



Zootaxa 2585: 1–122 (2010)
www.mapress.com/zootaxa/

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Monograph

ISSN 1175-5326 (print edition)

ZOOTAXA

ISSN 1175-5334 (online edition)

ZOOTAXA

2585

Review of the European genera of Eviphididae (Acari: Mesostigmata) and the species occurring in Slovakia

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Magnolia Press
Auckland, New Zealand

Accepted by O. Seeman: 1 Jun. 2010; published: 31 Aug. 2010

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(*Zootaxa* 2585)

122 pp.; 30 cm.

31 Aug. 2010

ISBN 978-1-86977-565-0 (paperback)

ISBN 978-1-86977-566-7 (Online edition)

FIRST PUBLISHED IN 2010 BY

Magnolia Press

P.O. Box 41-383

Auckland 1346

New Zealand

e-mail: zootaxa@mapress.com

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

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ISSN 1175-5326 (Print edition)

ISSN 1175-5334 (Online edition)

Table of contents

Abstract	5
Introduction	5
Material and methods	7
Ecology of Eviphididae	9
The status of the genus <i>Iphidosoma</i>	15
Review of leg chaetotaxy in the Eviphididae	16
Review of European genera and Slovakian species of Eviphididae	19
Family Eviphididae Berlese	19
Key to the European genera of the family Eviphididae (females)	21
Key to the European genera of the family Eviphididae (males)	23
Genus <i>Alliphis</i> Halbert	24
Key to European species of the genus <i>Alliphis</i> (females)	25
Key to European species of the genus <i>Alliphis</i> (males)	26
<i>Alliphis halleri</i> (G. & R. Canestrini)	26
<i>Alliphis kargi</i> Arutunian	29
<i>Alliphis necrophilus</i> Christie	30
<i>Alliphis phoreticus</i> Mašán	32
<i>Alliphis siculus</i> (Oudemans)	33
Genus <i>Alloseius</i> Mašán & Halliday	33
<i>Alloseius pratensis</i> (Karg)	36
Genus <i>Copriphis</i> Berlese	39
Key to European species of the genus <i>Copriphis</i> (females)	42
<i>Copriphis falcinellus</i> (G. & R. Canestrini)	42
<i>Copriphis pterophilus</i> (Berlese)	42
Genus <i>Crassicheles</i> Karg	45
<i>Crassicheles striatus</i> (Berlese)	47
Genus <i>Evimirus</i> Karg	51
<i>Evimirus uropodinus</i> (Berlese)	53
Genus <i>Eviphis</i> Berlese	53
<i>Eviphis ostrinus</i> (C. L. Koch)	54
Genus <i>Halolaspis</i> Mašán & Halliday	60
<i>Halolaspis hypedon</i> Mašán & Halliday	61
Genus <i>Neocrassicheles</i> gen. nov.	63
<i>Neocrassicheles sternomus</i> sp. nov.	65
Genus <i>Pelethiphis</i> Berlese	68
Key to European species of the genus <i>Pelethiphis</i> (adults)	69
<i>Pelethiphis crinitus</i> (Berlese)	69
<i>Pelethiphis insignis</i> (Berlese)	70
<i>Pelethiphis opacus</i> Koyumdjieva	70
Genus <i>Pseudoalliphis</i> Mašán & Halliday	72
<i>Pseudoalliphis sculpturatus</i> (Karg)	72
Genus <i>Rafaphis</i> Skorupski & Błaszak	74
<i>Rafaphis microsternalis</i> Skorupski & Błaszak	74
Genus <i>Scamaphis</i> Karg	75
<i>Scamaphis equestris</i> (Berlese)	76
Genus <i>Scarabacariphis</i> Mašán	77
<i>Scarabacariphis ankavani</i> (Arutunian)	78
Genus <i>Scarabaspis</i> Womersley	79
<i>Scarabaspis inexpectatus</i> (Oudemans)	81
Genus <i>Thinoseius</i> Halbert	82
Key to European species of the genus <i>Thinoseius</i> (females)	83
Key to European species of the genus <i>Thinoseius</i> (males)	84

Key to European species of the genus <i>Thinoseius</i> (deutonymphs)	84
Genus <i>Uroiphis</i> Berlese	84
Key to European species of the genus <i>Uroiphis</i> (females)	85
Key to European species of the genus <i>Uroiphis</i> (males)	86
Key to European species of the genus <i>Uroiphis</i> (deutonymphs)	86
<i>Uroiphis greeni</i> (Evans) comb. n.	86
<i>Uroiphis montivagus</i> sp. nov.	89
<i>Uroiphis scabratus</i> Berlese	91
European species considered as incertae sedis	96
<i>Copriphis puer</i> Berlese	97
<i>Copriphis (Pelethiphis) undulatus</i> Berlese	97
<i>Iphis ciliatus</i> C. L. Koch	97
<i>Iphis hirtellus</i> Berlese	97
European taxa excluded from Eviphididae	98
<i>Ameroseius oviforme</i> Schweizer	98
<i>Copriphis orbinellus</i> Schweizer	98
<i>Eviphis gibbus</i> Berlese	98
<i>Iphidosoma</i> Berlese	98
<i>Iphidosoma fimetarium</i> (Müller).....	98
<i>Iphidosoma multiclavatum</i> Willmann	99
<i>Iphidosoma ovatum</i> Berlese	99
<i>Iphidosoma physogastris</i> Karg	99
<i>Iphidosoma razumovae</i> Bregetova.....	99
<i>Pelethiphis anoxiae</i> Koyumdjieva	99
Taxonomic summary	99
Acknowledgements	101
References	102
Appendix (Collecting localities)	112

Abstract

The study presents a review of the European fauna of Eviphididae (Acari: Mesostigmata), based on over 4,000 specimens, including type specimens in the Berlese Acaroteca, Florence. The European fauna is shown to include 29 species in 16 genera. These genera are reviewed, and a key provided for their identification. The fauna of Slovakia includes 14 genera and 19 species. These species are reviewed, and keys are provided for their identification. The European fauna includes the genera *Alliphis* Halbert 1923, *Alloseius* Mašán & Halliday 2009a, *Copriphis* Berlese 1910, *Crassicheles* Karg 1963, *Evimirus* Karg 1963, *Eviphis* Berlese 1903, *Halolaspis* Mašán & Halliday 2009a, *Neocrassicheles* **gen. nov.**, *Pelethiphis* Berlese 1911, *Pseudoalliphis* Mašán & Halliday 2009a, *Rafaphis* Skorupski & Błaszak 1997, *Scamaphis* Karg 1976, *Scarabacariphis* Mašán 1994a, *Scarabaspis* Womersley 1956, *Thinoseius* Halbert 1920 and *Uroiphis* Berlese 1903. All of these genera except *Evimirus* and *Thinoseius* occur in Slovakia.

The genus *Uroiphis* Berlese 1903, with type species *Uroiphis scabratus* Berlese 1903 (= *Eviphis holsaticus* Willmann 1937), is considered to be a valid genus, and is removed from synonymy with *Eviphis*. The new taxa described here are *Neocrassicheles* **gen. nov.**, with type species *Neocrassicheles sternomus* **sp. nov.**, and *Uroiphis montivagus* **sp. nov.** The previously unknown adult female of *Crassicheles striatus* (Berlese 1903) and male of *Uroiphis scabratus* Berlese 1903 are described for the first time.

The following new synonymies are proposed: *Alliphis brevisternalis* Ma & Wang 1998 and *Alliphis yinchuanensis* Gu & Bai 1997 are synonyms of *Alliphis necrophilus* Christie 1983; *Alliphis hirschmanni* Arutunian 1991 is a synonym of *Alliphis scarabaeorum* Ogandzhanyan 1969; *Alliphis montanus* Koroleva 1968, *Alliphis rotundianalis* Mašán 1994a and *Scarabaspis altaicus* Sklyar 1999 are synonyms of *Alloseius pratensis* (Karg 1965); *Hypoaspis evansi* Arutunian 1993 is a synonym of *Scamaphis equestris* (Berlese 1911); *Iphidoides concentricus* Oudemans 1904 is a synonym of *Uroiphis striatus* Berlese 1903; *Eviphis holsaticus* Willmann 1937 and *Iphidosoma bennwili* Schweizer 1961 are synonyms of *Uroiphis scabratus* Berlese 1903; *Scarabacariphis grandisternalis* Mašán 1994a is a synonym of *Scarabacariphis ankavani* (Arutunian 1992); *Bactriphis Athias-Henriot* 1980 is a synonym of *Uroiphis* Berlese 1903. The male and deutonymphal paratypes of *Alliphis stenosternus* Gu & Liu 1996 are misidentified specimens of *Alloseius pratensis* (Karg 1965).

One genus and three species are reported from Slovakia for the first time: *Alliphis kargi* Arutunian 1991, *Rafaphis* with *Rafaphis microsternalis* Skorupski & Błaszak 1997, and *Uroiphis greeni* (Evans 1980). *Alliphis* and *Uroiphis* are represented in Slovakia by several species each; all other genera in Slovakia are represented by single species. The external morphology and ecology of the European genera and Slovakian species are reviewed. Most of the species are coprophilous and associated with coprophilous insects; a complete list of their phoretic associations is given. The eviphidid species occurring in Slovakia can be classified into three general ecological groups and five subgroups: (A) edaphic detriticoles, with four species; (B) saprophilous detriticoles, with five species, subdivided into (B1) non-specialised coprophiles, with one species, and (B2) specialised coprophiles, with four species; (C) insecticoles, with nine species, subdivided into (C1) non-specialised insecticoles, with three species, and (C2) specialised insecticoles, with six species. *Uroiphis montivagus* **sp. nov.** is not classified ecologically because it is only known from two specimens.

Some species that occur in very fresh wet dung or very humid habitats (*Alloseius pratensis*, *Crassicheles striatus*, *Neocrassicheles sternomus* **sp. nov.**), have a specific morphological adaptation consisting of elongate pointed lateral lobes on pulvilli II–IV in the non-phoretic female. An elongation of some components of the pulvillus also occurs in some strongly hygrophilous Blattisociidae, and the modified pulvillus appears to facilitate the mite's movement in semi-aquatic substrates.

Key words: Acari, Mesostigmata, Eviphididae, taxonomy, dung beetle, Scarabaeidae, phoresy, Slovakia

Introduction

The family Eviphididae is a cosmopolitan group of predatory soil mites that display a wide range of ecology and behaviour. They are abundant in various types of habitats, including stable and continuous microhabitats in soil and leaf litter, as well as temporally and spatially isolated patches of resources such as dung and carrion. The family includes a range of insecticolous species that have intimate associations with scarab beetles and other arthropods, including some that inhabit the subelytral cavity of their hosts and breed in their subterranean nesting chambers. Phoresy on flying insects is a very important part of the life history strategy of these mites, and ensures the continued existence of species that occur in ephemeral and scattered habitats.