



MOLECULAR PHYLOGENY OF PREDATORY MITES OF THE FAMILY PHYTOSEIIDAE

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The predatory mites of the family Phytoseiidae are well known for their use in biological control. Phytoseiidae systematic has a long and complex history, due to the difficulty to establish the evolutionary meaning of the morphological structures. It contains 2,400 species, distributed in three sub-families and 90 genera. The classification presently accepted is essentially based on the dorsum chaetotaxy but other authors have proposed other structures to be taken into account. However, none of the classification proposed are based on phylogenetic relationships. Thus, it is impossible to say if one of these hypotheses is truer than another. Furthermore, questions arise when trying to objectivize the characters taken into account for Phytoseiidae classification. First, a synthesis of these questions will be provided. Then, recent molecular results will be presented. This study aimed to test the monophyly of the three sub-families, some tribes and genera, using a combination of six DNA markers (12S rRNA, COI mtDNA, CytB mtDNA, 28S rRNA, ITSS and HSP90). A total number of 3,454 bp were analysed. The main conclusions do not match with the present classification. The sub-family concept is questioned. Species of the genus *Phytoseius* (Phytoseiinae) is included in a clade also containing taxa of Typhlodrominae. Main of the Typhlodrominae taxa considered are included in a same clade; however this study questions the validity of some tribes, for instance the tribe Typhlodromini and some genera and sub-genera as *Typhlodromus* (*Typhlodromus*) and *Typhlodromus* (*Anthoseius*). Some species of Typhlodrominae (*Galendromimini* et *Metaseiulini*) are included in the sub-family Amblyseiinae. Finally, this latter sub-family appears to be polyphyletic as well as several tribes as Amblyseiini, Neoseiulini and Typhlodromipsini and genera (i.e. *Amblyseius*). This study confirms the monophyly of the tribe Euseiini, Phytoseiulini and of some taxa within the Kampimodromini. The molecular characters associated to these evolutionary relationships are discussed. Finally, other taxa and additional analyses seem to be considered to better support the present findings and propose a modification of the classification.

Keywords: molecular markers, phylogeny, taxonomy, Phytoseiidae.