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## ***Zadbimyia*, a new genus of asynaptine Porricondylinae (Diptera: Cecidomyiidae) with twenty-two new species from the cloud forest of Costa Rica**

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### **Abstract**

Twenty-two new species of *Zadbimyia*, a new genus of the tribe Asynaptini, are described from Costa Rica, the first new descriptions of Neotropical Porricondylinae (Cecidomyiidae) in modern times. The new species are: *Zadbimyia aberrans*, *Z. anniae*, *Z. artborkenti*, *Z. browni*, *Z. carolinae*, *Z. costaricensis*, *Z. dubia*, *Z. elenae*, *Z. elviae*, *Z. holdenae*, *Z. inornata*, *Z. lasalturas*, *Z. marcoi*, *Z. membranacea*, *Z. minima*, *Z. spinapiscis*, *Z. talamanca*, *Z. tapanti*, *Z. viquezi*, *Z. wendyae*, *Z. zumbadoi*, and *Z. zurqui*. All species were found during the Zurquí All-Diptera Biodiversity Inventory, in mid-elevation (1600 m) cloud forest in the central highlands of Costa Rica. A maximum of 19 species occurred at a single site. *Pseudocamptomys* Parnell, a genus known from one species in northeastern United States and possibly two species in Somalia, was identified as the closest relative of *Zadbimyia*. Ultraviolet light traps proved to be the most effective device to collect adults of *Zadbimyia*. As a peculiarity in Porricondylinae, the circumfila of *Zadbimyia* males are multi-looped and not substantially different from the circumfila known from male Cecidomyiidi (subfamily Cecidomyiinae).

**Key words:** Cecidomyiidae, Porricondylinae, adult morphology, taxonomy, new taxa, Neotropical Region, Costa Rica, Zurquí

### **Introduction**

Little-known even among dipterists, Porricondylinae are one of the fungivorous subfamilies of the family Cecidomyiidae, the gall midges. Only recently re-defined (Jaschhof & Jaschhof 2013), this subfamily now contains three tribes (viz. Dicerurini, Porricondylini, and Asynaptini), 71 genera, and 460 extant species (Gagné & Jaschhof 2014). Most described Porricondylinae are from the Palearctic Region, in particular Europe, where the few taxonomic experts of the group have been located. Parnell (1971) provided a limited study of the subfamily in the Nearctic. This situation has remained almost unchanged up to the present, with the result that Porricondylinae in tropical regions, the Neotropics included, are essentially unstudied. For that reason Porricondylinae were not keyed even to the level of genus in the Cecidomyiidae chapter of the *Manual of Central American Diptera* (Gagné & Jaschhof 2009).

It is safe to assume that the Neotropical Region would have continued to be a blank area for Porricondylinae if the Zurquí All-Diptera Biodiversity Inventory (ZADBI) had not been implemented in 2012. ZADBI is a 3-year effort that aims at providing a comprehensive list of the Diptera species occurring within a ten acre tract of Costa Rican cloud forest named Zurquí de Moravia. This inventory, along with comparative information from two other mid-elevation sites in the central highlands of Costa Rica, will contribute to a better understanding of local and global biodiversity and the importance flies play in ecosystems (see further details on ZADBI at <http://www.tropicalflies.net>). Furthermore, ZADBI is likely to stimulate the taxonomic description of at least a part of the many Diptera species new to science that have already been found during the project. The present paper is a concrete manifestation of this stimulating effect.

Here we describe 22 new species from Costa Rica of a new genus, *Zadbimyia*, that belongs to the Porricondylinae: Asynaptini. Our work is the first addition to the knowledge of Neotropical Porricondylinae for almost 80 years. Alexander (1936, 1937) introduced the genus *Feltomyina* for a single female porricondyline from Panama that excited him because it had an extraordinary antenna with 63 flagellomeres. *Feltomyina*, left unplaced

shared possession of circumfila was used by Jaschhof and Jaschhof (2013) as evidence of the sister-group relationship between Porricondylinae and Cecidomyiinae, and this argument is now strengthened by the discovery that the same complex type of circumfilum occurs in both sister groups; it makes it even more unlikely that circumfila evolved separately in the two subfamilies. Apart from that, *Zadbimyia* can give us an idea of the possibly stepwise evolutionary process leading from the ring-shaped (Fig. 24B) to the small-looped type of circumfilum (Fig. 17B) via intermediate (meandering) stages (Fig. 5D, 11B).

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