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A review of the ecology and distribution of *Protoribates* (Oribatida, Oripodoidea, Haplozetidae) in Alberta, Canada, with the description of a new species

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Abstract

The oribatid mite genus *Protoribates* Berlese (Haplozetidae) is reviewed for North America and the genus diagnosis is revised to account for the North American species, *Protoribates robustior* (Jacot, 1937) is redescribed and newly reported from western North America and a new species from Alberta is described. *Protoribates haughlandae* sp. n. is bisexual, heterotridactylous, and lives primarily in the peat soils of fens and bogs. *Protoribates robustior* is all-female, monodactylous, and occurs primarily in dry forests or in dry, treeless sites dominated by grasses, sedges, and shrubs. Both species feed on fungal hyphae and spores, but *P. haughlandae* also is an opportunistic predator and/or necrophage of small arthropods and *P. robustior* gut contents often include material that resembles plant cell walls. Examination of type specimens confirms that *Protoribates prionotus* (Woolley, 1968) is a junior synonym of the widespread *Protoribates lophotrichus* (Berlese, 1904). A key to differentiate *Lagenobates* from *Protoribates* and to identify the 7 species of the latter that are known or reported from North America is provided.

Key words: *Xylobates*, *Transoribates*, *Lagenobates*, fen, bog, peat soils

Introduction

Until recently, *Protoribates* Berlese, 1908, has been a poorly known and taxonomically confusing genus variously treated as a member of the Haplozetidae or as the type genus of Protoribatidae. Weigmann *et al.* (1993) redescribed the type species (*Oribates dentatus* Berlese, 1883) and convincingly demonstrated that *Xylobates* Jacot, 1929, was a junior subjective synonym of *Protoribates*, as hypothesized by Grandjean in 1936. Miko *et al.* (1994), Weigmann and Miko (2002), and Weigmann and Monson (2004) further clarified generic concepts in the Haplozetidae for European species. However, many problematic taxa still exist, especially for species described under *Xylobates*. The purpose of this paper is to review the ecology, distribution, and systematics of *Protoribates* in North America and describe a new species from Alberta.

The Province of Alberta, Canada, covers about 661,000 km² and stretches approximately 1,223 km from the Northwest Territories south to the state of Montana in the USA (49–60° N latitude) and 660 km from the Canadian province of Saskatchewan in the east (110th meridian) to the crest of the Rocky Mountains on the Alberta-British Columbia border (~120th meridian) in the west. The climate is continental in the south to subarctic in the north. Mixed grasslands cover south eastern Alberta, grading into aspen parkland in central Alberta and the foothills of the Rocky Mountains. Much of the northern two-thirds of the Province is covered by boreal forest (taiga), peatlands, and wetlands. About 330 species of oribatid mites are currently known to occur in Alberta (Walter *et al.* 2012).

For the last five years (2007–2011), adult Oribatida have been used by the Alberta Biodiversity Monitoring Institute (2012) in their Province-wide assessment of the state of biological diversity. In total, 579 sites in Alberta have been sampled for oribatid mites. This survey presents a unique opportunity to assess the ecological and biogeographical distribution of oribatid mites within the Province.