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A review of a new catalog and illustrated key to facilitate identification of and research on flat mites (Acariformes: Tenuipalpidae)

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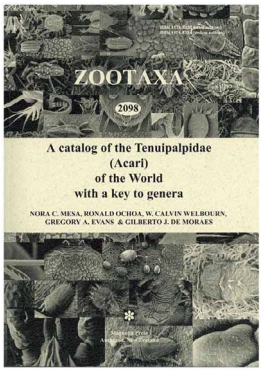

Mesa, N.C., Ochoa, R., Welbourn, W.C., Evans, G.A. & de Moraes, G.J. (2009) *A catalog of Tenuipalpidae Berlese (Acari: Prostigmata) of the World, with a key to genera*; *Zootaxa* 2098, Auckland, Magnolia Press, 185 pp.

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The flat mites, also known as the false spider mites, are one of the most diverse groups of plant feeding mites (Prostigmata: Tetranychoidea: Tenuipalpidae). There has been increasing interests in the Tenuipalpidae both from applied and fundamental perspectives (Gerson 2008). The applied interest is to a large extent caused by roles of *Brevipalpus* species in vectoring the leprosis virus resulting in the widespread epidemic in the Americas (Childers *et al.* 2003) and also the recent introduction of invasive mites such as *Raoiella indica* Hirst to the Americas (Flechtmann & Etienne 2004). Also there has been recent interest in using tenuipalpid mites as model organisms to explore basic evolutionary questions such as sex determination and microorganism-mite interactions (Gerson 2008). There is a great need for an updated and comprehensive guide to the taxonomy of the family. The recent book by Mesa *et al.* (2009) is the first step towards fulfilling that need.

The Tenuipalpidae is quite unusual in that there were several major checklists and revisions of the family and indeed duplicate efforts in the late 1980s and early 1990s. A few years after the founding of the family by Sayed (1950a, b), Prichard and Baker (1958) published the first revision of the family, which then included 143 species in 14 genera. In 1979, Mitrofanov and Strunkova reported 365 species of Tenuipalpidae in 33 genera in their revision of the family, whereas Meyer in her revision of the Tenuipalpidae of Africa provided keys to 21 genera and 504 species known then in the world. Sepasgosarian (1983) provided a taxonomic checklist of 541 species in 21 genera, whereas Ghai and Shenhmar (1984), obviously independently, published another checklist of 562 species in 22 genera of the Tenuipalpidae, with a key to the genera. Sepasgosarian (1984, 1985, 1987, 1990) updated his list to include 697 species in 25 genera with four addenda in 1984, 1985, 1987 and 1990.

The new catalog of Mesa *et al.* (2009) is timely, now including 891 species in 34 genera. This new book not only provides an updated checklist of the family, but also an illustrated key to world

genera and a comparative morphological analysis at the generic level.

The book begins with a concise review of major papers on the Tenuipalpidae that contain important taxonomic data (e.g. new genera, new revisions, new classifications etc.). This is followed by a zoogeographical tabulation of the genera to eight zoogeographic regions—Nearctic (NA), Neotropical (NT), Western Palearctic (WPA), Afrotropical (AF), Eastern Palearctic (EPA), Oriental (O), Australian (AU) and Pacific Islands (PI); that of species is placed in an appendix because of its large size, with the distribution of each species given by country and, for the U.S.A., state. It should be noted that the authors included mainland China in the Eastern Palearctic Region, but most southern parts of China are in the Oriental Region. I applaud the authors' use of the tabular format, which has the advantages in that total genera and species of each region can be easily summarized and distribution of each species and genera within regions can be easily compared. It is a pity that the authors just gave the tables here but did not make further analyses of the data (although they provided some summaries of the data on page 103 at the end of the catalog) and thus this section lacks, for example, some of the taxonomic and zoogeographical results that could be summarized and should be of interest to readers: (1) The described species show highly aggregated distribution with genera, with *Tenuipalpus* (302 species) and *Brevipalpus* (282 species) accounting for two-thirds of all the species of the family; (2) of the 34 genera, over half (18 genera) are endemic to one of the zoogeographic regions with AU showing the highest degree of endemism at the generic level (10 genera), followed by Oriental (4 genera); (3) only two genera (*Aegyptobia* and *Tenuipalpus*) are distributed in all regions. Further zoogeographical analyses of the data could have added to the value to the book.

The bulk of the book (pp. 11–103) is the catalog of genera and species by alphabetical order. For each genus, the following data are provided: valid name, author, date and page of the corresponding original description, synonyms if any, and type species. For each species, the following data are given: valid name of species, author, date and page of the corresponding original description, type locality and host, designation(s), synonyms each followed by the respective reference of its first citation, references to redescription(s) with information on the morphology of the species, and type depository. For some entries, notes are also included. Some of the important taxonomic changes are: *Rarosiella* Rimando 1996 and *Neoraoiella* Mohanasundaram 1996 were synonymized with *Raoiella* Hirst 1924; the genus *Meyeraepalpus* Smiley, Frost & Gerson 1996 was synonymized with *Aegyptobia* Sayed 1950; and three genera, *Magdalenapalpus*, *Chaudhripalpus* and *Urigersonus*, are erected.

Following the catalog, the authors proposed a protocol for future research on the Tenuipalpidae, with emphasis on how specimens are best collected and preserved for study, and also how species should be described to allow future researchers to reliably identify species.

A novel contribution of this book is the comparative morphological analysis of the family at the generic level, although this part is not immediately evident from the title of the book. The application of Grandjean's notation to the Tenuipalpidae facilitates comparison with other related families. The tabular summary of opisthosomal setae, body shape, rostral shield and number of palpal segments in exemplar species provides excellent comparisons among these taxa and is very useful for identification of genera as well.

The main part of the book concludes with an illustrated key to genera, which is very user-friendly. Notations for idiosomal setae were added to most figures. Most couplets are illustrated; the few without illustrations are quite easy to understand and require no figures. The key was tested using specimens of some common tenuipalpids in the New Zealand Arthropod Collection (Auckland), with no problems. The key is also very complete, including a genus recently described from Australia (Beard & Gerson 2009).

The book completes with a full reference list, a species index and a host index.

The authors are to be congratulated for putting this useful book together. I have no doubt that it will stimulate research on this fascinating family of phytophagous mites and facilitate the identification of these mites.

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