



## Two new *Gordionus* species (Nematomorpha: Gordiida) from the southern Rocky Mountains (USA)

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### Abstract

The phylum Nematomorpha contains approximately 350 species in 19 extant genera. The genus *Gordionus* contains 56 species, four of which occur in the contiguous United States of America. Here we describe two new *Gordionus* species from the southern Rocky Mountains. Worms were collected at three sites in the Santa Fe National Forest in northern New Mexico in the southernmost tip of the Rocky Mountains. Sites consisted of first order streams above 3120m in aspen/pine woodland. *Gordionus lokaaus* n. sp. has flat, polygonal or roundish, areoles covering all parts of the body. The male cloacal opening is surrounded by broad bristles with stout apices forming a unique tube-like opening. Adhesive warts are small and postcloacal spines are thin and triangular-shaped. *Gordionus bilaus* n. sp. also has flat polygonal or round shaped areoles, but has indistinct interareolar furrows making neighboring areoles appear fused. The male cloacal opening is surrounded by stout, finger-like bristles in 2–3 rows. Adhesive warts are larger and postcloacal spines are broad and mound-shaped. These species double the number known from the state of New Mexico and are the first gordiids described from the southern part of the Rocky Mountains.

**Key words:** *Gordionus lokaaus*, *Gordionus bilaus*, hairworm, cloaca, postcloacal spines, biodiversity, DNA sequencing, morphology, taxonomy

### Introduction

The phylum Nematomorpha is the sister phylum to the Nematoda (Dunn *et al.* 2008). Nematomorphs are arthropod parasites and are found in freshwater and marine habitats. The freshwater nematomorphs or gordiids (Nematomorpha: Gordiida), are parasites largely of orthopterans, coleopterans, and mantids (Hanelt *et al.* 2005) and contain about 350 species within 18 genera (Schmidt-Rhaesa 2001a; Zanca & Schmidt-Rhaesa 2008).

The genus *Gordionus* was recognized by Müller, in 1927, to separate several unique species from the genus *Parachordodes* based on the presence of adhesive warts (Müller 1927). Adhesive warts are limited to males, and are elevated cuticular structures on both sides of the ventral midline about 0.5mm anterior to the cloacal opening, and often contain canoe-shaped elevations. However, adhesive warts as a character has become problematic in gordiid systematics since few *Gordionus* species descriptions mention adhesive warts, likely due to the lack of study of the body area containing these structures (Schmidt-Rhaesa *et al.* 2003). Instead, taxonomists have subsequently used the number of areole types to separate *Gordionus*, having one areolar type, from *Parachordodes*, having two areolar types. Areoles are elevated epicuticle surface ornamentations. Use of this single cuticle character to separate these genera has introduced much taxonomic uncertainty and the monophyly of both genera is in doubt (Schmidt-Rhaesa 2001a), and has resulted in the description of some *Gordionus* species without adhesive warts and some *Parachordodes* species with adhesive warts.

Currently, *Gordionus* species are characterized by a bifurcating male posterior end, which is longer than wide,