

ZOOTAXA

1951

**Phylogeny and systematics of the endoparasitic
astigmatid mites (Acari: Sarcoptiformes) of mammals:
families Gastronyssidae, Lemurnyssidae, and Pneumocoptidae**

ANDRE V. BOCHKOV, SVETLANA ZABLUDOVSKAYA &
BARRY M. OCONNOR



Magnolia Press
Auckland, New Zealand

Andre V. Bochkov, Svetlana Zabludovskaya & Barry M. Oconnor
Phylogeny and systematics of the endoparasitic astigmatid mites (Acari: Sarcoptiformes) of mammals: families Gastronyssidae, Lemurnyssidae, and Pneumocoptidae
(*Zootaxa* 1951)

152 pp.; 30 cm.

5 Dec. 2008

ISBN 978-1-86977-301-4 (paperback)

ISBN 978-1-86977-302-1 (Online edition)

FIRST PUBLISHED IN 2008 BY

Magnolia Press

P.O. Box 41-383

Auckland 1346

New Zealand

e-mail: zootaxa@mapress.com

<http://www.mapress.com/zootaxa/>

© 2008 Magnolia Press

All rights reserved.

No part of this publication may be reproduced, stored, transmitted or disseminated, in any form, or by any means, without prior written permission from the publisher, to whom all requests to reproduce copyright material should be directed in writing.

This authorization does not extend to any other kind of copying, by any means, in any form, and for any purpose other than private research use.

ISSN 1175-5326 (Print edition)

ISSN 1175-5334 (Online edition)



Phylogeny and systematics of the endoparasitic astigmatid mites (Acari: Sarcoptiformes) of mammals: families Gastronyssidae, Lemurnyssidae, and Pneumocoptidae

ANDRE V. BOCHKOV^{1,2}, SVETLANA ZABLUDOVSKAYA³ & BARRY M. OCONNOR²

¹Zoological Institute, Russian Academy of Sciences, Universitetskaya embankment 1, 199034 St. Petersburg, Russia.
E-mail: prostigmata@zin.ru

²Museum of Zoology, University of Michigan, 1109 Geddes Ave., Ann Arbor, Michigan 48109 USA. E-mail: bmoc@umich.edu

³Schmalghausen Institute of Zoology, National Academy of Ukraine, B. Khmelnytsky str. 15, Kiev, Ukraine

Table of contents

Abstract	4
Introduction	5
Historical summary	6
Material and methods	9
Cladistic analysis	20
Biology and host-parasite relationships of endoparasitic sarcoptoids	26
Systematics	35
Family Gastronyssidae Fain, 1959	35
Key to subfamilies of the family Gastronyssidae Fain, 1959	36
Subfamily Gastronyssinae Fain, 1959	36
Key to tribes of the subfamily Gastronyssinae Fain, 1959	36
Tribe Gastronyssini Fain, 1959	37
Tribe Rodhainyssini Fain, 1964 st. nov.	43
Key to genera of the tribe Rodhainyssini Fain, 1956	44
Genus <i>Rodhainyssus</i> Fain, 1956	44
Key to the genus <i>Rodhainyssus</i> Fain, 1956	64
Genus <i>Opsonyssus</i> Fain, 1959	65
Key to the genus <i>Opsonyssus</i> Fain, 1959	81
Genus <i>Pseudoopsonyssus</i> Bochkov et OConnor gen. nov.....	81
Key to the genus <i>Pseudoopsonyssus</i> Bochkov et OConnor, gen. nov.	88
Genus <i>Mycteronyssus</i> Fain, 1959	88
Genus <i>Eidolonyssus</i> Fain, 1967	92
Tribe Phyllostomonysini Bochkov et OConnor tr. nov.	97
Genus <i>Phyllostomonysus</i> Fain, 1970	98
Subfamily Yunkeracarinae Fain, 1964	102
Key to genera of the subfamily Yunkeracarinae Fain, 1964	102
Genus <i>Yunkeracarus</i> Fain, 1957	102
Key to females of the genus <i>Yunkeracarus</i> Fain, 1957	128
Genus <i>Sciuracarus</i> Fain, 1964	129
Key to genera of the family Lemurnyssidae Fain, 1957	131
Genus <i>Lemurnyssus</i> Fain, 1957	131
Genus <i>Mortelmansia</i> Fain, 1959	132
Key to species of the genus <i>Mortelmansia</i> Fain, 1959	142
Family Pneumocoptidae Baker, Camin, Cunliffe, Woolley et Yunker, 1958	143
Genus <i>Pneumocoptes</i> Baker, 1951	144
Key to females of the genus <i>Pneumocoptes</i> Baker, 1951	150
Acknowledgements	150
References	150

Abstract

We reconstruct the phylogenetic relationships of the mammal-associated endoparasitic mites belonging to 3 families, Gastronyssidae (42 species in 9 genera), Lemurnyssidae (4 species in 2 genera), and the monogeneric Pneumocoptidae (4 species) on the basis of maximum parsimony analysis of 120 morphological characters. In the strict consensus tree (all characters unordered and unweighted, Branch and Bound search option), these 3 families form a monophyletic group with the first dichotomy between Pneumocoptidae-Lemurnyssidae and Gastronyssidae. The node joining these families is mainly supported by setal reductions. Such regressive characters alone provide relatively weak evidence for the monophyly of the group due to a greater probability of their homoplastic origin. On the other hand, the monophyly of each family is well supported by several progressive character changes. The family Gastronyssidae splits into 2 clusters. The first cluster represents the subfamily Yunkeracarinae and the second includes the subfamilies Gastronyssinae and Rodhainyssinae. With respect to current classifications, there are 2 unexpected results in the tree: the position of the genus *Gastronyssus* Fain, 1955 (Gastronyssinae) within the core of the subfamily Rodhainyssinae and the polyphyly of the genus *Opsonyssus* Fain, 1959. The surprising placement of the genus *Gastronyssus* has the following explanation. In our data matrix, all distinctive derived character states characterizing this genus appear as autapomorphies and, therefore, do not affect the tree pattern. At the same time, these mites, being stomach parasites, exhibit the greatest degree of morphological reduction, including setae. Most of the character states shared with rodhainyssines are setal reductions and are of lesser reliability. The strict consensus of 14 trees obtained after successive weighting differs from the previous consensus tree mostly by the position of the genus *Gastronyssus*, which is the sister group to the all other rodhainyssine genera, excluding *Phyllostomonysus* Fain, 1970. The genus *Opsonyssus* remained polyphyletic. We consider the 2 clusters observable in this tree as the subfamilies Yunkeracarinae (the genera *Yunkeracarus* Fain, 1957 and *Sciuracarus* Fain, 1964) and Gastronyssinae, respectively. The latter subfamily is divided onto 3 monophyletic lineages, which we rank as tribes: two monobasic tribes, Gastronyssini and Phyllostomonysini **tr. nov.**, and the tribe Rodhainyssini **stat. nov.**, including the remaining genera, *Eidolonyssus* Fain, 1967, *Mycteronyssus* Fain, 1959, *Opsonyssus*, *Rodhainyssus* Fain, 1956, and the clade *O. striatus* Fain, 1967-*O. phyllorhina* Fain, 1959. A new genus *Pseudoopsonyssus* **gen. nov.** with species *P. phyllorhina* (Fain, 1959) **comb. nov.** (type species), *P. striatus* (Fain, 1967) **comb. nov.**, and *P. zumpti* (Fain, 1959) **comb. nov.** is established for this clade. The host-parasite associations of these endoparasitic mites are discussed, and a new hypothesis suggesting their secondary switching from the common ancestor of bats to myomorph rodents is proposed. Detailed taxonomic revisions of all 3 families based on examination of type materials are provided. Fifteen new species in 6 genera are described: *Gastronyssus philippinensis* Bochkov et OConnor **sp. nov.**, *Rodhainyssus saccopteryx* Bochkov et OConnor **sp. nov.**, *Opsonyssus pseudoindicus* Bochkov et OConnor **sp. nov.**, *O. pteropodi* Bochkov et OConnor **sp. nov.**, *O. klompeni* Bochkov et OConnor **sp. nov.**, *O. macroglossus* Bochkov et OConnor **sp. nov.**, *Mycteronyssus haplonycteri* Bochkov et OConnor **sp. nov.**, *Eidolonyssus myersi* Bochkov et OConnor **sp. nov.**, *Yunkeracarus apomys* Bochkov et OConnor **sp. nov.**, *Y. rattus* Bochkov et OConnor **sp. nov.**, *Y. limnomys* Bochkov et OConnor **sp. nov.**, *Y. lophuromys* Bochkov et OConnor **sp. nov.**, *Y. otomys* Bochkov et OConnor **sp. nov.**, *Y. hylomyscus* Bochkov et OConnor **sp. nov.**, and *Y. alticola* Zabludovskaya **sp. nov.**

Key words: endoparasitic mites, Gastronyssidae, Lemurnyssidae, Pneumocoptidae, phylogeny, systematics, mammals, bats, rodents