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## New taxonomic assignments of Calisiinae with description of two new genera (Hemiptera, Heteroptera, Aradidae)

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### Abstract

Examination of type species of *Calisius pallipes* Stål 1860 from Brazil and *Calisius ghiliani* (A. Costa 1864) from Europe has revealed essential morphological differences warranting their placement into different genera. Stål's *pallipes* is the genotype of *Calisius*, and *ghiliani* that of *Aradosyrtris* A. Costa, whose generic status is revived. A neotype is designated for *Aradosyrtris ghiliani* A. Costa 1864. Clearly distinguished from *Calisius* sensu Stål are the Neotropical *Calsius farri* Kormilev 1964 and the African *Calisius lativentris* Horvath 1913, for which the new genera *Caribocalisius* n.gen and *Afrocalisius* n.gen are established, respectively.

**Key words:** Hemiptera, Heteroptera, Aradidae, Calisiinae, new genera, Neotropics, Palaearctic, Africa

### Introduction

Following an invitation by Paul D.N. Hebert (University of Guelph, Canada) to supply specimens of the flat bug family Aradidae for barcoding, 83 taxa from all 8 recognized subfamilies (Aneurinae, Aradinae, Calisiinae, Carventinae, Chinamyersiinae, Isoderminae, Mezirinae, Prosympiestinae) from the collection of the author (CEHI) were sent for further treatment.

The results of standardized sequencing used by BOLD (Barcode of life Data System) for the 5' region of COI gene were then analysed and displayed as graphic trees (for exact specimen-sequence links visit the "Barcoding World Aradidae [ARAEH]" project at the Barcode of life portal: <http://www.boldsystems.org/>). When studying the BOLD TaxonID tree [SEARCH2] comprising all currently sampled Aradidae, the two taxa identified as *Calisius salicis* Horvath 1913 from Bulgaria and *Calisius farri* Kormilev 1964 from Jamaica showed a considerable sequence divergence of 27.6% (of 658 bp) from each other, a figure usually indicating possible discontinuity in classification heteropteran taxa (Ratnasingham & Hebert, 2007; Park et al., 2013).

Both these species of *Calisius* were then morphologically reexamined, and several clear differences were highlighted. Therefore, it was necessary to clarify which of them belongs to true *Calisius*. The genus *Calisius* Stål 1860 was erected for *C. pallipes* Stål 1860 from Brazil and used in the past as a "catch-all" for most of the small, similar looking species across all continents. *Aradosyrtris* A. Costa 1864, with the type species *Aradosyrtris ghiliani* A. Costa 1864, was also synonymized with *Calisius* Stål by Bergroth 1894.

Investigation and comparison of the borrowed holotype of *C. pallipes*, topotype of *C. ghiliani* (the holotype from Sardinia is lost) and specimens of the congeneric and closely related *C. salicis* Horvath 1913 with the holotype of *C. farri* Kormilev 1964 has shown that these taxa belong to 3 different genus-group taxa.

The most obvious morphological difference is the whitish round plaques of antennal segment IV, which in very high magnification (1000x) reveal a half-globular structure with a dorsal opening. These structures are probably olfactory organs (Figs. 15,18), and their size is about 0.01mm. They are not observed in *Calisius pallipes* and *Caribocalisius farri* n. comb., but are present in *Aradosyrtris ghiliani* and *Afrocalisius lativentris* (and mentioned for all other Calisiinae genera: *Aradacanthia* A. Costa 1864, *Calisiopsis* Champion 1898, *Heissia* Kormilev 1986, *Paracalisiopsis* Kormilev 1963, *Paracalisius* Kormilev 1974 and *Breviscutheissia* Jacobs 2006).

Additionally important structural differences concern the development of a dorsally exposed tergite VIII in males and females, the number of tubercles on lateral margins of connexiva, and the position of spiracles (Table 1).