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Problems with the taxonomy of *Phytoptus tetratrichus* Nalepa 1890 (Acari: Eriophyoidea) inhabiting *Tilia* spp.: Analysis based on morphological variation among individuals

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Abstract

The purpose of this research was to investigate both the qualitative and quantitative morphological traits of *Phytoptus tetratrichus* Nalepa 1890 populations inhabiting three different lime tree species: *Tilia cordata* Mill., *Tilia tomentosa* Moench and *Tilia americana* L.. Morphological characters of two populations collected from *T. cordata* and *T. tomentosa* over three successive growing seasons were compared with the aid of canonical variate analysis. Additionally, individuals occurring on *T. americana* in a consecutive year were also studied. Protogyne and deutogyne females were differentiated using both qualitative and quantitative traits. For deutogyne females, individuals from all combinations of *Tilia* species × year (which constituted populations for comparison) clearly differed from each other. However, the differences between populations from *T. cordata* and *T. tomentosa* were less distinct. For protogyne females, observed differences were clearly visible. The between-season variation in morphological characters such as body size appeared to be quite large, indicating that morphological analysis based on observations from only a single season can be inaccurate. Deutogyne females of *P. tetratrichus* were observed to cause various types of damage symptoms: leaf-roll galls along the leaf edges of *T. cordata*; small round erinea on the lower leaf surface and small wart-like galls on the upper leaf surface of *T. tomentosa*; finger-like galls on both leaf surfaces of *T. americana*.

Key words: Basswood, deutogyne, erineum, eriophyoid mites, galls, protogyne, silver lime, small-leaved lime, redescription

Introduction

Six species of the genus *Phytoptus* (Phytopidae), commonly known as gall mites, are recognized from lime trees, *Tilia* spp. (Tiliaceae) (de Lillo 2004). They are: *Phytoptus rotundus* (Hall 1967), *Phytoptus abnormis* (Garman 1883) Nalepa 1918, *Phytoptus bursarius* (Nalepa 1918), *Phytoptus erinotes* (Nalepa 1920), *Phytoptus stenoporus* (Nalepa 1918) and *Phytoptus tetratrichus* (Nalepa 1890).

Nalepa (1920) commenced the trinomial nomenclature for *P. tetratrichus* (Table 1) by describing 5 subspecies. Amrine and Stasny (1994) later reported that some reassignments were made in the genus *Eriophyes*, but finally these mites were returned to the genus *Phytoptus*. In the meantime, Westhpal and Manson (1996) mentioned *Phytocoptella tetratrichus*. However, the trinomial nomenclature was later changed to binomial, suggesting that the *P. tetratrichus* subspecies that were first described by Nalepa then became separate species (Amrine & Stasny 1994; de Lillo 2004). As discussed by Jeppson *et al.* (1975), Nalepa's assumption that structurally diverse galls on unrelated hosts are the result of different mite species, calls for experimental evaluation. To the authors' knowledge, up until now, such studies had not yet been done.

The only existing description of *P. tetratrichus* by Nalepa (1890), being 120 years old, is not very accurate and lacks illustrations. Unfortunately, no type specimens of Nalepa's original material are available for study. Only his descriptions exist for the comparison of new material with the species that he originally described. The species *P.*

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