A NEW SPECIES OF THE GENUS *ISOMIRA* MULSANT, 1856 FROM CYPRUS (INSECTA: COLEOPTERA: TENEBRIONIDAE)

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**Abstract.**— A new species of the genus *Isomira* Mulsant, 1856, *I. aliquoi* sp. nov., is described from the island of Cyprus. It is compared to all its relatives of the Eastern Mediterranean Basin.

**Key words.**— Coleoptera, Tenebrionidae, Alleculinae, *Isomira aliquoi*, new species, Cyprus.

**INTRODUCTION**

*Isomira* Mulsant, 1856 is a widely distributed genus within the Palaearctic region, from Morocco to Japan, with about 71 species into 6 subgenera (Novak and Pettersson 2008). Most of the species occur in Mediterranean Europe and the Caucasus. The genus *Isomira* has been relatively well studied compared to most of genera of Alleculinae.

Seidlitz (1896) has been the first to revise the whole genus. After him, some comparatively recent monographs deal with various regions of the Palaearctic area: Hölzel (1958) for *Isomira* of Central Europe, Weise (1974) for European and Mediterranean species, Iablokoff-Khnzorian (1976) for Caucasian species and Dubrovina (1982) for *Isomira* of the former USSR. Some taxonomic papers complete these significant works: Bonadona (1979) and Bouyon (2002).

None *Isomira* had been recorded from Cyprus yet. The study of numerous specimens from several localities of this island reveals that the genus is at least represented in Cyprus by a vicariant new species described below.

**MATERIAL AND METHODS**

**Studied material**

Voucher specimens have been taken from the following collections:
– Institutional collection: Muséum d’Histoire Naturelle, Nice (France);
– Private collections: Hervé Brustel, Clermont-le-Fort (France); Manfred Egger, Wattens (Austria); Jean-Michel Lemaire, Nice (France).

**Preparation of specimens**

Specimens have been cleaned before identification, in order to be able to study cuticle and pilosity of pronotum and elytra accurately. These have been soaked for 24 hours in a solution of 5% detergent and 95% water and cleaned with a supple paint-brush.

Male genitalia (aedeagus) have been extracted from the last abdominal segment, cleaned with a solution of detergent and water (see above) and glued on a small white card, dorsal or lateral side visible.
The ladybird genus *Sticholotis* Crotch, 1874 originally described from Japan, is the largest genus of Sticholotidini with about 70 described and many more undescribed species, mostly occurring in the Oriental Region (Miyatake 1994). The genus lacks a modern taxonomical revision, and most of the species are known only from the original descriptions, mostly from the late 19th century. Ślipiński (2004, 2007) redescribed the genus and revised the Austral-ian species; recent further descriptions of regional *Sticholotis* species were provided by Poorani and Booth (2006) and Tomaszewska and Łączyński (in press).

*Sticholotis ruficeps* Weise, 1902 was described from Malaysia and redescribed and illustrated by Bie-lawski (1960) based on the type series. Later Chapin (1965), Pung and Mao (1979) and Hoang (1982) recorded its broader distribution in Asia and the Pacific. According to Leeper (1976) this species (misidentified as *S. punctata* Crotch, 1874) was introduced to Hawaii from China and Japan, where it was established feeding on *Eriococcus araucariae* Maskell, 1879 (Eriococidae, Hemiptera) and *Pinnaspis buxi* (Bouche, 1851) (Diaspididae, Hemiptera).

Chazeau et al. (1974) redescribed *Sticholotis madagassa* Weise, 1909 and since then it was recorded as a predator of the sugarcane scale *Aulacaspis tegalensis* (Zehntner, 1898) (Diaspididae, Hemiptera) in Mauritius (Réunion Islands) and Tanzania (Williams and Greathed 1990). Recently it was suggested (Poorani 2002) that *S. madagassa* could be a junior synonym of *S. transversa* (Motschulsky, 1866) from India.

This species, recorded as *S. ruficeps* or *S. madagassa*, has been used in biocontrol programs against various scale insects and it is here recorded from USA (Hawaii), Guadeloupe, Madagascar, Mascarene and Mauritius (Réunion Islands), Singapore, Indonesia, New Caledonia, Australia (Christmas and Cocos-Keeling Islands) and Cook Islands.

**STICHOLOTIS RUFICEPS** WEISE: NEW SYNONYMIES AND DESCRIPTION OF ITS MATURE LARVA (COLEOPTERA: COCCINELLIDAE: STICHOLOTIDINI)

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Abstract.— The adult and larval stages of a scale insect predator, *Sticholotis ruficeps* Weise, 1902 are described and illustrated. *Sticholotis madagassa* Weise, 1909 and *Mesopilo soufrierensis* Duverger, 2001 are synonyms of *S. ruficeps* (new synonyms). *S. ruficeps* has been used in biocontrol programs against various scale insects and it is here recorded from USA (Hawaii), Guadeloupe, Madagascar, Mascarene and Mauritius (Réunion Islands), Singapore, Indonesia, New Caledonia, Australia (Christmas and Cocos-Keeling Islands) and Cook Islands.

Key words.— biological control, Coccinellidae, Hemiptera, introduced species, larvae, scale insects, Sticholotidini, taxonomy.

INTRODUCTION

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INTRODUCTION

The genus *Chujochilus* (Coelocentra: Chilocorini) was erected by Sasaji (2005) with *Exochomus isensis* Kamiya, 1966 from Honshu, Japan as the type-species. *E. isensis* was originally described by Kamiya as a new species of the genus *Exochomus* Redtenbacher, 1843 and was subsequently transferred to the genus *Arawana* Leng, 1908 by the same author, as Sasaji (1971). Kovář (1995) argued that *A. isensis* was separable from the Neartic species of *Arawana* at the generic level by comparing the form of pronotum, the first visible abdominal sternum, cuticular structures and other characters of the American representatives of the genus *Arawana*, but he did not give the detailed treatment of this problem and did not take any actions to recognize them as separate. Sasaji (2005) adopted Kovář’s opinion and erected a new monotypic genus for *isensis*: *Chujochilus*. This genus is distinguished from *Arawana* by 9-segmented antennae and lacking finger-like processes at the parameres of the tegmen.

The genus *Chujochilus* was monotypic until recently. In this paper two new species, collected by the authors from China are described. A diagnosis of the genus and a key to the known species are also given.

MATERIALS AND METHODS

The specimens examined were collected from China. All materials were preserved in 85% ethanol. External morphology was observed with a dissecting stereoscope (Zeiss Stemi 2000-cs). The measurements made with an ocular micrometer are as follows: Length from apical margin of clypeus to apex of elytra (TL); width across both elytra at widest part (TW); height at highest elytral part (TH); head width at widest part (HW); pronotal length at longest part (PL); pronotal width at widest part (PW); elytral length along suture, including scutellum (EL); elytral width across both elytra at widest part (EW). Male and female genitalia were dissected, cleared in 10% solution of KOH by boiling for several minutes, and examined with an Olympus BX51 compound microscope.

Images were photographed with digital cameras (Qimagin 5.0 RTV and Coolsnap-ProCf & CRI Micro* Color), connected to the dissecting microscope. The software Image-Pro Plus 5.1 was used to capture images from both cameras, and photos were cleaned up and laid out in plates with Adobe Photoshop CS 8.0.

Type specimens designated in the present paper are deposited at the Department of Entomology, South
NEW AND LITTLE KNOWN SPECIES OF THE TRIBE MEGAPENTHINI GURJEVA, 1973 (COLEOPTERA: ELATERIDAE) FROM SULAWESI

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Abstract.— Eight new species of the tribe Megapenthini from the Indonesian island Sulawesi are described and illustrated: Abelater bosi sp. nov., A. buechei sp. nov., A. dongalaensis sp. nov., A. jakubi sp. nov., Cateanus sulawesiensis sp. nov., Friedrichiellus bosi sp. nov., Simodactylus suetosus sp. nov., and Xanthopenthes dongalaensis sp. nov. New records of further eight species of the tribe Megapenthini from Sulawesi are given. Abelater brandti Schimmel, 2004, and A. jaecki Schimmel, 2004 are recorded from this island for the first time.

Key words.— Coleoptera, Elateridae, Megapenthini, new species, distribution, Sulawesi.

INTRODUCTION

Through our colleague, Mr. B. Büche (Berlin) we kindly received material of the tribe Megapenthini Gurjeva, 1973 (Elateridae) for determination, which has been collected in the years 2003 to 2005 on Sulawesi. This material was collected by Dr. M. M. Bos (currently Stuttgart) in cacao plantations and primary forests of Central Sulawesi, mostly by fogging under the tree canopy. Fogging seems to be an efficient method for collecting epixylous Elateridae such as Megapenthini. All species available for study belong to this tribe, and some of them represent new species, which are described here. Further species are recorded from Sulawesi for the first time, or the records confirm the current the previously published data on distribution of species from this island. From this point of view, the given data increase our knowledge on the distribution of the several genera of the tribe Megapenthini from Southeast Asia.

ABBREVIATIONS AND METHODS

The following abbreviations have been used in this study:

CSV – Coll. Schimmel, Vinningen, Germany;
CTW – Coll. Tarnawski, Wrocław, Poland.

The specimens were examined using a ZEISS Stemi 2000-C binocular microscope with a micron insert. Photographs were taken with a NIKON E4500 camera with a TV2/3°C 0.63x adaptor to the microscope. Body length of the specimens was measured from posterior margin of frons up to apex of elytra, and body width along basis angles of pronotum, using the micron insert of the binocular. The examined specimens were fixed on white pasteboard. The male genitalia were pulled out of the abdomen, cleaned and glued beside the body.
REMARKS ON THE GENUS PSEUDAORIA JACOBY, 1908
WITH DESCRIPTION OF A NEW SPECIES FROM CHINA
(CHRYSOMELIDAE: EUMOLPINAE)

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Abstract.—The paper contains some remarks on the genus Pseudoaoria Jacoby, 1908; a key to determining of all known species and the description of a new species Pseudoaoria petri sp. nov. from Sichuan.

Key words.—Coleoptera, Chrysomelidae, Eumolpinae, Pseudoaoria, key to species, new species, Southeast Asia.

INTRODUCTION

The genus Pseudoaoria was created by Martin Jacoby (1908) for two new described species from Manipur (E India) and neighboring territory of Birmania. Main features characterizing this genus are: claws bifid, pronotum without lateral margin, fore margin of proepisterna concave, elytra sparsely covered by relatively long, stiff, suberect hairs. General outline of body in dorsal view as in Aoria Baly, 1863, elytra much wider at base than pronotum, narrowed posteriorly. Legs long, femora more or less thickened, antennae thin, eyes strongly protruding. From Aoria differing by narrowed, not transverse but rather subquadrate prosternum, longer legs and the sparse, suberect hairs on elytra. In two first described species burmanica Jacoby, 1908 and caerulea Jacoby 1908 surface of elytra is covered by rather strong rugosities or callosities. The mentioned characteristic was introduced in the original diagnosis of Pseudoaoria and later used by some authors in keys to genera of the subfamily Eumolpinae. However, not in all Pseudoaoria species elytra are covered by unevenness, therefore this character should be removed from diagnosis of the genus.

In year 2005 I obtained in exchange from prof. Yoshiaki Komiya (Tokyo) about 120 specimens of Chrysomelidae collected in the mountains Emeishan (Sichuan), in great part dammaged and shortly labelled (China, Szechwan, Emei-Shan, July, 2003, without the name of collector). In this material I found two specimens (male and female) of a Pseudoaoria unknown to me, but I could not decide on descriptions of a new species, because the specimens were rather differently coloured. Newly I obtained to examine material collected by Mr. Andreas Pütz (Eisenhüttenstadt, Germany) in Sichuan; in this material I found three further females of the same species. Description of new species is given below.

Key to species

1. In male abdomen with a pair of brushes of dark yellow hairs .................................................. 2
—. In both sexes abdomen without hair brushes ....... 3
2. Hair brushes on abdomen situated on sternite 3. Legs black. Body reddish-brown to black. Antennae black except for the antennomere 11 being paler and the antennomeres 1–4 partly brownish. Smaller, length 5.2–6.5 mm. Aedeagus and spermatheca not studied. Described from mountains Henghuan in Qinghai-Xizang plateau, China ........... ............................ floccosa Tan, 1992
INTRODUCTION

Pic described the genus *Calvarium* in 1918 to accommodate two peculiar Afrotropical species that he believed to be related to *Microcara* Thomson. In subsequent studies by Pic, few new Afrotropical taxa were added. No species were described in *Calvarium* after 1955. Apart from studies by Pic, the name *Calvarium* has appeared only in Ruta (2009).

After detailed studies of the types of species described by Pic and comparing them with other taxa, it has become evident to me, that several species closely related to *Calvarium* were subsequently described from the Oriental region in *Cyphon* Paykull. Moreover, *Calvarium* seemed to be closely allied to *Indiocyphon* Pic, redescribed recently by Klausnitzer (2006a).

In the present paper my morphological studies on the genus *Calvarium* are summarised, the genus is redescribed, morphological characters are evaluated and new combinations are proposed for species in *Indiocyphon* and the *Cyphon hashimotorum* species group. Subsequent parts of the revision will cover taxonomic revision of Afrotropical and Oriental taxa.

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Abstract.— The genus *Calvarium* Pic is redescribed and morphological characters discussed. A catalogue of the world species is presented and several new combinations are proposed. *Indiocyphon* Pic is regarded as a junior synonym of *Calvarium* Pic. *Calvarium maxi* Pic is designated the type species of *Calvarium* Pic. *Calvarium inimpressum* Pic, 1955 and *Calvarium semiobseurum concoloripenne* Pic, 1953 are junior synonyms of *Calvarium latithorax* (Pic, 1950). Several species are transferred from *Cyphon* to *Calvarium: Calvarium carolinense* (Blair) comb. nov., *C. cautum* (Klausnitzer) comb. nov., *C. dentatum* (Klausnitzer) comb. nov., *C. fouchi* (Pic) comb. nov., *C. fouqueti* (Pic) comb. nov., *C. gredleri* (Klausnitzer) comb. nov., *C. hashimotorum* (Yoshitomi) comb. nov., *C. johorense* (Yoshitomi et Satô) comb. nov., *C. latithorax* (Pic) comb. nov., *C. longior* (Yoshitomi et Satô) comb. nov., *C. notabile* (Yoshitomi et Satô) comb. nov., *C. paui* (Pic) comb. nov., *C. primitum* (Klausnitzer) comb. nov., *C. rotundatum* (Klausnitzer) comb. nov., *C. samuelsoni* (Yoshitomi et Satô) comb. nov., *C. sulavesicem* (Yoshitomi et Satô) comb. nov., *C. takahashii* (Yoshitomi et Satô) comb. nov. Two species are transferred from *Calvarium* to *Cyphon: Cyphon massarti* (Pic) comb. nov. and *C. semiobseurum* (Pic) comb. nov.

Key words.— Coleoptera, Scirtidae, *Calvarium*, *Indiocyphon*, *Cyphon hashimotorum* species group, redescription, new combinations.
INTRODUCTION

Up to the present, 47 species and subspecies of the genus *Nazeris* Fauvel (1873) have become known from China. Among them, 3 were described from Zhejiang Prov. (Koch 1939, Ito 1996); 20 from Taiwan Prov. (Ito 1985, 1995, 1996); 9 from Yunnan Prov. (Watanabe and Xiao 1993, 1997, 2000); 8 from Sichuan Prov. (Zheng 1992, Hu *et al.* 2007); 1 from Guizhou Prov. (Hu *et al.* 2005); 2 from Jiangxi Prov. (Hu *et al.* 2006); 2 from Xizang Municipality (Hu *et al.* 2008); 2 from Anhui Prov. (Hu *et al.* 2009). No species of *Nazeris* has hitherto been described from Fujian Prov. The collecting efforts during two expeditions to Meihuashan Nature Reserve in 2007 and 2008 brought the discoveries of two *Nazeris* species which were unknown to science, described here as *N. fujianensis* sp. nov. and *N. xuwangi* sp. nov. The male sexual characters are described and illustrated.

METHODS

The specimens were collected from decaying leaf litter of forest floors by hand sifting. They were killed with ethyl acetate and dried. To examine the male genitalia, the last four abdominal segments were detached from the body after softening in hot water. The aedeagus and male abdominal sternites were mounted in Euparal on plastic slides. The habitus photos were taken with a Canon 40D camera. The photos of the sternites and aedeagi were taken with a Canon G9 camera mounted on an Olympus SZ61 stereoscope. The drawings were made by using Adobe Illustrator CS2.

MEASUREMENTS

Body length – measured from anterior margin of labrum to end of abdomen;
Forebody length – measured from anterior margin of labrum to elytral apices;
Eye length – longitudinal length of eye in dorsal view;
Postocular length – length of postocular portion in dorsal view;
Head width – width of head across eyes;
Pronotum width – width of pronotum across the widest part;
Elytra width – width of elytra across the widest part;
NOTES ON THE TAXONOMY AND BIOLOGY OF SMARIDIDAE (ACARI: PROSTIGMATA: PARASITENGONA)

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Abstract.— Rearing of larvae from eggs deposited by adults in laboratory proved Pilosoma pluto Southcott, 1961 (based on larva) and Fessonia papillosa (Hermann, 1804) (based on adult) to be conspecific. Clipeosoma Southcott, 1961 (larva) and Hirstiosoma (Berlese, 1887) (adult) are congeneric. The validity of Hirstiosoma latreillei (Grandjean, 1947) is confirmed, the larva of Hirstiosoma ampulligera Berlese, 1887 is described for the first time. Data on egg development and nutrition of postlarval instars are provided. Causal reasoning for the exclusion of Phanolophinae from Smarididae is provided.

Key words.— Taxonomy, life cycle, diapause, Erythraeidea, Phanolophus, Hirstiosoma, Fessonia, Clipeosoma, Pilosoma.

INTRODUCTION

The family Smarididae is distributed worldwide except Antarctica and includes the two subfamilies Smaridinae and Hirstiosomatinae (Southcott 1961, 1963, 1995, Beron 2008). The monotypic family Phanolophinae originally included in Smarididae was transferred to Erythraeidae in the phylogenetic analysis of Welbourn (1991); however, no causal reasoning for this decision is provided in the publication. Only two of the eleven valid genera of Smarididae (Tab. 1) are known for both, the heteromorphic larva and postlarval instars – actually for only two species correlations of instars through laboratory rearing has been done. The remaining genera are either known solely for postlarval instars or for the larva. Correlations of larva and postlarval instars proposed for some species by Grandjean (1947) based on common appearance in natural habitats were rejected by Southcott (1961) with reference to the inappropriate methodology applied.


The present investigation aimed to evaluate European species of Smarididae and to correlate larvae with postlarval instars of European Smarididae by means of laboratory rearing. Moreover, Phanolophus oedipodarum (Frauenfeld, 1868) has been examined in order to evaluate its relationships within the Erythraeidea.

MATERIAL AND METHODS

Postlarval Phanolophus oedipodarum were collected in A) Mallorca (Balearic Islands) by R. Olomski in May 1995, B) Abd al Kuri (Republic of Yemen) by W. Wranik in February 2000, and C) close to the River Mosel (Germany) by H.-B. Schikora during April–July 2004. Adults of Fessonia papillosa were captured in A) Italy (Liguria, Lucinasco) by G. Sieber in September 1996, and B) Southeast France at various localities by G. Sieber and B. Hagens in June 1991. Larvae were reared from eggs deposited by B) females in
A NEW SPECIES OF PTYCTIMOUS MITE (ACARI: ORIBATIDA: EUPHTHIRACARIDAE) WITH NOTES ABOUT SOME KNOWN SPECIES

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ABSTRACT.— One new species of the ptyctimous mite Microtritia pinarensis sp. nov. is described from Cuba. Some morphological notes about some known species – Mesotritia maerkeli Sheals, 1965, Mesotritia nova Starý, 1992, Indotritia nuda Mahunka, 1988, Euphthiracarus (Poesia) microseta (Starý, 1993) and Microtritia glabrata Starý, 1993 – are given.

KEY WORDS.— Oribatid, ptyctimous mites, new species, taxonomy, morphology.

INTRODUCTION

In comparison with some other parts of the Neotropical Region, oribatid mite fauna of Cuba is poorly known but shows high level of endemism. Prof. J. Rusek, well-known specialist on ecology and taxonomy of Apterygota, has visited Cuba in the years 1979–81 and collected large material of soil microarthropods, including many ptyctimous oribatid mites. First results concerning taxonomy of mites superfamily Euphthiracaroidea based on mentioned material were published by Starý (1992b, 1993b). The genus Microtritia was erected by Märkel (1964) with Phthiracarus minimus Berlese, 1904 as type species. In total 16 species of the genus Microtritia were described from all parts of the World so far, except of Antarctica, sub-Antarctic islands and Arctic tundra (Subías 2009). Seven species were recorded from Neotropical Region and three of them (Microtritia tropica Märkel, 1964, M. incisa Märkel, 1964, and Microtritia glabrata Starý, 1993) were found in Cuban soils (Starý 1993b, Niedbała 2008). Description of another new species, Microtritia pinarensis sp. nov., and redescription, synonymy and taxonomical notes on several other euphthiracaroid mites are subject of this contribution. Type material is deposited in the Department of Animal Taxonomy and Ecology, Poznań, Poland (DATE) and in Institute of Soil Biology BC ASCR, České Budějovice, Czech Republic (ISB).

MATERIAL AND METHODS

The mite specimens were preserved in alcohol before identification and then were mounted and cleared in slides with 80% lactic acid, then were mounted to slides with glycerol. Observations, measurements and illustrations were made using a standard light microscope equipped with a drawing attachment. All measurements are given in micrometers. The terminology is based on that of Niedbała (2000).
INTRODUCTION

Plateremaeoidea and Gymnodamaeoidea (Acari: Oribatida) are closely related oribatid mite superfamilies that are similar morphologically. Collectively these superfamilies comprise more than 200 species (Subías 2004). However, juvenile stages have been studied in a small number of species (Grandjean 1928, 1953, 1964; Covarrubias 1968; Fernández 1990; Eguaras et al. 1990; Bayartogtokh and Schatz 2009; Ermilov and Lochynska 2010).

The purpose of the present work is to describe and illustrate morphology of all juvenile stages of Pedrocortesella africana Pletzen, 1963 (Plateremaeoidea, Pedrocortesellidae) and Aleurodamaeus africanus Mahunka, 1984 (Gymnodamaeoidea, Aleurodamaeidae). Adults of these species were described by Pletzen, 1963 and Mahunka, 1984, accordingly. Both species are distributed in the African region.

The genus Pedrocortesella Hammer, 1961 comprises 36 species (Subías 2004). Juvenile stages
TWO NEW SPECIES OF ORIBATID MITES (ACARI: ORIBATIDA) FROM ETHIOPIA

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Abstract.— We described Machadobelba shtanchaevae sp. nov. and Microtegeus khaustovi sp. nov., collected in Bale Mountains National Park (Africa, Ethiopia). The first new species is similar to Machadobelba symmetrica Balogh, 1958 (Distribution: Africa, Congo) and to Machadobelba ceplonica Balogh, 1970 (Asia, Sri Lanka), but differs from the former species by body size, length of costulae and length of notogastral setae, and from the latter species by body size, morphology of cristae and position of adanal setae ad. Microtegeus khaustovi sp. nov. is similar to Microtegeus variabilis Mahunka, 1988 (Africa, Tanzania) and Microtegeus rugosus Mahunka, 1982 (Africa, Ethiopia), but differs from the former species by body size, number of prodorsal tubercles, length of notogastral setae c, and morphology of the notogaster; from the latter species it differs by morphology of lamellar setae, the number of prodorsal tubercles, and morphology of the notogaster.

Key words.— Oribatid mites, new species, Machadobelbidae, Microtegeidae, Machadobelba shtanchaevae, Microtegeus khaustovi, Ethiopia.

INTRODUCTION

In the course of taxonomic studies of oribatid mite fauna of Bale Mountains National Park (Ethiopia, African region) we have found new species in the genera Machadobelba Balogh, 1958 (Machadobelbidae) and Microtegeus Berlese, 1916 (Microtegeidae), which are described below.

The pantropical genus Machadobelba comprises 15 species; three species of this genus are known from Africa: M. dispar Balogh, 1958 (Distribution: Congo, Ghana), M. symmetrica Balogh, 1958 (Congo), M. tanzica Mahunka, 1988 (Tanzania). The pantropical genus Microtegeus comprises 31 species; seven species of which are known from continental Africa: M. alzaveri Pérez-Íñigo, 1958 (Guinea Equatorial), M. cervus Mahunka, 1983 (Tanzania), M. papillosus Mahunka, 1984 (Tanzania), M. quadrisetosus Balogh et Mahunka, 1977 (Congo), M. rugosus Mahunka, 1982 (Ethiopia), M. undulatus (Berlese, 1916) (Somalia, Tanzania), M. variabilis Mahunka, 1988 (Tanzania) (Subías, 2004). Distinctive morphological characters of African species of Machadobelba and Microtegeus were given in the keys of Balogh and Balogh (2002).
A NEW DATA ON BIOLOGY AND TAXONOMY OF
NEOTROMBICULA INOPINATA (OUDEMANS, 1909) AND
LEPTOTROMBIDIDUM RUSSICUM (OUDEMANS, 1902)
(ACARI: ACTINOTRICHIDA: TROMBICULIDAE)

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Abstract.— The results of experimental rearing of Neotrombicula inopinata and
Leptotrombidium russicum and of field studies aiming at finding the hitherto unknown
habitats occupied by active postlarval forms are presented. Diagnoses of deutonymphs
reared from field-collected larvae of both species are provided. Literature interpretation of
deutonymph of N. inopinata is inconsistent with the characteristics of deutonymph of
N. inopinata obtained from larvae by experimental rearing. Larvae of L. russicum and
L. silvaticum can be separated only on the base of host spectrum. Considering the biology
of the parasite and host species, it is likely that postlarval forms of bat-parasitizing species
may be confined to tree and cave habitats, whereas those species that are known as
parasites of rodents inhabit the soil habitats.

Key words.— Parasitengona, systematics, deutonymphs, hosts, parasitism, life cycle.

INTRODUCTION

Eighteen species of Trombiculidae (s. Kudryashova 1998) have been hitherto recorded from Poland (Mąkol and Gabryś 2008), whereas ca. 270 are known from Russia and the neighboring countries (Womersley 1952, Daniel 1961a, Kudryashova 1998, Stekolnikov 1999, 2001, 2004, 2008, Kaluż 2008). Of the Polish fauna – only five species, i.e. Hirsutiella zachvatkini (Shluger, 1948), Neotrombicula autumnalis (Shaw, 1790), N. talmiensis (Shluger, 1955), N. inopinata (Oudemans, 1909), and Leptotrombidium russicum (Oudemans, 1902) have been known from larvae and postlarval forms, whereas as many as 13 – exclusively from larvae (op. cit.). Such disproportion results from the heteromorphic character of larvae in relation to active postlarval forms. Generally, greater attention has been paid to parasitic larvae that are associated with vertebrates, including humans (with the exception of single records related to other hosts, i.e.
MYRMECOPHILOUS PARASITENGONA (ACARI: PROSTIGMATA) – ACCIDENT OR ADAPTATION?

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Abstract.— Hitherto data on ecological relations between terrestrial Parasitengona mites and ants are summarized and supplemented with the characteristics of two observed cases, which confirm the specific feeding adaptations of some Erythraeidae. Altogether, 21 species representing six Parasitengona families have been recorded as displaying permanent, temporary or accidental relationship with ants. Of those only the parasitic larvae of Forania mentonensis (André, 1929), F. sendrai Mayoral et Barranco, 2010, Makolia crimeaensis Saboori, Khaustov et Hakimitabar, 2009, Leptus clarki Southcott, 1989 and L. debeauforti (Oudemans, 1905) may be regarded as specialists. The verified diagnosis of M. crimeaensis, based on the material originating from Crimea (Ukraine) is proposed.

Key words.— Parasitengona, Formicidae, ecological relationship, host specificity.

INTRODUCTION

Larvae of Parasitengona mites (Acari, Trombidiiformes, Prostigmata) are regarded as protelean parasites and, except vast majority of species assigned to Trombiculidae, parasitize invertebrates. A few members of the group (e.g. Balaustium, some Johnstoniana and Abrolophus) secondarily returned to the predatory life style. Active postlarval forms, with the exception of few representatives of Balaustium (Erythraeidae), which feed on pollen, are predacious (Wohltmann 2000).

Parasitic, predatory as well as of unknown nature relations between Parasitengona terrestria and ants (Hymenoptera: Formicidae) have been occasionally mentioned in the literature. Parasitizing larvae of Parasitengona are usually found on more than one host species and the feeding spectrum of postlarval forms seems to go beyond the members of one species, genus or even family, recognized as prey. Most of the discussed cases (Morikawa 1963, Moss 1960, Wohltmann and Mąkol 2009, Wohltmann 1996) apply to species, which in all likelihood should be regarded as feeding opportunists, however their food spectrum and host range may be still more or less restricted. Only few cases (André 1929, 1930b, Mayoral and Barranco 2010, Oudemans 1905, Saboori et al. 2009, Southcott 1989) point to the possible presence of highly specialized myrmecophiles within terrestrial Parasitengona mites.

Our aim is to summarize the hitherto data on ecological relations between terrestrial Parasitengona mites and ants. Here we present characteristics of two observed cases, which confirm various feeding adaptations existing within this group of mites. A complementary data to the diagnosis of Makolia crimeaensis, based on the material originating from Crimea are given.
A REDESCRIPTION OF Balaustium murorum (HERMANN, 1804) (ACARI: PROSTIGMATA: ERYTHRAEIDAE) WITH NOTES ON RELATED TAXA

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Abstract.—Balaustium murorum (Hermann, 1804) is redescribed. Characteristics of active postlarval forms and first characteristics of larvae, supplemented with data on biology of the species, are provided. Female of B. murorum, from which larvae were obtained by experimental rearing, has been designated as neotype. Key characters, hitherto used by different authors in order to distinguish between members of Balaustium are discussed. Seventeen species known from larvae are presently assigned to Balaustium, at the total number of 41 members of the genus known worldwide.

Key words.—Acarology, Parasitengona, taxonomy, biology, Balaustium.

INTRODUCTION

Balaustium (Acari: Erythraeoidea: Balaustiinae), a genus of worldwide distribution comprises 41 species, of which 25 have been hitherto known from postlarval forms, 13 from larvae and only three from both (Beron 2008, Mayoral and Barranco 2009). Members of Balaustium, known from all active instars are B. kendalli Welbourn, 1991, of which larval-ve were obtained under laboratory conditions from field collected female, and also B. cristatum Meyer et Ryke, 1959 and B. zhangi Saboori, 2001, for which the correlation between larvae and postlarval forms was made based on field data (Meyer and Ryke 1959, Saboori 2001, Welbourn and Jennings 1991). Larvae of another species, B. putmani Smiley, 1968 were obtained by experimental rearing (Cadogan and Laing 1977), however their description has not been published.

Twenty five nominal species of Balaustium have been recorded from the Palaearctic region (Beron 2008, Mayoral and Barranco 2009). Of those, only B. zhangi has been hitherto known from larvae and postlarval forms.

Balaustium murorum (Hermann, 1804), a type species of Balaustium is widely distributed in the Western Palaearctic. A broad account on taxonomic history of the species has been provided by Southcott (1961).

The present paper contains the first description of larva of B. murorum obtained by experimental rearing from field-born female. A characteristics of adults is provided. Specimens representing the postlarval forms, including the female, from which larvae were obtained by experimental rearing, were assigned to B. murorum on the basis of characteristics provided by Gabryś (2000). All indicates that the type material of B. murorum has been lost (v. Grandjean 1947), hence the neotype designation.
First description of the larva of *Trischidothrombium* Feider, 1952 (Acari: Actinotrichida: Microtrombidiidae)

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Abstract.— *Trischidothrombium discrepans* (Willmann, 1950) is redescribed basing on postlarval instars. The larva of the genus is described for the first time. Data on habitat specificity and phenology of the species as well as on larval developmental time are given. A female, from which larvae were obtained by experimental rearing, has been designated as neotype. The distribution of the genus, hitherto known from Austria and Hungary, is extended for Poland. The phylogenetic position of *Trischidothrombium* within the Microtrombidiidae is discussed.

Key words.— Acarology, Parasitengona, taxonomy, habitat specificity, phenology, life cycle.

Introduction

*Trischidothrombium* was erected by Feider (1952) to accommodate *Enemothrombium discrepans* Willmann, 1950 and from then on *Trischidothrombium discrepans* has remained the only representative of the genus, known exclusively from postlarval forms. The distribution of *Trischidothrombium* is restricted to Central Europe. The members of this monotypic genus have been recorded from Austria (Willmann 1950, 1951a, 1951b, Franz 1950) and Hungary (Gabryś and Mąkol 1991), hitherto. Literature data that refer to the morphological characteristics of the genus are brief and incidental (Willmann 1950, Feider 1952, Wohltmann et al. 2007).

The present paper contains the first description of larva of *Trischidothrombium*. Apart from that, all active instars of *T. discrepans* (Willmann, 1950) are characterized and data on biology, habitat specificity, phenology and larval developmental time are given. As the type specimen of *T. discrepans* does not exist, a female, from which larvae were obtained by experimental rearing, has been designated as neotype.

Material and methods

Active postlarval forms of *T. discrepans* that were the subject of morphological studies, originated from
INTRODUCTION

The knowledge of life cycles and reproductive biology is useful when studying phylogeny, evolution and ecology. In the case of land pulmonates, several comprehensive works contain valuable information on their biology (e.g. Frömming 1954, Runham and Hunter 1970, Tompa 1984, Baur 1994, Heller 2001, Jordaens et al. 2007). Apart from observations of individuals or population dynamics, another source of important data is histological and cytological research. It provides an insight into the structure and function of the reproductive system, most of all gonad, and processes that take place in it (e.g. Tompa 1984, Gómez 2001, Gomot de Vaufleury 2001, Healy 2001 and references contained therein).