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Phylogenetic relationships of *Tectoribates*: nymphal characters of new North American species place the genus in Tegoribatidae (Acari, Oribatida)

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Abstract

Species in the oribatid mite genus *Tectoribates* are primarily Palaearctic and Neotropical, with scattered, unidentified records from North America. Herein, we describe 3 new *Tectoribates* species from dry forest and prairie habitats in North America: *T. alcecampestris* **sp. nov.**, from Alberta, *T. borealis* **sp. nov.**, from southern Alberta and Ontario, both on the basis of adults and nymphs, and *T. campestris* **sp. nov.**, from dry grassland habitats in Ontario and Kansas, on the basis of adults. We provide a revised and expanded diagnosis for adults of *Tectoribates*. We assess relationships of *Tectoribates*, using characters of adults and newly discovered apheredermous, plicate immatures. We include observations on *Pseudotectoribates* which is closely related to *Tectoribates.* The closest relatives of these genera are hypothesised to be among the Tegoribatidae (Achipterioidea) rather than among the Achipteriidae (Achipterioidea), Oribatellidae (Oribatelloidea), or Ceratozetoidea, as suggested in previous classifications. Finally, we give a key to adults of the world fauna of *Tectoribates*.

Key words: Oribatida, *Tectoribates*, *Pseudotectoribates*, new species, Tegoribatidae, North America, Canada, USA, world key

Introduction

The oribatid mite genus *Tectoribates* includes 4 extant species worldwide, described from Europe and Mongolia. Species are found in dry grassland and forest habitats, or dry microhabitats in these ecosystems. They are a component of the oribatid fauna in urban lawns (Eitminaviciute 2006, Ermilov & Chistyakov 2005), Palaearctic steppe (Smelyansky 2006), pine forests (Mahunka & Mahunka-Papp 2008) and arable and non-arable grassland (e.g., Ivan 2006, Luptáčik *et al.* 2012), but are rarely dominant members. In Poland *Tectoribates ornatus* (Schuster 1958) is among the species tolerant of metal contamination (e.g., Skubała & Zaleski 2012). In North America there are records of the genus from New York, Québec (Marshall *et al.* 1987), Ontario (St. John *et al.* 2002), Saskatchewan (Willard 1973), Alberta (Walter *et al.* 2013), and Florida (Jordan 2001).

The generic concept of *Tectoribates* was confused for many decades. It was proposed by Berlese (1910) as a subgenus of *Sphaerozetes,* with *Sphaerozetes (Tectoribates) proximus* Berlese, 1910, as the only included species. Berlese (1910) did not illustrate this species, and the brief description noted brown coloration, gave measurements for length and width and indicated a similarity to *Sphaerozetes howardi* Berlese, 1908 and *S. tecta* (Michael, 1884). *Sphaerozetes howardi* is presently considered a member of the achipteriid genus *Anachipteria* Grandjean, 1932 (Norton & Kethley 1990), whereas *Oribata tecta* (= *S. tecta*) is a member of the oribatellid genus *Ophidiotrichus* Grandjean, 1953 (Behan-Pelletier 2013). Jacot (1929, p. 422) listed *Tectoribates* as a monotypic subgenus, and thus *Sphaerozetes (Tectoribates) proximus* would be type species by monotypy. The generic concept was further confused by Radford (1950) who indicated, incorrectly, that Berlese (1910, p. 264) had designated *Oribata tecta* Michael, 1884, as type.

To clarify this taxonomic mess Grandjean (1953a) proposed *Ophidiotrichus* as a replacement name for

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- Interlamellar seta reaching anteriorly at most to base of seta *le*; medial and lateral dentes of lamellar cusp short or absent . . . 6
6(5) Bothridial seta globular; body length <300 µm . . . . . *T. deserticola* (Balogh & Mahunka)
- Bothridial seta fusiform; body length >300 µm . . . . . *T. mongolicus* Bayartogtokh

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