



Article

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***Oziella sibirica* (Acari: Eriophyoidea: Phytoptidae), a new eriophyoid mite species described using confocal microscopy, COI barcoding and 3D surface reconstruction**

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Abstract

Oziella sibirica sp. nov., collected from sedges (Cyperaceae: *Carex macrourea*) in Siberia, Russia, is herein described based on the external morphology of all active instars using primarily conventional phase contrast microscopy, and on the female internal genitalia and prodorsal shield design using confocal laser scanning microscopy (CLSM) imaging and a 3D modelling technique. A partial mitochondrial COI gene sequence of *O. sibirica* sp. nov. is also provided, through GenBank, and this represents the first published record of any gene sequence data for the family Phytoptidae. We present remarks on the phylogenetic significance of the position of setae *3a* in immature instars of eriophyoids and on the ontogenic variability of the empodium morphology of *O. sibirica* sp. nov. Using this species as a model, we propose a method for describing the internal genitalia of eriophyoids based on CLSM. We advocate the use of CLSM imaging as a new, relatively simple technique for observing and describing the internal genitalia of eriophyoids, as these largely unexplored genitalic structures may provide phylogenetically meaningful information for improving the classification of this poorly understood group of mites. In addition, CLSM may complement conventional light microscopy techniques in facilitating the interpretation of external structures such as body ornamentation or chaetotaxy.

Keywords: Prostigmata, Phytoptinae, phytophagous mites, internal genitalia, sedges, *Carex*, monocots

Introduction

Eriophyoid mites (Acari) are a diverse group of plant parasites that are highly adapted for phytophagy. They have an extremely reduced morphology with few remaining setae and only two pairs of legs, and only three active life stages. A large proportion of species induce plant deformities such as erineae, galls or leaf rolling and most are specific to a single species or genus of host plants (Lindquist & Oldfield 1996). The host-plant adaptations of eriophyoid mites probably favoured their radiation onto all major groups of vascular plants. Overall, their current classification is largely based on artificially defined groups, in part because their simplified morphology offers limited sets of diagnostic characters (Lindquist & Amrine 1996).

The family Phytoptidae (sensu Amrine *et al.* 2003) is a relatively small family of Eriophyoidea and includes taxa that are reputed to be the earliest derivatives of the group. Despite the comparative