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Review of the mite genus *Gaeolaelaps* Evans & Till (Acari: Laelapidae), and description of a new species from North America, *G. gillespiei* n. sp.

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Abstract

The concept of the genus *Gaeolaelaps* of the mite family Laelapidae is reviewed, based on species descriptions in the literature and the examination of specimens of selected described and undescribed species. A short diagnosis and a description of the genus is presented, showing the range of morphological character states and indicating species that depart from the typical character states. *Gaeolaelaps* is restored from subgeneric to generic rank. A new species, *G. gillespiei* **n. sp.**, is described from adult female and male specimens. This species shows promise in the control of fungus gnats and thrips on greenhouse cucumbers in British Columbia, Canada. It is a relative of the well known biocontrol agent *Gaeolaelaps* (or *Hypoaspis*) *aculeifer*, but presents a set of morphological traits that distinguish it from *G. aculeifer* and other related species. The diversity of soil-dwelling mesostigmatic mites remains poorly explored, and so is their potential for biological control.

Key words: *Hypoaspis*, Hypoaspidinae, Mesostigmata, predatory mite, biocontrol

Introduction

The mesostigmatic mite family Laelapidae is ecologically diverse, and comprises obligate and facultative parasites of vertebrates, insect paraphages, and free-living predators that inhabit soil-litter habitats, as well as the nests of vertebrates and arthropods (Strong & Halliday 1994; Krantz & Walter 2009). The family, including the genus *Gaeolaelaps* Evans & Till 1966, is in need of taxonomic revision (Evans & Till 1966; Gilyarov & Bregetova 1977; Tenorio 1982; Casanueva 1993). The taxonomic rank and the boundaries of *Gaeolaelaps* are unclear and subject to disagreement between authors. Evans & Till (1966) defined *Gaeolaelaps* for the first time (Halliday & Lindquist 2007) as a subgenus of *Hypoaspis* Canestrini *sensu lato*. They later (1979) gave provisionally generic status to most of the subgenera of *Hypoaspis*, but kept *Gaeolaelaps* (along with *Alloparasitus* and *Hypoaspisella*) under the genus *Hypoaspis*. Most subsequent authors of taxonomic studies (e.g. Costa 1968; Hunter & Yeh 1969; Gilyarov & Bregetova 1977; Karg 1979; Tenorio 1982; Ruf & Koehler 1993; Ma & Yin 1998) and biological studies (e.g. Lesna *et al*. 2000; Vänninen & Koskula 2004) regarded *Gaeolaelaps*-like species as *Hypoaspis* species, sometimes giving *Gaeolaelaps* as a subgenus, or even as a species group (Van Aswegen & Loots 1970). Other authors have used *Gaeolaelaps* at the genus level (Ryke 1963; Hyatt 1964; Rosario 1981; Walter & Oliver 1989; Gillespie & Quiring 1990; Krantz & Ainscough 1990; Farrier & Hennessey 1993). In this paper, I revise the concept of *Gaeolaelaps* by describing the range of morphological character states based on species descriptions in the literature and on the examination of specimens of selected described and undescribed species.

Predatory laelapids tend to be voracious, polyphagous predators that reproduce quickly and can be reared easily (Walter & Oliver 1989; Gillespie & Quiring 1990; Lesna *et al*. 1995). This makes them good candidates for biological control of pests that spend time in the soil or in other plant growing media. Two soil-dwelling

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