



Phase morphs and phoresy: New species of *Antennoseius* (*Vitzthumia*) mites (Acari: Mesostigmata: Ascidae) associated with pyrophilous carabids (Carabidae: *Sericoda* spp.) in Alberta, Canada

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Abstract

The mite genus *Antennoseius* is composed of free-living species in soil and litter, as well as species that are phoretic on carabid beetles as adult females. Among approximately 60 described *Antennoseius* species, one North American species, *A. janus*, was found in laboratory cultures to have two female morphs: one granular, free-living morph, and one smooth, putatively phoretic morph. We here describe the adult females of *A. perseus* n. sp. and *A. pyrophilus* n. sp. collected from under the elytra of carabid beetles (*Sericoda quadripunctata* and *S. bembidioides*) associated with recently burned forests in Alberta, Canada. We also describe the female and male of a distinct, granular, non-phoretic morph of *A. perseus*, obtained from soil and by rearing the offspring of phoretic females. A key to the females of *Antennoseius* species having an ambulacrum on leg I (i.e. subgenus *Vitzthumia*) is provided.

Key words: predatory mites, phoretic morph, dimorphism, ground beetles, fire fauna

Introduction

The Mesostigmata is an ecologically diverse taxon comprising over 10,000 described species of mites. The best known mesostigmatans are predators of agricultural pests (e.g. the phytoseiid mites used as biocontrol agents), parasites of vertebrates (e.g. poultry mites), and associates of other organisms of human interest, e.g. the varroa mite of honeybees or the hummingbird-flower mites (Walter & Proctor 1999). About half of all described species of mesostigmatans, however, are predators of invertebrates in detritus-based systems such as soil, rotting wood, compost, carrion, and dung. Those living in patchy habitats often disperse to new patches by forming temporary associations with insects, a behaviour called phoresy. In the Mesostigmata, the phoretic stage is usually either the last immature instar (the deutonymph) of both sexes, or the adult female (Athias-Binche 1993; Walter & Proctor 1999).

Although phoretic deutonymphal stages that differ in morphology from free-living deutonymphal stages (i.e. heteromorphs) are known in the Mesostigmata (Athias-Binche 1993), in general, phoretic adult female mesostigmatans are morphologically identical to free-living females of a given species. The single probable exception known is *Antennoseius janus* Lindquist & Walter (Ascidae), a free-living predator of small invertebrates in montane meadows in the Rocky Mountains, which produces two distinct female morphs in laboratory cultures (Lindquist & Walter 1989). Species of *Antennoseius* are mostly found in open habitats such as