Zootaxa 4012 (1): 001–032
www.mapress.com/zootaxa/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

http://dx.doi.org/10.11646/zootaxa.4012.1.1
http://zoobank.org/urn:lsid:zoobank.org:pub:4DE5E609-AC90-4AA5-84D1-AA0D86B5C4DB

Little walking leaves from southeast Ecuador: biology and taxonomy of *Typophyllum* species (Orthoptera, Tettigoniidae, Pterochrozinae)

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Abstract

Eight katydid species of the leaf-mimicking specialist genus *Typophyllum* were found in the southeast of Ecuador in an area comprising part of the eastern Andean cordillera and foothills toward the Cordillera del Cóndor in elevations between 850 and 3000 m. They are described along with the peculiar calling songs and other interesting aspects of their biology. Three of these species are new: *T. morrisi* **sp. nov.**, *T. onkiosternum* **sp. nov.** and *T. vignoni* **sp. nov.** A fourth species represented by a single male is possibly new as well. In males and females of a species considered as identical with *T. egregium* Hebard 1924, which was previously known from a unique female specimen, was found a remarkable variation of coloration, in addition to the striking sexual dimorphism typical for the genus, with the females being twice as large as the small males. The latter is related to the curious mating behaviour, which is documented for this species and *T. erosifolium* Walker 1870. The two other species found in the region are *T. bolivari* Vignon 1925 and *T. mortuifolium* Walker 1870. The calling songs of four species were recorded. In *T. erosifolium* and *T. morrisi* **sp. nov.** the sounds are almost pure sine waves at the lower boundary of ultrasound. In *T. egregium* and *T. onkiosternum* **sp. nov.** the spectrum of the carrier frequency is broader, which might be related to lower and denser vegetation at higher elevation. Based on the intraspecific variety found in *T. egregium* and *T. erosifolium*, which includes variation in tegmina shape and venation pattern, are established several syonymies among *Typophyllum* species from western South America. *T. erosifolium* is found to be identical with *T. peruvianum* Pictet 1888 syn. nov. Additionally are considered identical *T. inflatum* Vignon 1925 and *T. gibbosusm* Vignon 1925 syn. nov., *T. trigonum* Vignon 1925 and *T. quadriincisum* Vignon 1925 syn. nov., and finally *T. lacinipenne* Enderlein 1917 and *T. acutum* Vignon 1925 syn. nov. and *T. undulatum* Caudell 1918 syn. nov. The discussion treats the problematic taxonomy of the little walking leaves, bioacoustics, the pre-copulatory riding behaviour, the sophisticated mimesis, and very briefly the uncertain position within the katydid phylogeny.

Key words: Andes, bioacoustics, colour polymorphism, leaf mimicry, mating behaviour, new species, Reserva de Biosfera Podocarpus—El Cóndor, Pterochrozini, sexual dimorphism, tropical montane rainforest

Introduction

The neotropical Pterochrozinae include the probably most perfectly camouflaged katydids. Their distribution ranges from southern Mexico over Central America and the tropical part of South America, extending southward to Bolivia and southern Brazil, and to the north-eastern extension of Argentina (close to the Iguazú Falls, pers. obs. 2011/2012). They comprise almost 100 recognized species in 14 genera (Eades *et al.*). The most diverse genus is *Typophyllum* with currently 36 species from tropical South America, followed by the closely related genus *Mimetica* with 15 species from Central America and northern South America. At day reposing *Typophyllum* individuals are practically indistinguishable from a fallen leaf, unnoticeable in an environment full of "aerial leaf litter" accumulating on tree branches covered by bromeliads and other epiphytes. But at night, when they become active and extend their legs and raise the long antennae, with the aid of a lamp they can be uncovered as katydids. The males' distinctive calling songs (so far described for five species by Morris *et al.* 1989, Montealegre & Morris 1999, and Morris & Montealegre 2001) can also help finding these special insects in the understory of the rainforest, usually by means of an ultrasound detector. And very rarely a peculiar ensemble can be encountered: a female with a much smaller male riding sideways on one of the former's tegmina. *Typophyllum* males (with tegmen

Accepted by D. Rentz: 21 Jul. 2015; published: 2 Sept. 2015