Skuse, 1889), but if the relationships between subgenera were unresolved a cladogram as short as the shortest trees could be erected with *Polypedilum s. str.* as monophyletic.

It is proposed to reestablish the genus *Tripedilum* Kieffer, 1921a as a subgenus with the type species *P. (T.) fuscipenne* (Kieffer, 1921a) and including *P. (T.) nubifer* (Skuse); treat *Polypedilum* Kieffer, 1913 as valid (pending an application to the ICZN to suppress *Polypedilum* Kieffer, 1912); reestablish the subgenus *Kribionympha* Kieffer, 1921a with the type species *Polypedilum (Kribionympha) declivis* Kieffer, 1922; give priority to *Tripodura* Townes, 1945 over senior synonyms; and erect the new subgenus *Probolum* Andersen et Sæther with *Polypedilum (Probolum) marcondesi* Pinho et Mendes **sp. n.** as type species and including at least *P. (Probolum) pedatum excelsius* Townes *sensu* Grodhaus et Rotramel, 1980, *P. (Probolum) simantokeleum* Sasa, Suzuki et Sakai, 1998 and *P. (Probolum) bullum* Zhang et Wang, 2004.

Short diagnoses for the subgenera of *Polypedilum* are presented. *Polypedilum (Probolum) marcondesi* **subgen. n., sp. n.** is described and figured as male, female, pupa and larva. The two subspecies of *P. (Uresipedilum) pedatum* Townes, 1945 are regarded as full species. The male imago of *P. (Uresipedilum) excelsius* Townes, 1945 and the male and female of *P. (Uresipedilum) pedatum* Townes are redescribed.

**Key words:** Chironomidae, *Polypedilum*, *Probolum*, new subgenus, new species, Brazil

## Introduction

The genus *Polypedilum* Kieffer is one of the largest chironomid genera containing about 440 described species. The larvae mostly occur in sediments, but several species are associated with phytotelmata and a few mine aquatic plants or co-inhabit pupal retreats of caddis flies (Ashe & O'Connor 2002; Cranston *et al.* 1989; Bolton 1991; Kobayashi *et al.* 2003). Although the triangular, basally constricted eighth tergite combined with the bifid pulvilli readily distinguish the genus among the Chironomini, further division into subgenera has proven problematic. At present the genus is regarded as having five recognized subgenera: *Polypedilum s. str.* Kieffer, 1912, *Pentapedilum* Kieffer, 1913, *Tripodura* Townes, 1945, *Uresipedilum* Oyewo et Sæther, 1998 and *Cerobregma* Sæther et Sundal, 1999. The genus *Asheum* Sublette et Sublette (Sublette & Sublette 1983) was previously placed in *Polypedilum*, but as the pulvilli are not bilobed and the eighth abdominal segment of the male is not basally constricted it was reestablished as a separate genus by Oyewo and Sæther (2008).

Several phylogenetic analyses of the genus have been performed during the last decade (Oyewo & Sæther 1998; Sæther & Sundal 1999; Bjørlo *et al.* 2000; Vårdal *et al.* 2002; Sæther & Oyewo 2008; Oyewo & Sæther 2008). What they all have in common, however, is that they attempt to test the monophyly of the separate subgenera rather than analyze the genus as a whole. *Pentapedilum*, *Tripodura*, *Uresipedilum* and *Cerobregma* all are indicated as being monophyletic by these analyses while the nominal subgenus is often indicated as paraphyletic or polyphyletic even when excluding the unique *Polypedilum nubifer* (Skuse, 1889).

In spite of the numerous species included in the genus the females and immatures, especially the larvae, are known from a very limited number of species. A major problem with the above mentioned analyses is the unknown character states. Here we attempt to analyze the full genus utilizing only the species with sufficiently known larvae. However, we still lack sufficient female characters to include this stage. In addition to the 53 species in the data matrix the larvae are tentatively or insufficiently known from an additional 3–5 species.

When examining material from Brazil a new species inhabiting phytotelmata, apparently belonging to *Uresipedilum*, was found. In Brazil 51 *Polypedilum* species are recorded (Mendes & Pinho 2008); however, none are from the southern states of Brazil and none belong to *Uresipedilum*. Most species belong in the subgenera *Polypedilum s. str.* and *Polypedilum (Tripodura)* and were described by Bidawid and Fittkau (1995) and Bidawid-Kafka (1996). However, the larva of this new species could not belong to *Uresipedilum*