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Eight new species of *Oragua* Melichar, 1926 (Insecta: Hemiptera: Cicadellidae) from Amazonas State, Brazil, with description of the female terminalia of *Oragua jurua* Young, 1977, and new records for the genus

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Abstract

The thirty known species of *Oragua* are distributed from southern Mexico to Argentina. Seventeen species are recorded from Brazil, but only *O. elegantula* Young, 1977, *O. insipida* Young, 1977, and *O. jurua* Young, 1977 are recorded from Amazonas State. *Oragua partitula* (Jacobi, 1905) is herein firstly recorded from Brazil, occurring in Amazonas State. The aim of the study was to describe eight new species of *Oragua*, to provide a key to males of the species of the genus that are recorded from Amazonas State and to study in detail the female terminalia of these new species. Also, the female of *O. jurua* Young, 1977 is herein described for the first time. *Oragua alerochae* sp. nov. has the external color pattern similar to *O. bifasciata* Cavichioli, 2000, however, the head is darker, the forewings are paler and the stripes are thinner, aedeagus is much more curved with long apical processes, and apex of paraphyses rami are curved. *Oragua aurantimaculata* sp. nov. is similar externally to *O. elegantula* and *Oragua jau* sp. nov. as they share the body brown with three orange maculae on crown and orange maculae on forewings, but it has the aedeagus with shaft enlarged medially with a pair of apical processes curved anteriorly and connective more slender. *Oragua bella* sp. nov. is dark with orange spots, aedeagus with basal elongated processes extending to the apex of the pygofer, with the basal portion enlarged and narrowing toward the apex. *Oragua copiosa* sp. nov. is dark with small pale dots all over the body, paraphyses rami are slender and their apices expanded, and styles with hooked apex, extending posteriorly beyond the connective apex. *Oragua gracilenta* sp. nov. has the external color similar to *O. galerula*, but it can be distinguished by the brown ground color, absence of two maculae near median line just before posterior margin on pronotum and apex of rami of paraphyses bifurcate and not truncate. *Oragua jau* sp. nov. has the external color similar to *O. elegantula*, but the aedeagus is curved and slender with a pair of small lateral processes at the apex and very thin paraphyses rami bifurcating only in the final portion, with the length of the rami just one third of the total length. *Oragua schwertineri* sp. nov. has the external color similar to *O. insipida*, however the male genitalia differs from the latter by the lack of paraphyses and aedeagus with pair of basal processes curved dorsally and shaft with pair of apical lateral processes. *Oragua unifasciata* sp. nov. is dark brown with pale spots over the body with a pale transverse stripe over the antepical cells and paraphyses stem slender and abruptly broadened at apical two thirds, with rami robust and flattened with posterior margin serrate with large and irregular tooth-like projections. This work raises the number of *Oragua* species occurring in Amazonas State from three to twelve.

Key words: Amazonia, Brazil, taxonomy, new species

Introduction

Cicadellidae comprises about 21,000 species distributed all over the world, grouped in approximately 1,000 genera, making it the largest family of the order Hemiptera and one of the 10 largest families of insects (Ross, 1957; Oman *et al.*, 1990). It is currently divided in 22 subfamilies (Dietrich, 2005), including the subfamily Cicadellinae, which comprises approximately 9% of known species in the family (Mejidalani, 1998), and comprises two tribes, Cicadellini and Proconiini, (Young, 1968, 1977). The nominotypical tribe includes about 250 genera

Oragua species to be described, and conducting a revision of this group will be a lengthy process. In the present study eight new species of *Oragua* were described and illustrated and *O. partitula* was recorded for the first time from Brazil, increasing from three to twelve species of the genus recorded from Amazonas State. This demonstrates that the leafhopper diversity in the region is underestimated and more material must be collected and deposited in biological collections.

Furthermore, the female internal terminalia of species of *Oragua* were studied and illustrated for the first time. The study of the morphology of the internal terminalia is relevant because it can add to the suite of characters that are conservative intraspecifically and variable interespecifically, and thus useful for taxonomic identification of species. In Cicadellidae, the female internal terminalia is not usually studied or described because it usually has a very conservative morphology, and it is more studied in comparative works at higher taxonomic levels (e.g., Zahniser & Dietrich, 2008). However, in Cicadellinae, many generic studies have found useful variation in the female terminalia at species level (e.g., Nielson, 1965; Takiya & Mejdalani, 2004; Carvalho *et al.* 2011). Considering that two species of *Oragua* are known only by their female lectotypes, a detailed study of internal female morphology is necessary to ascertain if there is useful variation in the characterization of females of *Oragua*. Based on this study, despite the shape of the abdominal sternite VII being very conservative, we found variation in sclerotization patterns of the internal abdominal sternite VIII and general shape of the valvulae I and II of the ovipositor, showing that these female structures could be used for specific identification. The internal abdominal sternite VIII is sclerotized in *O. alerochae* **sp. nov.** and slightly sclerotized in *O. unifasciata* **sp. nov.**, but completely membranous in all of the other new species and *O. jurua*. The shape of the base of valvulae I varies interspecifically. In *O. jau*, *O. aurantimaculata*, and *O. bella*, the internal margin of the base is thick longitudinally, and the shape of the anterior margin has a distinct pattern in each new species and in *O. jurua*. The sculpturing of the shaft of valvulae I also showed some variation: it is strigate dorsally, becoming concatenate towards the apex, and imbricate ventrally in all of the females studied, except in *O. bella* **sp. nov.** which has the sculpturing concatenate dorsally and ventrally. The valvulae II of the ovipositor had the number of teeth on the dorsal margin varying from approximately 43 to 51, except in *O. bella* **sp. nov.**, which has 17 to 20 teeth. All species studied have denticles along the anterior and posterior margins of the subtriangular teeth of the valvulae II and on the ventral anteapical margin of the apex of valvulae II, except *O. bella* **sp. nov.**, which does not have denticles on the anterior margin of the teeth and on the ventral anteapical margin of the apex of the shaft.

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