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Mites of the family Phytoseiidae Berlese from Kenya (Acari: Mesostigmata)

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Abstract

We surveyed the phytoseiid mites in four different geographical zones of Kenya: Zone I, upper highland and tropical alpine (2400–4400m); Zone II, lower highland (1800–2400 m); Zone III, midland (800–1800 m); Zone IV, tropical, hot and humid (0–800 m). A total of 107 species was found. In the subfamily Amblyseiinae there were 14 species in the genus *Neoseiulus* Hughes, one in *Asperoseius* Chant, one in *Paraphytoseius* Swirski & Schechter, five in *Typhlodromips* De Leon, five in *Transeius* Chant & McMurtry, one in *Graminaseius* Chant & McMurtry, 11 in *Amblyseius* Berlese, one in *Arrenoseius* Wainstein, two in *Typhlodromalus* Muma, seven in *Ueckermannseius* Chant & McMurtry, one in *Amblydromalus* Chant & McMurtry, 20 in *Euseius* Wainstein, one in *Iphiseius* Berlese, one in *Phytoseiulus* Evans and one in *Gynaeseius* Ehara & Imano. In the subfamily Phytoseiinae Berlese, there were four species in the genus *Phytoseius* Ribaga. In the subfamily Typhlodrominae Wainstein, there were four species in the genus *Kuzinellus* Wainstein, and 27 in *Typhlodromus* Scheuten.

Key words: Acari, Phytoseiidae, Amblyseiinae, Phytoseiinae, Typhlodrominae, taxonomy, Predacious mites, Kenya, geographical zones

Introduction

Mites of the family Phytoseiidae show little variation in major morphological characters. Prior to the publication of Chant (1965) on the generic concepts for the systematics of the family, few papers dealt with this issue (Nesbitt, 1951; Chant, 1959; Muma, 1961; Wainstein, 1962a; Pritchard & Baker, 1962; Schuster & Pritchard, 1963). In these systems of classification, phytoseiids were included as few genera in the subfamily Phytoseiinae in the family Laelapidae, or as many genera and subgenera arranged in tribes and subfamilies. In contrast, Hirschmann (1962) and Westerborer & Bernhard (1963) placed all the mites now considered as Phytoseiidae in the single genus *Typhlodromus* in the subfamily Melicharinae (Family Gamasidae).

In his study of the generic concepts of phytoseiids, Chant (1965) recognised ten genera, because a genus is a systematic category including species of common phylogenetic origin that is separated from similar units by a decided gap. Furthermore, a genus should broaden our knowledge of a family and not add to the endless combinations of minor characters better dealt with below the generic level, and taxa of generic rank should be based on several rather than only one character. Characters used by Chant (1965) for generic designation and grouping the fewer than 500 species of phytoseiids known at that time were: presence or absence of an additional pair of prolateral setae on the dorsal shield after second moult; whether there are four or more pairs of prolateral setae in the deutonymph and adult; the position of the sublateral setae; the degree of the sclerotisation of the lateral integument; the shape of the body and the degree to which it is covered dorsally by the dorsal shield; chaetotaxy of the legs, and characteristics of the gnathosoma.

Baker & Warton (1952) elevated the subfamily Phytoseiinae to the family level but included genera of other families such as *Lasioseius* and *Ameroseius*. Chant (1957c) recognised the family Phytoseiidae and included only the three major groups that constitute the family: Amblyseiinae, Phytoseiinae and Typhlodrominae. However, several authors have proposed other combinations of taxa for the family. Muma (1961) recognised four subfamilies in the Phytoseiidae: the Phytoseiinae, Amblyseiinae, Macroseiinae and Aceodrominae. Wainstein (1962a) recognised two subfamilies, transferred two genera from the Otopheidomenidae to the Phytoseiidae, representing a third new subfamily Treatiinae (Wainstein, 1972) and recognised five subfamilies (Wainstein, 1973).

Chant & McMurtry (1994) attempted to establish a hierarchical system that creates a balance between the system proposed by Hirschmann (1962), in which all forms are placed in the single genus *Typhlodromus*, and those proposed by others such as Muma and Wainstein, with a more complex system of genera and subgenera. They proposed a system that restricted the Phytoseiidae to taxa consistent with the family diagnosis and recognised only three subfamilies: the Amblyseiinae Muma (1499 species), Phytoseiinae Berlese (142 species) and Typhlodrominae Chant & McMurtry (452 species) (Fig. 1).

The subfamily Amblyseiinae is distinguished by the absence of dorsal lateral setae z3 and absence of the caudoventral seta JV3, although the latter is retained in one species in the Amblyseiinae (*Macrocaudus multisetatus* Moraes *et al.*, 2003). Although the Phytoseiinae and Typhlodrominae are assumed to have a common ancestor in which z3 and s6 are retained, the Amblyseiinae represents an enormous range of phenetic variability (Chant & McMurtry, 1994). Almost every feature observed in the Phytoseiinae and Typhlodrominae has its homology in the