



*Zootaxa* 3679 (1): 001–068  
www.mapress.com/zootaxa/

Copyright © 2013 Magnolia Press

# Monograph

ISSN 1175-5326 (print edition)

**ZOOTAXA**

ISSN 1175-5334 (online edition)

<http://dx.doi.org/10.11646/zootaxa.3679.1.1>

<http://zoobank.org/urn:lsid:zoobank.org:pub:770B1AA2-869F-4F1B-8010-0E3FAECB0592>

# ZOOTAXA

3679

## **A taxonomic catalogue of the Dyspnoi Hansen and Sørensen, 1904 (Arachnida: Opiliones)**

**AXEL L. SCHÖNHOFER**

*Department of Biology, San Diego State University, San Diego, CA 92182-4614, USA, E-mail: Axel.Schoenhofer@gmx.net.*



Magnolia Press  
Auckland, New Zealand

*Accepted by P. Schwendinger: 16 May 2013; published: 17 Jun. 2013*

*Licensed under a Creative Commons Attribution License <http://creativecommons.org/licenses/by/3.0>*

AXEL L. SCHÖNHOFER

**A taxonomic catalogue of the Dyspnoi Hansen and Sørensen, 1904 (Arachnida: Opiliones)**  
(*Zootaxa* 3679)

68 pp.; 30 cm.

17 Jun. 2013

ISBN 978-1-77557-212-1 (paperback)

ISBN 978-1-77557-213-8 (Online edition)

FIRST PUBLISHED IN 2013 BY

Magnolia Press

P.O. Box 41-383

Auckland 1346

New Zealand

e-mail: [zootaxa@mapress.com](mailto:zootaxa@mapress.com)

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

© 2013 Magnolia Press

ISSN 1175-5326 (Print edition)

ISSN 1175-5334 (Online edition)

## Table of contents

Abstract	4
Introduction	4
Material and methods	5
Results and discussion	7
Species and genera counts and changes compared to previous approaches	7
Higher taxonomic classification within the Dyspnoi	7
Key to the higher groups within the Dyspnoi	9
Taxonomic catalogue	10
Suborder Dyspnoi Hansen & Sørensen, 1904	10
Superfamily Ischyropsalidoidea Simon, 1879a	10
Family Ischyropsalididae Simon, 1879a	11
Subfamily Ceratolasmatinae Shear, 1986	11
Genus <i>Acuclavella</i> Shear, 1986	11
Genus <i>Ceratolasma</i> Goodnight & Goodnight, 1942	12
Subfamily Ischyropsalidinae Simon, 1879a	12
Genus <i>Ischyropsalis</i> C.L. Koch, 1839b	12
Family Sabaconidae Dresco, 1970	16
Genus <i>Sabacon</i> Simon, 1879a	16
Family Taracidae fam. n.	19
Genus <i>Crosbycus</i> Roewer, 1914	20
Genus <i>Hesperonemastoma</i> Gruber, 1970	20
Genus <i>Taracus</i> Simon, 1879b	21
Superfamily Troguloidea Sundevall, 1833	22
Family Dicranolasmatidae Simon, 1879a	22
Genus <i>Dicranolasma</i> Sørensen, 1873	22
Family Nemastomatidae Simon, 1872a	23
Subfamily Ortholasmatinae Shear & Gruber, 1983	24
Genus <i>Cladolasma</i> Suzuki, 1963	24
Genus <i>Dendrolasma</i> Banks, 1894a	24
Genus <i>Martensolasma</i> Shear, 2006	25
Genus <i>Ortholasma</i> Banks, 1894a	25
Genus <i>Trilasma</i> Goodnight & Goodnight, 1942	25
Subfamily Nemastomatinae Simon, 1872a	26
Genus <i>Acromitostoma</i> Roewer, 1951	26
Genus <i>Carinostoma</i> Kratochvíl, 1958	27
Genus <i>Caucnemastoma</i> Martens, 2006	27
Genus <i>Centetostoma</i> Kratochvíl, 1958	28
Genus <i>Giljarovia</i> Kratochvíl, 1958	28
Genus <i>Hadzinia</i> Šilhavý, 1966a	29
Genus <i>Histicostoma</i> Kratochvíl, 1958	29
Genus <i>Mediostoma</i> Kratochvíl, 1958	31
Genus <i>Mitostoma</i> Roewer, 1951	32
Genus <i>Nemaspela</i> Šilhavý, 1966a	35
Genus <i>Nemastoma</i> C.L. Koch, 1836b	35
Genus <i>Nemastomella</i> Mello-Leitão, 1936	37
Genus <i>Paranemastoma</i> Redikorzev, 1936	39
Genus <i>Pyza</i> Staręga, 1976	47
Genus <i>Saccarella</i> Schönhofer & Martens, 2012	47
Genus <i>Starengovia</i> Snegovaya, 2010	47
Genus <i>Vestiferum</i> Martens, 2006	48
Nemastomatinae incertae sedis	48
Family Nipponopsalididae Martens, 1976	48
Genus <i>Nipponopsalis</i> Martens & Suzuki, 1966	48
Family Trogulidae Sundevall, 1833	49
Genus <i>Anarthrotarsus</i> Šilhavý, 1967	49
Genus <i>Anelasmoecephalus</i> Simon, 1879a	49
Genus <i>Calathocratus</i> Simon, 1879a	51
Genus <i>Kofiniotis</i> Roewer, 1940	52
Genus <i>Trogulus</i> Latreille, 1802	52
Acknowledgements	56
References	57

## Abstract

An update of the systematics and determination key of the Opiliones suborder Dyspnoi is provided. The included catalogue represents the first comprehensive species and synonymy listing since Roewer (1923). It summarises all taxonomic changes to date and attempts to be a sound basis against the exponential growing number of online errors, for which examples are given. Species taxonomy features most obvious changes within the Nemastomatidae. The number of species in the collective genus *Nemastoma* is reduced from 96 (Hallan 2005) to its sensu stricto definition of 7, and the excluded names are transferred to other genera or considered as nomina dubia, predominantly in *Paranemastoma*. The systematics of the superfamily Ischyropsalidoidea is discussed and family-level diagnoses are renewed to support taxonomical changes: The morphological heterogeneity in the Sabaconidae is resolved by reverting the family to its original monogeneric state. *Taracus* and *Hesperonemastoma* are separated as Taracidae **fam. n.**, and *Crosbycus* is tentatively transferred to this assembly. The remaining genera of Ceratolasmatidae, *Acuclavella* and *Ceratolasma*, are included as subfamily Ceratolasmatinae in the Ischyropsalididae and *Ischyropsalis* is assigned subfamily status, respectively. Other nomenclatural acts are restricted to species-group level with the following synonymies established: *Sabacon jonesi* Goodnight & Goodnight, 1942 **syn. n.** (= *cavicolens* (Packard, 1884)), *Dicranolasma diomedea* Kulczyński, 1907 **syn. n.** (= *hirtum* Loman, 1894), *Mitostoma* (*Mitostoma*) *sketi* Hadži, 1973a **syn. n.** (= *chrysomelas* (Hermann, 1804)), *Mitostoma asturicum* Roewer, 1951 **syn. n.** (= *pyrenaicum* (Simon, 1879a)), *Nemastoma formosum* Roewer, 1951 **syn. n.** (= *Nemastomella bacillifera bacillifera* (Simon, 1879a)), *Nemastoma reimoseri* Roewer, 1951 **syn. n.** (= *Paranemastoma bicuspidatum* (C.L. Koch, 1835)), *Nemastoma tunetanum* Roewer, 1951 **syn. n.** (= *Paranemastoma bureschi* (Roewer, 1926)), *Phalangium flavimanum* C.L. Koch, 1835 **syn. n.** (= *Paranemastoma quadripunctatum* (Perty, 1833)), *Crosbycus graecus* Giltay, 1932 **syn. n.** (= *Paranemastoma simplex* (Giltay, 1932)), *Nemastoma bimaculosum* Roewer 1951 **syn. n.** (= *Paranemastoma titaniacum* (Roewer, 1914)), *Trogulocratus tunetanus* Roewer, 1950 **syn. n.** (= *Calathocratus africanus* (Lucas, 1849)), *Trogulus albicerus* Sørensen, 1873 **syn. n.** (= *Calathocratus sinuosus* (Sørensen, 1873)), *Metopoctea exarata* Simon, 1879a **syn. n.** (= *Trogulus aquaticus* Simon, 1879a), *Trogulus galasensis* Avram, 1971 **syn. n.** (= *Trogulus nepaeformis* (Scopoli, 1763)) and *Trogulus roeweri* Avram, 1971 **syn. n.** (= *Trogulus nepaeformis* (Scopoli, 1763)). *Paranemastoma wernerii* (Kulczyński, 1903) is elevated from subspecies to species. *Ischyropsalis luteipes* Simon, 1872b is proposed as **nomen protectum**, taking precedence over *Lhermia spinipes* Lucas 1866 **nomen oblitum**. The same accounts for *Anelasmacephalus cambridgei* (Westwood, 1874) **nomen protectum**, taking precedence over *Trogulus violaceus* Gervais, 1844 **nomen oblitum**, *Trogulus closanicus* Avram, 1971 **nomen protectum** over *Trogulus asperatus* C.L. Koch, 1839a **nomen oblitum**, as well as *Trogulus martensi* Chemini, 1983 **nomen protectum** over *Trogulus tuberculatus* Canestrini, 1874 **nomen oblitum**. New combinations, all from *Nemastoma*, are *Histicostoma anatolicum* (Roewer, 1962), *Mediostoma globuliferum* (L. Koch, 1867), *Nemastomella hankiewiczii* (Kulczyński, 1909), *Nemastomella maarebense* (Simon, 1913), *Nemastomella monchiquense* (Kraus, 1961) and *Paranemastoma simplex* (Giltay, 1932); from *Mitostoma*: *Nemastomella armatissima* (Roewer, 1962). Revived combinations are *Nemastomella cristinae* (Rambla, 1969) (from *Nemastoma*) and *Nemastomella sexmucronatum* (Simon, 1911) (from *Nemastoma*). The following *Nemastoma* are transferred to *Paranemastoma* but suggested as nomina dubia: *aeginum* (Roewer, 1951), *amuelleri* (Roewer, 1951), *bolei* (Hadži, 1973a), *caporiaccoi* (Roewer, 1951), *carneluttii* (Hadži, 1973a), *ferkeri* (Roewer, 1951), *gigas montenegrinum* (Nosek, 1904), *gostivarense* (Hadži, 1973a), *ikarium* (Roewer, 1951), *quadripunctatum ios* (Roewer, 1917), *kaestneri* (Roewer, 1951), *longipalpatum* (Roewer, 1951), *macedonicum* (Hadži, 1973a), *multisignatum* (Hadži, 1973a), *nigrum* (Hadži, 1973a), *perflugium* (Roewer, 1951), *santorinum* (Roewer, 1951), *senussium* (Roewer, 1951), *sketi* (Hadži, 1973a), *spinosulum* (L. Koch, 1869). Further suggested nomina dubia are *Trogulus coreiformis* C.L. Koch, 1839a, *Trogulus lygaeiformis* C.L. Koch, 1839a and *Trogulus templetonii* Westwood, 1833.

**Key words:** Troguloidea, Ischyropsalidoidea, Ceratolasmatinae, Ischyropsalidinae, Taracidae fam. n., cyber-taxonomy, cyber-plagiarism, systematics, taxonomy

## Introduction

When searching for taxonomic-systematic online resources on Opiliones one quickly discovers an extensive list managed by Joel Hallan (2005; the 'Hallan list') providing taxonomic and systematic information on many groups of animals. Its contribution to Opiliones is comprehensive, and the Hallan list is presently the only available digital entity, which gives most taxon names together with relevant taxonomic and additional information. Even with errors introduced, additional taxa described and systematics partly changed, these issues are recognisable for taxonomic experts, to whom the Hallan list serves as a good template. The main issue are other internet sites featuring taxonomy and systematics, approaching Hallan list information uncritically, multiplying initial errors and preserving outdated synonymies. Locating and correcting these errors throughout the Internet has already become a rather futile effort.

As an example, the Hallan list combined the genus *Centetostoma* Kratochvíl, 1958 with an incorrect authorship (*Centetostoma* Kratochvíl & Miller, 1958). A Google search in February 2011 retrieved 214 hits for “*Centetostoma* Kratochvíl & Miller, 1958” while the correct combination “*Centetostoma* Kratochvíl, 1958” had almost no hits, although being the only combination mentioned in all taxonomic-systematic literature investigated. The error likely originated from the misinterpretation of a preface article by Kratochvíl and Miller, followed by the description of *Centetostoma* by Kratochvíl alone (Martens pers. com.). Originating from the Hallan list, this example makes it obvious that most other online lists did not consult original taxonomic information but simply copied the source. The error seems to multiply further as the false authorship retrieved 346 hits only a year later (14 Feb. 2012) and 564 on 30 June 2012, but with the correct authorship having a higher number of hits, likely due to the available *Centetostoma* revision by Martens (2011). The whole matter appears almost absurd, as the genus *Centetostoma* and its species have never played an important role in systematics or in other scientific fields, not even in faunistics, while apparently receiving considerable online attention. Unfortunately, this is not a single incidence. Kratochvíl (1958) is the author of several valid genera, all given the same erroneous authorship in the Hallan list and subsequently having multiplied in the same manner. Other errors comprise insufficient incorporation of published synonymies, e.g. from important reference works as Martens (1978) for Nemastomatidae, influencing many open-source references, as e.g. Wikipedia.

Tracking other errors originating from the Hallan list suggests that a large proportion of taxonomic information on Opiliones online 1) is copied from the Hallan list without re-checking the taxonomy, 2) is not curated or worked through, subsequently, 3) results from a strong desire to compile and exhibit large, comprehensively looking lists for Internet projects, many of which do not cite the original source. This cyber-plagiarism is deleterious for taxonomic science, as the multiplying errors invite “Google hit” majority opinions, rather than considering peer-reviewed taxonomic-systematic publications. As these lists do and will aid as anchor points for scientific and community projects, the many known problems and criticisms of approaches neglecting taxonomy apply (Smith *et al.* 2011). Updating the Dyspnoi section of the Hallan list will follow the publication of this catalogue and may solve some of these problems. Providing a peer-reviewed publication as a template to update and correct any of the erroneous databases appears the most effective solution and is the aim of the presented taxonomic catalogue.

Aside the aforementioned rather formal problems, Opiliones is a group still in need of major revisions from suborder (e.g. Giribet *et al.* 2010, Hedin *et al.* 2012) to species level. For the suborder Dyspnoi a comprehensive overview is given by Gruber (2007), yet a summarizing approach listing all species is missing since Roewer (1923). Giribet *et al.* (2010) changed the systematics of the superfamily Ischyropsalidoidea, but some aspects, not only the placement of several genera, remained unclear. Diagnoses of groups within this superfamily presently do not provide distinguishing characters and lack support from molecular genetics used for their emendation. Revisiting all available information, including recent molecular genetic results, Ischyropsalidoidea is reorganised and characters supporting this systematics are discussed. Male genital morphology, accepted as key character in most other groups of Opiliones (see Schönhofer & Martens 2012) but neglected in the most recent emendations, is re-evaluated.

Having been studied for over two centuries, the Dyspnoi still exhibit many problems with species delineation and assignment. Many species have not been treated since their original description, and generic concepts have changed suggesting transfer of these species from their original placement (e.g. *Nemastoma* C.L. Koch, 1836b; Gruber & Martens 1968). This catalogue takes a pragmatic approach, to assign as many species as possible to a more reasonable systematic position or treat them otherwise. Being only a snapshot in time, this revision aims to provide a comprehensive starting point for future ventures, and highlights and comments on taxonomic and systematic issues of many taxa.

## Material and methods

All taxon names associated with the Dyspnoi were tracked manually by following citations to the original description. 2,950 references were scanned or downloaded from acknowledged sources and from many single online providers not explicitly mentioned. If unavailable in the original pdf, text was made accessible with Adobe Acrobat Pro 9.3.1. This searchable database allowed data-mining and located even difficult records.

Taxonomic and systematic information was assessed as follows: 1) a list of all available species epithets associated with the Dyspnoi and generic names contained in the Dyspnoi was compiled; 2) the original descriptions were investigated; 3) perception of taxa over time was checked, including synonymies, alternative placements, and descriptions; 4) the last revising author's opinion was generally accepted; 5) if disagreement or unreasonable placements were found, correction upon available descriptions, and partly original material was attempted; 6) authors were followed if they suggested but not formally established more reasonable placements of species, e.g. when removing species from *Nemastoma sensu stricto*; 7) unrecognisable taxa, based on questionable descriptions and not further discussed, are treated as nomina dubia, excluding them from the species count, e.g. see *Paranemastoma* Redikorzew, 1936 and further comments on Roewer; 8) the Index of Organism Names (ION; <http://www.organismnames.com>) was searched, using all generic names to check for species names; obvious spelling errors were neglected.

The catalogue style follows a hierarchical and then alphabetical order. All taxa considered as valid are given in bold. Subgenera are mentioned in parentheses (e.g. *Mitostoma (Carinostoma)* Kratochvíl, 1958) to highlight historical taxonomic interpretations, but are currently not considered of importance in the Dyspnoi. Citations provided are limited to those of taxonomic-systematic relevance, e.g. original descriptions, synonymies, taxonomic transfers, alternative spellings, redescriptions and discussions of the taxon status. Mere faunistic citations, reiterative listings and misidentifications are omitted. Type genera of families and type species of genera are given by their original assignment and spelling, and their fixation is stated. Etymologies for all genera are provided. Citations and synonyms are arranged in chronological order of first appearance. If not unambiguously perceivable from this order, remarks outline taxonomic issues and list additional information. Taxon authors are always indicated by separating their name with a comma from the year of description. Others are treated as citations without a comma and are additionally separated by “—” from the species epithet or the species author. For author names of Cyrillic origin, transcribed into the Latin alphabet, the predominant spelling was selected (e.g. Mcheidze; alternative Mkheidze; Ljovuschkin; alternative Lyovushkin). The locus typicus (loc. typ.) is given for every species. Hierarchical order of administrative and/or geographic units using English names is preferred, and primary historical locality names are stated for clarification only. Cardinal directions are abbreviated. Type depositories are omitted; locality information better helps to explain associated taxonomic problems. Information about the types of spurious species is given in the remarks. Abbreviated type depositories are: BMNH - The Natural History Museum, London, UK; MHNP - Muséum national d'Histoire naturelle, Paris, France; NHMW - Naturhistorisches Museum, Vienna, Austria; SMF - Senckenberg Naturmuseum, Frankfurt am Main, Germany. Other abbreviations used are: compr. - comprising; redescr. - redescription. References in the catalogue aim to pinpoint page numbers of exact taxonomic statements, but in few cases page ranges are given or page numbers are omitted if not available. Fossil species were not considered.

To provide an additional online source, results will be available and frequently updated at the Tree of Life (ToL) project (Schönhofer & Hedin 2012). ToL will also feature phylogenetic information gathered when compiling this catalogue. Furthermore, a new version of the Biology Catalog managed by Joel Hallan will soon integrate the updated information on the Dyspnoi (<http://pipev.tamu.edu/Biocat/About/Introduction.aspx>).

C.F. Roewer has been the most prolific harvestmen expert in terms of describing new species. However, his glory fades when having to deal with his often intangible mess of made-up species, invented species characters and false type localities. His inability to look through the growing maze partly caused him to misidentify his own species, describing them anew or assigning false type localities even where this would not have been necessary in order to describe new “geographic” species. Helversen and Martens (1972) and Novak and Gruber (2000) provided detailed criticism of Roewer's works. Especially Roewer's later works (1950, 1951) described numerous species upon variable characters such as spination and colour patterns, recognised as variable by many subsequent authors. This is perceivable from the extensive synonymy lists of many species, e.g. in *Ischyropsalis* C.L. Koch, 1839 and *Paranemastoma*. Collective groups of Roewer's 1951 *Nemastoma* species are therefore treated as nomina dubia (see *Paranemastoma*). Remarks throughout this revision highlight other issues associated with Roewer, whose information is generally to be treated with caution.

## Results and discussion

### Species and genera counts and changes compared to previous approaches

Although new species and genera have been described since Pinto-da-Rocha *et al.* (2007) and the last update of the Hallan list (03.07.2005), the number of Dyspnoi species as recognised here (286) decreases by 13–14% (Hallan list: 323; Pinto-da-Rocha *et al.* 2007: 327). This substantial difference stems from acknowledging already published synonymies and defining many *Nemastoma* as nomina dubia within *Paranemastoma*. The Hallan list included 96 species in *Nemastoma* (including revalidated subgenera) while the actual species count as specified for the genus is only 7 (Gruber & Martens 1968). In *Ischyropsalis* the species count drops from 35 (Hallan list) to 22. The number of genera increased from 32 (Hallan list) to 38 in Pinto-da-Rocha *et al.* (2007), likely for over-counting Nemastomatidae genera, and is reported here as slightly lower (36). Changes in the grouping of genera are due to additions in the Nemastomatidae, new synonymies in the Trogulidae and re-establishment of genera in the Ortholasmatinae. The Hallan list also recognised the otherwise long abandoned superfamily Nemastomatoidea and listed six genera of Nemastomatidae as incertae sedis (Pinto-da-Rocha *et al.* 2007 listed them as Nemastomatinae incertae sedis). According to the definition by Martens (1978), summarising all West Palearctic genera within one subfamily, these have to be assigned to the Nemastomatinae, which is supported by phylogenetic data and morphology (Schönhofer & Martens 2012).

### Higher taxonomic classification within the Dyspnoi

Following the taxonomic overview provided by Gruber (2007) the Dyspnoi are accepted to include the superfamilies Troguloidea and Ischyropsalidoidea. The Troguloidea comprise the families Dicranolasmatidae, Nemastomatidae, Nipponopsalididae and Trogulidae, with the Nipponopsalididae in an unresolved, but likely basal position (Giribet *et al.* 2010). Schönhofer and Martens (2010a) suggested uniting Dicranolasmatidae and Trogulidae based on molecular relationship and morphological traits, which remains a matter of taxonomic convenience. All genera within the Troguloidea can be clearly assigned to a respective family and systematic questions concern mainly relationships of genera within the families (Trogulidae: Schönhofer & Martens 2010a; Nemastomatidae: Schönhofer & Martens 2012) and the composition of several genera within the Nemastomatidae.

The situation is different in the second superfamily Ischyropsalidoidea, where the placement of the clear-cut genera in families is uncertain. Currently three families, Ceratolasmatidae, Ischyropsalididae and Sabaconidae, are recognised. Problems arise as the latest emendations and diagnoses provided no clear understanding of two of these families. In particular, the following issues concerning the Ischyropsalidoidea need to be considered:

- 1) The family Ceratolasmatidae was originally diagnosed upon external structures of legs and scutum to encompass its highly divergent genera (Shear 1986). Its composition has since changed, with *Hesperonemastoma* Gruber, 1970 having been transferred to Sabaconidae (Giribet *et al.* 2010) but retaining its proposed sister *Crosbycus* Roewer, 1914 (Shear 1986) in Ceratolasmatidae for which an updated diagnosis is necessary.

- 2) The emended diagnosis of Sabaconidae by Giribet *et al.* (2010) listed differences between the included genera, but no unambiguous diagnostic characters for the family. Molecular support, the main argument to retain *Taracus* Simon, 1879b and *Hesperonemastoma* close to *Sabacon* Simon, 1879a, was weak (Giribet *et al.* 2010) and Sabaconidae requires redefinition.

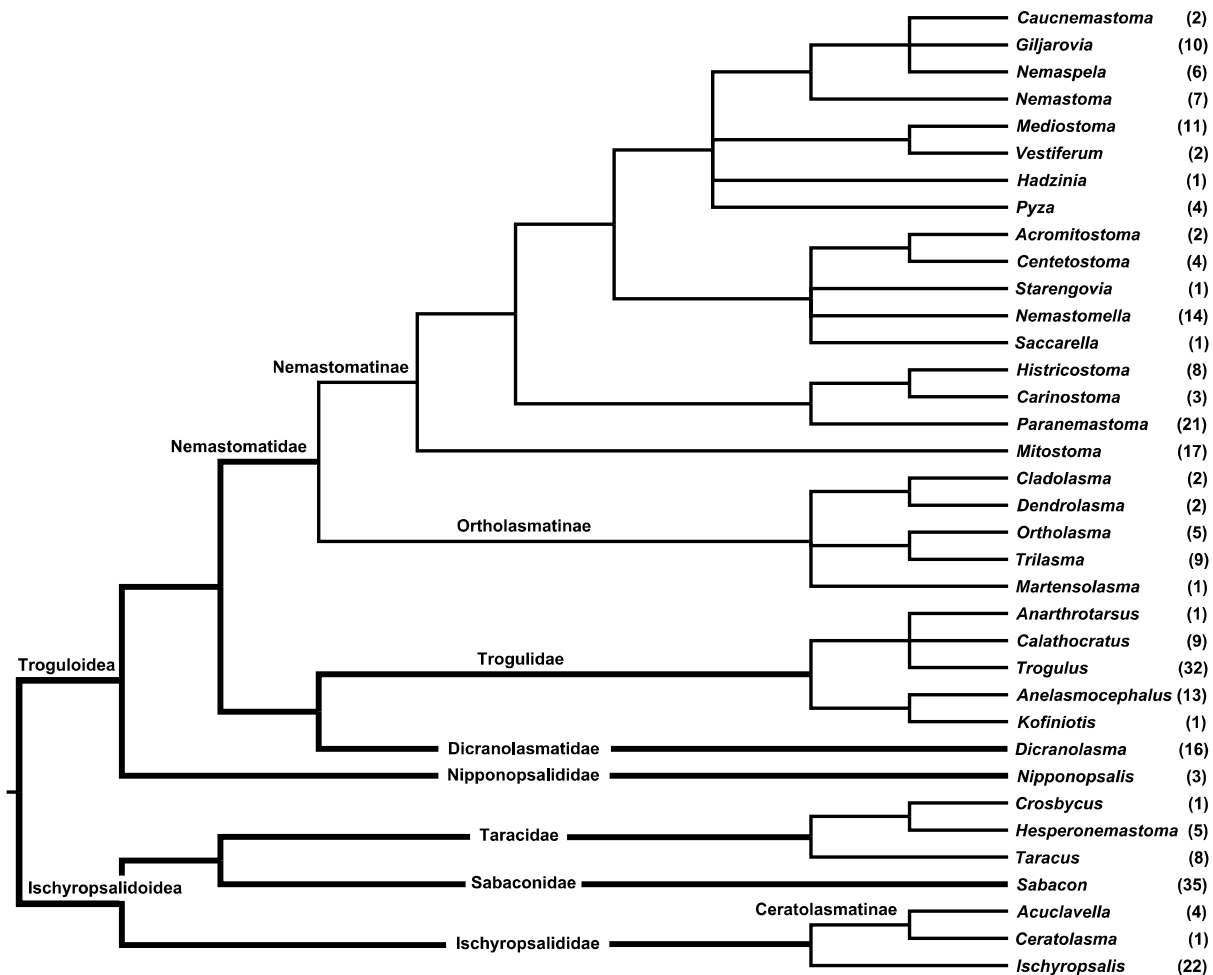
- 3) Shear (1986) downgraded the complex genital morphology of *Sabacon* as genus-specific to include *Taracus* within Sabaconidae. He rejected Martens (1976, 1983) and Martens *et al.* (1981) suggesting a monotypic family Sabaconidae.

- 4) Genital characters were disregarded for the classification of Ischyropsalidoidea, while metapeltidial sensory cones (with sensory capabilities assumed for one species in *Sabacon*; Juberthie *et al.* 1981) were assigned high significance without knowing their phylogenetic value (Shear 1986, Giribet *et al.* 2010).

Studies featuring molecular genetics will help draw a clearer systematic picture of Ischyropsalidoidea (Richart & Hedin in press, Schönhofer *et al.* 2013b). *Acuclavella* Shear, 1986 is most closely related to *Ceratolasma* Goodnight & Goodnight, 1942, which is also obvious in the morphological similarity of both genera, and both are next relatives to *Ischyropsalis* (Richart & Hedin in press). The composition of the complex sternal region, sharing

isolated coxal endites II to IV and a large labium (Martens 1969, Gruber 1978, Shear 1986), and the peculiar penial morphology with a glans formed by two separate sclerotised areas only joined close to the stylus, support a close relationship of all three genera. Divergence estimates show that the split between *Ischyropsalis* and *Ceratolasma* is considerably younger than in other clades in Ischyropsalidoidea (Schönhofer *et al.* 2013b), and all evidence suggests including *Acuclavella* and *Ceratolasma* in Ischyropsalidoidea. Maintaining a subfamily Ceratolasmatinae for *Acuclavella* and *Ceratolasma* is proposed, here. It parallels a systematic and geographic situation that is roughly similar to the mainly European and Western North American distributed subfamilies within the Nemastomatidae.

The remaining Ischyropsalidoidea genera share palps with peculiar bottle-brush hairs (a plesiomorphic character) and have reduced (only on leg II) or missing coxapophyses. While uniting them in Sabaconidae accords with the weak molecular support (Giribet *et al.* 2010), the phylogenetic level of the two main Sabaconidae clades is much higher than in the Ischyropsalidoidea as proposed here (Schönhofer *et al.* 2013b). This coincides with the wide range of morphological characters outlined in the emended family diagnosis of Sabaconidae (Giribet *et al.* 2010). Recompiling and extending this diagnosis *sensu* Giribet *et al.* (2010) revealed no flaws by these authors and retrieved the same variable characters. However, this lack of shared morphological characters and weak molecular support does not add confidence to accept Sabaconidae in its present composition.



**FIGURE 1.** Cladogram summarising the classification and systematics of the Dyspnoi to genus level, incorporating hypotheses of this study, Giribet *et al.* 2010, Richart and Hedin in press, Shear 1986 and Schönhofer and Martens 2010a, 2012. The tree is a compilation and not based on a phylogenetic reconstruction. All genera are listed on the right, with corresponding species numbers in parentheses; family level lineages are indicated by bold branches.

Regarding the first of the two sabaconid clades, comprising only *Sabacon*, a simple generic rank has to be rejected. *Sabacon* is highly diversified, and its primary lineages are comparably older than most other genera within the superfamily and within the Dyspnoi (Schönhofer *et al.* 2013b). Its wide Holarctic distribution and a



wealth of functional penis modifications reflects this divergence. Penis modifications in other Dysnoi, e.g. the Nemastomatidae, are characters perceived to outline separate generic levels (Schönhofer & Martens 2012). In the future it is likely that *Sabacon* will be split into several genera that should be enclosed in a taxon of family level. Highly distinct male genitals with a bent and deeply split penial base and a muscle concentrated at the base, and positioned outside the sclerotised truncus (Martens 1983), peculiar inflated palps with specialised tarsi, and the lack of coxapophyses (Gruber 2007, Tsurusaki & Song 1993, Thaler 1976), serve as distinct characters, justifying a taxonomic status clearly isolated within Ischyropsalidoidea and higher than the generic level (Gruber 1970, Martens *et al.* 1981, Martens 1983).

Consequently, the genera *Taracus* and *Hesperonemastoma* require evaluation if being recognisable as a distinct and separable unit. The two genera share a straight and generally short and massive penial truncus filled with a large muscle that is completely enclosed within the truncus, normal, uninflated palps and coxapophyses on coxae II (Gruber 2007). These characters also apply to *Crosbycus* (Gruber 2007), considered close to *Hesperonemastoma* in the original composition of Ceratolasmatidae (Shear 1986), but that is clearly different from the remaining Ceratolasmatidae. Molecular evidence strongly supports a grouping of *Hesperonemastoma* with *Taracus* (Schultz & Regier 2001; Giribet *et al.* 2002, 2010), while the placement of *Crosbycus* needs confirmation.

Restricting Sabaconidae to *Sabacon* and treating *Hesperonemastoma* and *Taracus* as a separate taxonomic unit provides a convincing number of diagnostic characters to accept both as well-defined entities which is in accordance with strong molecular support. Sabaconidae is thus restored to its original monogeneric state, and a new family Taracidae, based on the oldest taxon *Taracus*, is here proposed. Taracidae **fam. n.** further includes *Hesperonemastoma* sensu Giribet *et al.* (2010) and, tentatively, *Crosbycus*. Considering these clades as subfamilies within a higher taxon Sabaconidae resulted in the same problem of being unable to diagnose such a family.

Full diagnoses of all new or emended family level taxa in the Ischyropsalidoidea are given in the taxonomic section, followed by listing the genera and species included. A systematic overview, featuring a summary of all phylogenetic results and hypotheses presently available for the Dyspnoi, is given in Fig. 1.

## Key to the higher groups within the Dyspnoi

The latest determination key for the higher groups within the Dyspnoi (Giribet 2007) needs to be presented in more detail and corrected, partly for disregarding the morphological diversity of the keyed taxa, partly due to newly described species (especially *Hesperonemastoma smilax* Shear, 2010b). The following also needs to be taken into account:

- 1) the number of metapeltidial sensory cones (spines on 2nd prosomal tergite) in *Ischyropsalis* can be as low as two (e.g. in *I. hellwigii* (Panzer, 1794)), which does not key to the genus;
- 2) a reflexed tarsus of the palp is not a static condition in *Sabacon*, as in both living and preserved animals the tarsus is at different angles to the tibia, some not different from other Dyspnoi;
- 3) soil crypsis is not a reliable character to identify Dicranolasmatidae and Troglulidae, because animals (adults) need to reach a certain age to acquire the soil cover (and sometimes they do not; often lacking in juveniles); it is also a feature of some Nemastomatinae (*Vestiferum* Martens, 2006) and Ortholasmatinae;
- 4) thin and elongated palps of identical shape are present in both *Crosbycus* and some *Hesperonemastoma* species.

The following key is remodelled and intended to feature external characters in adult animals. A key for identification to Troglulidae genera is given in Schönhofer (2009: 168, erroneously including *Dicranolasma* Sørensen, 1873). For a key to Ortholasmatinae see Shear (2010a: 16). For Nemastomatidae, a key based on external characters is difficult to establish and was therefore not attempted. Soil incrustated animals may require cleaning with a soft paintbrush to see relevant features.

- |   |   |             |
|---|---|-------------|
| 1 | Ventral opisthosomal sclerites with a median suture .....   | Troglulidae |
| - | Ventral opisthosomal sclerites without a median suture .....  | 2           |
| 2 | Chelicerae conspicuous and protruding, as long as and often much longer than body, body length in most cases clearly above 1 mm ..... | 3           |
| - | Chelicerae of moderate size, significantly shorter than body, if different, body length around 1 mm (troglomorph species) ..          | 5           |

3	Two or more spines on 2nd thoracic tergite; no diaphanous teeth in central part of cutting edges of chelae; Europe . . . . .	Ischyropsalis
-	One or no spines on 2nd thoracic tergite; diaphanous teeth in central part of cutting edges of chelae; North America and Eastern Asia . . . . .	4
4	No spine on 2nd thoracic segment; diaphanous teeth mostly restricted to central part of chelae, sometimes present in basal part; Japan and Korea . . . . .	<i>Nipponopsalis</i>
-	A single prominent spine on 2nd thoracic segment; diaphanous teeth in central and distal third of chelae; North America and Far Eastern Russia . . . . .	<i>Taracus</i>
5	Elaborate prosomal structures forming a basket-like cover over the chelicerae; if missing, dorsal ornamentation with extensive intersecting spines . . . . .	6
-	If structures covering chelicerae present, then these simple and spine-like; if dorsal ornamentation present, then this never consisting of extensive intersecting spines . . . . .	7
6	Dorsal side of body covered with reticulate ornamentation; eyes close together on an eye mound; if present, then structures covering chelicerae originating from eye mound; America and Asia . . . . .	Ortholasmatinae
-	Dorsal side of body covered with spines and tubercles; eyes widely separated and in the middle of each of two long processes anteriorly protruding from prosoma; Western Palearctic . . . . .	Dicranolasmatidae ( <i>Dicranolasma</i> )
7	Distal articles of palps with club-shaped hairs (can be missing in males of some <i>Paranemastoma</i> : then dorsum smooth and black; respective species with prominent spines and/or golden colour pattern) . . . . .	Nemastomatinae
-	Palps with bottlebrush-shaped hairs or without modified hairs . . . . .	8
8	Walking legs with dense cover of long, partly curly hairs, palps as long as shortest walking legs, body size below 1 mm . . . . .	<i>Crosbycus</i>
-	Walking legs without dense cover of hairs, hairs not curly, palps always shorter than walking legs, body length at least 1 mm . . . . .	9
9	Palps set with bottlebrush-shaped hairs and without appressed microtrichia; palps conspicuous, either very long or with inflated distal segments . . . . .	10
-	Palps set with normal sensory setae and appressed microtrichia; palps of normal proportion, neither very long nor with inflated distal segments . . . . .	11
10	Integument soft; pro- and opisthosoma never fused into a scutum magnum; distal segments of palps massive and inflated in most species. . . . .	Sabaconidae ( <i>Sabacon</i> )
-	Integument sclerotised; pro- and opisthosoma fused into a scutum magnum; distal segments of palps not massive or inflated . . . . .	<i>Hesperonemastoma</i>
11	Frontal margin of prosoma with two horns lateral of eye mound, colouration grey to brown . . . . .	<i>Ceratolasma</i>
-	Frontal margin of prosoma without horns, colouration black . . . . .	<i>Acuclavella</i>

## Taxonomic catalogue

### Suborder Dyspnoi Hansen & Sørensen, 1904

Dyspnoi Hansen & Sørensen, 1904: 81 (as tribus in Palpatores);—Roewer 1923: 3; Šilhavý 1961: 265–266 (as suborder); Martens 1969: 184 (as cohorts); Shear 1974: 68 (as superfamily); Gruber 1974a: 258 (as superfamily); Shultz 1998: 259 (as clade combining superfamilies).

**Remarks.** The initial composition of the Dyspnoi included Ischyropsalidoidea, Nemastomatoidea and Troguloidea (Hansen & Sørensen 1904: 81). Later, Roewer (1923: 3) added his new family Acropsopilionidae. It was excluded from Dyspnoi, united with Caddidae, and the resulting group elevated to superfamily rank as Caddoidea Banks, 1893 by Shear (1974: 68), which was supported by Gruber (1974a: 258). This resulted in classifying Caddoidea, Eupnoi and Dyspnoi as independent superfamilies, making it necessary to replace the latter two names by Phalangioidea and Troguloidea, respectively (Shear 1974: 68). Shultz (1998: 259) transferred Caddoidea to Phalangioidea, restoring the suborder classification in Dyspnoi and Eupnoi, revalidating these names.

### Superfamily Ischyropsalidoidea Simon, 1879a

Ischyropsalidae Simon, 1879a: 265 (compr. *Ischyropsalis*, *Sabacon*, *Taracus*);—Comstock 1913: 80; Roewer 1923: 680; 1950: 11.

Ischyropsalidoidea—Martens 1976: 66; 1978: 186 (compr. Ischyropsalididae, Sabaconidae); Gruber 1978: 107; Martens *et al.* 1981: 27; Shear 1986: 3 (compr. Ceratolasmatidae, Ischyropsalididae, Sabaconidae); **new composition** (compr. Ischyropsalididae, Sabaconidae, Taracidae **fam. n.**).

## Family Ischyropsalididae Simon, 1879a

Ischyropsalididae Simon, 1879a: 265 (compr. *Ischyropsalis*, *Sabacon*, *Taracus*); type genus *Ischyropsalis* C.L. Koch, 1839b as inferable from the stem of the family name (ICZN 11.7.1.1);—Roewer 1914: 100 (compr. *Ischyropsalis*, *Sabacon*, *Taracus*, *Tomicomerus*), 1923: 680, 1950: 11; Dresco 1970: 1212 (compr. *Ischyropsalis*, *Nipponopsalis*, *Taracus*, *Tomicomerus*); Shear 1975: 11; Gruber 1978: 105.

Ischyropsalididae—Martens 1969: 184–186 (compr. *Ceratolasma*, *Nipponopsalis*, *Ischyropsalis*, *Sabacon*, *Taracus*); **new composition** (compr. *Acuclavella*, *Ceratolasma*, *Ischyropsalis*).

**Diagnosis.** Dyspnoi of the superfamily Ischyropsalidoidea with a western Palearctic and western Nearctic distribution. Defined by peculiarities of glans penis morphology, composition of the sternal region, and supported by molecular phylogenetic evidence. Palps without bottlebrush-shaped hairs, distal articles with dense cover of microtrichia, claw rudiment present. Chelicerae of moderate size, enlarged in *Ischyropsalis*. Except for few cave-species in *Ischyropsalis* males with glandular fields on the dorsal cheliceral segment, these partly associated with apophyses. Truncus penis simple, filled up to two thirds with a single muscle; muscular tendon short; base of truncus divided into two short root-like structures.

Glans penis simple and conical, separated into two sclerotised areas: dorsally the continuously sclerotised portion of the truncus and ventrally an isolated sclerotised plate set with uniform spines of variable length; both sclerotised portions gradually tapering into and joined at the long stylus. Stylus simple, long and tapering, either bent at the base (*Ischyropsalis*) or set with indistinct hook-like structures. Ovipositor short and stout, without large papillae, opening cleft of vagina bordered by a seam of microspinules, medium-sized setae on apical part only, arranged into rows and clusters. Frontal margin of opisthosoma without a median furrow. Coxae II to IV with sternal apophyses, labium large. Two or more bump- or spine-like metapeltidial structures present, the median ones largest.

## Subfamily Ceratolasmatinae Shear, 1986

Ceratolasmatinae Shear, 1986: 13 (compr. *Acuclavella*, *Ceratolasma*, *Crosbycus*, *Hesperonemastoma*); type genus *Ceratolasma* Goodnight & Goodnight, 1942, by original designation;—Giribet *et al.* 2010: 422 (compr. *Acuclavella*, *Ceratolasma*, *Crosbycus*).

Ceratolasmatinae; **new rank, new composition** (compr. *Acuclavella*, *Ceratolasma*).

**Diagnosis.** Dyspnoi of the family Ischyropsalididae with a narrow western Nearctic distribution (USA: N-California, Washington, Idaho). Defined by peculiarities of male genital morphology and morphological similarities concerning palps, armature of dorsum and tuber oculorum, supported by molecular phylogenetic evidence. Palps short and stout, tibia and tarsus similar to each other and almost equal in length. Chelicerae of moderate size; males with large glandular fields dorso-medially on basal cheliceral segments, glands associated with rather unspecialised but in most species large, plateau-like apophyses exposing the glandular fields to dorsal and dorso-caudal side. Truncus penis as described for Ischyropsalididae but generally slender; glans penis simple and conical, rarely inflated, with a long, narrow, sclerotised ventral plate, gradually tapering into a long stylus being simple, straight, but slightly contorted in few species and set with indistinct, hook-like structures. Ventral plate irregularly set with small uniform spines, pronounced and structured setation otherwise lacking. Tuber oculorum set with a long blunt spine. Dorsal armature with blunt tubercles and partially varying numbers of large paired cones or spines on opisthosoma. Two bump-like enlarged metapeltidial structures.

## Genus *Acuclavella* Shear, 1986 (4 species)

*Acuclavella* Shear, 1986: 13; type species *Acuclavella cosmetoides* Shear, 1986 by original designation.

**Etymology.** Gender feminine; Latin neologism for “acute little spines” referring to the dorsal armament of the body.

*cosmetoides* Shear, 1986: 15; loc. typ.: USA, Idaho, Clearwater Co., Pierce.

*merickeli* Shear, 1986: 20; loc. typ.: USA, Idaho, Idaho Co., 20 mi ESE Lowell, Meadow Creek.

*quattuor* Shear, 1986: 22; loc. typ.: USA, Idaho, Idaho Co., 10 mi E Slate Creek.

*shoshone* Shear, 1986: 18; loc. typ.: USA, Idaho, Shoshone Co., Hobo Cedar Grove.

### Genus *Ceratolasma* Goodnight & Goodnight, 1942 (1 species)

*Ceratolasma* Goodnight & Goodnight, 1942: 3; type species *Ceratolasma tricantha* Goodnight & Goodnight, 1942 by monotypy and original designation.

**Etymology.** Gender neuter; Greek, combination of “keratos” (genitive of “keras” = horn) for the horn-like processes, and „elasma“ (plate), referring to similar prosomal structures in other genera of Dyspnoi, as e.g. *Dicranolasma*, *Ortholasma* or *Dendrolasma*.

*tricantha* Goodnight & Goodnight, 1942: 3; loc. typ.: USA, Oregon, near Forest Grove, Clear Creek;—Gruber 1978 (redescr.).

### Subfamily Ischyropsalidinae Simon, 1879a

Ischyropsalididae Simon, 1879a (see there).

Ischyropsalidinae; **new rank** (compr. *Ischyropsalis*).

**Diagnosis.** Dyspnoi of the family Ischyropsalididae with a western Palearctic distribution. Defined by peculiarities of male genital morphology and enlarged chelicerae with glandular fields situated distally on the basal segment in males of most species. Palps long and thin, elongated to enable interaction with the chelicerae. Chelicerae massive and enlarged, longer than the body; in most species glandular fields of males associated with knob-like apophyses exposing the field to dorsal and/or distal side. Truncus penis as described for Ischyropsalididae; glans penis usually simple and conical, but inflated and distinct from the truncus in many species; the sclerotised ventral plate mostly short, from roughly rhombic to deeply bi-lobed at the base; sclerotised area of glans with several defined regions exhibiting dense fields of mostly very thick, long and backward-pointing hairs; glans gradually tapering into a long stylus, the latter simple and pointed, bent at the base but without contortion or additional structures. Tuber oculorum without spine. Dorsal armature mostly lacking, dorsum smooth, often glossy, in few species opisthosomal areas raised to low, pointed bumps. Two or many spine-like metapeltidial structures, arranged in a transversal row.

### Genus *Ischyropsalis* C.L. Koch, 1839b (22 species, 4 subspecies)

*Ischyropsalis* C.L. Koch, 1839b: 23; type species *Ischyropsalis kollari* C.L. Koch, 1839b by subsequent designation (Thorell 1876: 467).

*Lhermia* Lucas 1866: 44; type species *Lhermia spinipes* Lucas 1866 by monotypy;—syn. Simon 1972b: 484 (because found to be a nomen nudum); Martens 1969: 213.

*Ischiropsalis*—Simon 1872a: 227 (misspelling).

*Lermia*—Simon 1872b: 484 (misspelling).

*Ischyropsalis (Odontopalpa)* Hadži, 1931: 113;—syn. Martens 1969: 189.

**Remarks.** Establishment of the present-day taxonomy and validating species-specific characters in *Ischyropsalis* have been mainly facilitated by the thorough revision of Martens (1969). Having been unable to borrow many types from the Iberian Peninsula, part of his work remained hypothetical for that local fauna, which was later

corrected by Dresco (e.g. 1970, 1972), Luque (1991, 1992) and Prieto (1990a, 1990b). Of the 42 species described or emended by Roewer (1914, 1916, 1923, 1950, 1953a) only two remain valid. Species delineation and discovery of new species in northern Spain are still in progress (L. Labrada and C. Prieto, pers. comm.).

**Etymology.** Gender feminine; from Greek “*ischyros*” (robust, strong) and “*psalis*” (scissor), referring to the enlarged chelicerae.

***adamii*** Canestrini, 1873; loc. typ.: Italian Peninsula, Golfo de Squillace.

*Ischyropsalis adamii* Canestrini, 1873: 50;—Martens 1969: 205 (redescr.). **Remarks.** Martens (1969: 205) reported Roewer’s (1950: 33) lectotype of *adamii* (SMF RI/976) as invalid and SMF data indicate that the lectotype locality could be “Como”, suggesting that the lectotype belongs to *I. carli*. A lectotype designation is only necessary if the species definition is questionable (ICZN 75), which is currently not the case.

*Ischyropsalis apuanus* Caporiacco, 1930: 125;—syn. Martens 1969: 205.

*Ischyropsalis kratochvili* Roewer, 1950: 32;—syn. Martens 1969: 205.

*Ischyropsalis amseli* Roewer, 1950: 33;—syn. Martens 1969: 205.

*Ischyropsalis apuana*—Roewer 1950: 36.

*Ischyropsalis apuanus nanus* Dresco, 1968b: 751; **syn. n.:** Dresco (1968b) described this subspecies, while Martens (1969) synonymised *I. apuana* likely without knowing about *nanus*.

***cantabrica*** Luque & Labrada, 2012: 28; loc. typ.: Spain, Cantabria, Alfoz de Lloredo, Oreña Rogeria Cave.

***carli*** Lessert, 1905; loc. typ.: Switzerland, Graubünden. **Remarks.** Schuls-Fettan (today Scuol-Ftan), the first of three localities listed by Lessert (1905) and separated from the others by a distance of 40 km, is to be favoured as explicit type locality.

*Ischyropsalis carli* Lessert, 1905: 658.

*Ischyropsalis pentelica* Roewer, 1950: 30;—syn. Martens 1969: 209.

***dentipalpis*** Canestrini, 1872; loc. typ.: Italy, Aosta Valley, Gressoney-St. Jean.

*Ischyropsalis dentipalpis* Canestrini, 1872: 9;—Schönhofer & Martens 2010b: 4 (redescr.).

*Ischyropsalis helvetica* Roewer, 1916: 152;—syn. Schönhofer & Martens 2010b: 4.

***dispar*** Simon, 1872a; loc. typ.: Spain, Vizcaya, Orduño, Cueva de Albia.

*Ischyropsalis dispar* Simon, 1872a: 227.

*Ischyropsalis goodnighti* Roewer, 1950: 31;—syn. Martens 1969: 256.

*Ischyropsalis archeri* Roewer, 1950: 48;—syn. Martens 1969: 256.

*Ischyropsalis noltei* Dresco, 1972: 121;—syn. Prieto 1990b: 286.

***gigantea*** Dresco, 1968a: 308; loc. typ.: Spain, Santander, Cueva la Cañuela.

***hadzii*** Roewer, 1950; loc. typ.: Slovenia, Mokritz Mountain, Zlavka Cave.

*Ischyropsalis hadzii* Roewer, 1950: 52;—Martens 1969: 242 (redescr.). **Remarks.** Originally described as *Phalangium cancroides* Schmidt, 1851: 61 Roewer (1950) assumed the name preoccupied (Müller 1776: 192) and changed it to *hadzii*. Müller (1776) might have referred to *Acarus cancroides* Linnaeus, 1758: 616 (transferred to *Phalangium* by Linnaeus 1767: 1028), now recognised as a pseudoscorpion. Meanwhile, the name *hadzii* is in frequent use and established, and should not be altered. Roewer (1923: 683; also Hadži 1954: 141) questioned a specimen labelled “*Ischyropsalis cavernosum* Schmidt” (Krain, Zoological Institute University of Vienna) being the type of *cancroides*, which was not verified.

***hellwigii hellwigii*** (Panzer, 1794); loc. typ.: Germany, Elm Mountain (Elem) near Destedt, Braunschweig (reconstructed by Martens 1969). **Remarks.** Changes to the original spelling “*hellwigii*” are prohibited (ICZN 33.4).

*Phalangium hellwigii* Panzer, 1794: 18.

*Ischyropsalis hellwigii*—C.L. Koch 1839b: 24.

*Ischyropsalis herbstii* C.L. Koch, 1847: 68;—syn. Martens 1969: 196.  
*Ischyropsalis hellwigii*—Sørensen in Lendl 1894: 20.  
*Ischyropsalis taunica* Müller, 1924: 418;—Roewer 1923: 683 (as nomen nudum); syn. Martens 1965: 144; Martens 1969: 197. **Remarks.** Roewer pre-published a description provided by Müller and acknowledged Müller to be the author, who officially named it a year later. Hadži (1954) placed *I. crassichelis* and *I. plicata* in the synonymy of *I. taunica*, the latter synonymised by Martens (1965).  
*Ischyropsalis plicata* Roewer, 1923: 692;—Hadži 1954: 159; syn. Martens 1969: 197.  
*Ischyropsalis pectinifera* Hadži, 1928: 30;—syn. Hadži 1954: 159; Martens 1969: 197.  
*Ischyropsalis frankenbergeri* Bartoš, 1938: 155;—syn. Martens 1969: 197.  
*Ischyropsalis franzi* Roewer, 1950: 22;—syn. Martens 1969: 197.  
*Ischyropsalis crassichelis* Roewer, 1950: 25;—syn. Hadži 1954: 159; Martens 1969: 197.

**hellwigii lucantei** Simon, 1879a; loc. typ.: France, Dép. Hautes-Pyrénées, Grotte de Bétharram.

*Ischyropsalis lucantei* Simon, 1879a: 273;—Dresco 1966: 814.  
*Ischyropsalis superbus* Simon, 1881a: 129;—syn. Martens 1969: 200.  
*Ischyropsalis superba*—Simon 1881a: 130; Roewer 1914: 117.  
*Ischyropsalis hellwigii lucantei*—Martens 1969: 200. **Remarks.** Dresco (1966: 814) found *lucantei* and *superba* conspecific but regarded the juvenile type of *lucantei* as invalid, an error corrected by Martens (1969: 200).

**hispanica** Roewer, 1953a; loc. typ.: Spain, Sierra de Ancares, Cabana vella.

*Ischyropsalis hispanica* Roewer, 1953a: 208;—Prieto 1990a: 319 (redescr.).  
*Ischyropsalis hispanum*—Roewer 1953a: 208 (misspelling).

**kollari** C.L. Koch, 1839b; loc. typ.: Austria, Salzburg, Gastein.

*Ischyropsalis kollari* C.L. Koch, 1839b: 24—C.L. Koch 1840: 19 (description).  
*Ischyropsalis bosnica* Roewer, 1914: 107;—syn. Martens 1969: 236.  
*Ischyropsalis (Odontopalpa) triglavensis* Hadži, 1931: 113;—syn. Martens 1969: 236.  
*Ischyropsalis danubia* Roewer, 1950: 21;—Hadži 1954: 152; syn. Martens 1969: 236.  
*Ischyropsalis strasseri* Roewer, 1950: 22;—syn. Martens 1969: 236.  
*Ischyropsalis tirolensis* Roewer, 1950: 23;—syn. Martens 1969: 236.  
*Ischyropsalis styriaca* Roewer, 1950: 23;—syn. Martens 1969: 236.  
*Ischyropsalis reimoseri* Roewer, 1950: 23;—syn. Martens 1969: 236.  
*Ischyropsalis spinichelis* Roewer, 1950: 25;—Hadži 1954: 155; syn. Martens 1969: 236.  
*Ischyropsalis nivalis* Roewer, 1950: 26;—Hadži 1954: 150; syn. Martens 1969: 236.  
*Ischyropsalis scutata* Roewer, 1950: 26;—Hadži 1954: 156; syn. Martens 1969: 236.  
*Ischyropsalis segregata* Roewer, 1950: 28;—syn. Martens 1969: 236.  
*Ischyropsalis troglodytes* Roewer, 1950: 32;—syn. Martens 1969: 236.

**lithoclasica** Schönhofer & Martens, 2010b: 9; loc. typ.: Italy, Bergamo, Stalle del Möschel.

**luteipes** Simon, 1872b; **nomen protectum**; loc. typ.: France, Ariège, Massat, grotte de Le Quère.

*Lhermia spinipes* Lucas 1866: 44; **nomen oblitum**; Simon 1872b: 484. **Remarks.** Reviewing Lucas' (1866) description, *Lhermia spinipes* is presented in a sparse description, in a comparison with other harvestmen and with a distinct type locality. Simon's (1872b) decision to treat the name as a nomen nudum and to provide the new name, *Ischyropsalis luteipes*, is questionable, especially as he seems to have understood *Lhermia spinipes* and *I. luteipes* to be conspecific. However, it is proposed to maintain the use of *luteipes* (ICZN 23.9.1; nomen protectum) because *spinipes* (nomen oblitum) has not been used as a valid name after 1899 (ICZN 23.9.1.1) and *luteipes* has been used in at least 60 works between 1962 and 2012 (ICZN 23.9.1.2).

*Ischyropsalis luteipes* Simon, 1872b: 484 (replacement name).  
*Ischyropsalis pestae* Roewer, 1950: 28;—syn. Martens 1969: 213.  
*Ischyropsalis caporiaccoi* Roewer, 1950: 33;—syn. Martens 1969: 213.

*Ischyropsalis caporiocci*—Martens 1969: 259 (misspelling).

**Remarks.** Dresco (1966: 598, 1970: 1205) defined three different forms or ecological races (*intermedia*, *longipes*, *brevipes*). Nothing is said about how to unambiguously recognise these forms, and they are of no nomenclatural relevance (ICZN 15.2).

**magdalenae** Simon, 1881a; loc. typ.: Spain, Galmádes, Cueva de la Magdalena.

*Ischyropsalis magdalenae* Simon, 1881a: 130;—Prieto 1990b: 289.

*Ischyropsalis madalena*—Roewer 1914: 118 (misspelling).

**manicata** L. Koch, 1869; loc. typ.: Romania (“Siebenbürgen”; not further specified).

*Ischyropsalis manicata* L. Koch, 1869: 164.

*Ischyropsalis ianotai* / *ianotae* Wajgel 1874: 36 (alternative spellings). **Remarks.** Wajgel (1874) mentioned the name *ianotae* in *Ischyropsalis*, and Rafalski (1961: 15, then spelled *ianotai*) recognised it as a nomen nudum.

*Ischiropsalis manicatus*—Lebert 1875 (incorrect ending).

*Ischyropsalis dacica* Roewer, 1916: 153;—syn. Staręga 1966b: 148.

*Ischyropsalis helvetica milleri* Kratochvíl, 1934: 13;—syn. Martens 1969: 217.

*Ischyropsalis kästneri* Roewer, 1950: 19;—syn. Martens 1969: 217.

*Ischyropsalis austriaca* Roewer, 1950: 22;—syn. Martens 1969: 217.

*Ischyropsalis balcanica* Roewer, 1950: 30;—syn. Martens 1969: 217.

*Ischyropsalis milleri*—Hadži 1954: 193.

**Remarks.** Martens (1969) states 1865 as the publication date which is related to a typo on his personal copy. Later authors have adopted this error.

**muellneri** Hamann, 1898; loc. typ.: Slovenia, Častitljiva Cave.

*Ischyropsalis müllneri* Hamann, 1898: 535—Roewer 1950: 26.

*Ischyropsalis mülleri*—Hansen & Sørensen 1904: 5 (misspelling).

*Ischyropsalis corcyraea* Roewer, 1914: 108;—syn. Martens 1969: 245.

*Ischyropsalis alfkeni* Roewer, 1950: 19;—syn. Martens 1969: 245.

*Ischyropsalis muellneri*—Martens 1965: 144; Martens 1969: 246 (redescr.).

**navarrensensis** Roewer, 1950; loc. typ.: Spain, Navarra. **Remarks.** Prieto (1990b) specified *nicaea* and *turki* as synonyms for having false type localities.

*Ischyropsalis turki* Roewer, 1950: 31;—syn. Prieto 1990b: 291.

*Ischyropsalis nicaea* Roewer, 1950: 36;—syn. Prieto 1990b: 291.

*Ischyropsalis navarrensensis* Roewer, 1950: 44.

*Ischyropsalis espagnoli* Dresco, 1968c: 962;—syn. Prieto 1990b: 291.

**nodifera** Simon, 1879a; loc. typ.: France, Basses-Pyrénées, St. Jean de Luz.

*Ischyropsalis nodifera* Simon, 1879a: 270;—Luque 1991: 28 (see Remarks on *petiginosa*).

*Ischyropsalis sharpi* Simon, 1879c: 129;—syn. Simon 1881a: 128 (see Remarks on *petiginosa*).

*Ischyropsalis janetscheki* Roewer, 1950: 22;—syn. Martens 1969: 222; Prieto 1990a: 319.

*Ischyropsalis moreana* Roewer, 1950: 31;—syn. Martens 1969: 222; Prieto 1990a: 319.

*Ischyropsalis corsica* Roewer, 1950: 34;—syn. Martens 1969: 222; Prieto 1990a: 319.

*Ischyropsalis asturica* Roewer, 1950: 48;—syn. Martens 1969: 222; Prieto 1990a: 319.

**petiginosa** Simon, 1913; loc. typ.: Spain, Oviedo, Pimiango, Première grotte de Mazaculos.

*Ischyropsalis petiginosa* Simon, 1913: 384;—Luque 1991: 28.

*Ischyropsalis petiginosa*—Mello-Leitao 1936: 12 (misspelling).

**Remarks.** Luque (1991) confirmed and redescribed *nodifera* and *petiginosa*, but did not unravel Martens' synonymies (1969: 222; *petiginosa* and *sharpi* in syn. of *nodifera*). A revision of these *Ischyropsalis* species needs to comment on the validity of *petiginosa* and *sharpi*.

**pyrenaea pyrenaea** Simon, 1872b; loc. typ.: France, Ariège, Moulis, grotte de l'Estelas.  
*Ischiropsalis helwigi* var. *pyrenaea* Simon, 1872b: 483.  
*Ischyropsalis pyrenaea*—Bedel & Simon 1875: 128.  
*Ischyropsalis moreana* Roewer, 1950: 31;—syn. Martens 1969: 228.  
*Ischyropsalis pyrenaea venasquensis* Dresco, 1967a: 670;—syn. Martens 1969: 228.  
*Ischyropsalis pyrenaea pyrenaea*—Martens 1969: 227.

**pyrenaea alpinula** Martens, 1978: 224; loc. typ.: Italy, Crissolo, Grotta di Rio Martino.

**ravasinii** Hadži, 1942: 11; loc. typ.: Italy, Cansiglio, Bus del Pal.

**robusta** Simon, 1872a; loc. typ.: Spain, Tras-os-Montes, Serra de Gerêz.  
*Ischiropsalis robusta* Simon, 1872a: 230.  
*Ischyropsalis robusta*—Simon 1879a: 276.  
*Ischyropsalis lusitanica* Roewer, 1923: 692;—syn. Martens 1969: 233.

**strandi** Kratochvíl, 1936; loc. typ.: Italy, Monte Baldo, Malgre Prato Cave.  
*Ischyropsalis strandi* Kratochvíl, 1936: 248.  
*Ischyropsalis ruffoi* Caporiacco, 1947: 139;—syn. Juberthie 1963: 330.  
*Ischyropsalis knirschi* Roewer, 1950: 27;—syn. Martens 1969: 249.

## Family Sabaconidae Dresco, 1970

Sabaconidae Dresco, 1970: 1210 (only including *Sabacon*); type genus *Sabacon* Simon, 1879a by monotypy and original designation;—Martens 1978: 225; 1983: 269; Shear 1986: 3 (compr. *Sabacon*, *Taracus*); Giribet *et al.* 2010: 421 (compr. *Hesperonemastoma*, *Sabacon*, *Taracus*); **new composition** (compr. *Sabacon*).

**Diagnosis.** Dyspnoi of the superfamily Ischyropsalidoidea with a disjunct Holarctic distribution. Defined by peculiarities of male genital morphology, molecular phylogenetic evidence and the peculiar shape and functionality of palps. Palps densely set with bottlebrush-shaped hairs, inflated in all parts, most pronounced in females and juveniles; tarsus freely movable to dorsal and ventral side. Chelicerae small to moderate in size, in many species males with glandular fields on dorsal side of proximal cheliceral segment, often associated with large apophyses. Truncus penis of complex shape, with a deeply split base drawn out in two long roots, forming an upside-down Y-structure with the two basal branches bent towards the truncus. A single muscle situated outside the truncus and mounted between the truncus roots, connected with the distal part of the penis by a long tendon running through the truncus. Further characters of truncus, glans and stylus very variable, but penial stylus generally very long, if not modified. Ventral region poorly sclerotised, generally smooth and glossy without armature or microstructure. Labium absent, coxae without coxal apophyses. Frontal margin of opisthosoma with a median furrow. Two metapeltidial sensory cones.

## Genus *Sabacon* Simon, 1879a (35 species, 4 subspecies)

*Sabacon* Simon, 1879a: 266; type species *Sabacon paradoxus* Simon, 1879a by monotypy.  
*Phlegmacera* Packard, 1884: 203; type species *Phlegmacera cavicolens* Packard, 1884, by monotypy;—syn. Roewer 1914: 123.  
*Tomicomerus* Pavesi, 1899: 533; type species *Tomicomerus bryantii* Banks, 1898 by monotypy;—syn. Shear 1986: 5 (see also Remarks on *bryantii*).  
*Parasabacon* Hansen & Sørensen, 1904: 83; type species *Nemastoma crassipalpis* L. Koch, 1879 by monotypy;—syn. Roewer 1914: 123.

**Remarks.** Roewer (1914) and subsequent authors treated *Sabacon* as neuter in gender, while Gruber (2003) clarified it to be masculine, but did not list species names with corrected ending. In a list of species from France



and Spain, Prieto (2008) stated that Gruber had corrected the endings. Additional mandatory changes made for the first time according to Gruber are indicated by “new ending”.

**Etymology.** Gender masculine; from Greek “Sabákon” (Egyptian king). For details see (Gruber 2003).

*akiyoshiensis* Suzuki, 1963; loc. typ.: Japan, Yamaguchi Pref., Miné-shi, Ōmine-machi, Satoyamase, Satoyamase-no-ana Cave.

*Sabacon akiyoshiensis* Suzuki, 1963: 156

*Sabacon akiyoshiense*—Suzuki 1974a: 102.

*altomontanus* Martens, 1983; loc. typ.: France, Dép. Hautes-Pyrénées, SW Lannemézan.

*Sabacon altomontanum* Martens, 1983: 290.

*Sabacon altomontanus*—Prieto 2008: 51.

*astoriensis* Shear, 1975: 24; loc. typ.: USA, Oregon, Clatsop Co., Fort Stevens State Park.

*briggsi* Shear, 1975: 26; loc. typ.: USA, California, Marin Co., Bolinas Ridge.

*bryantii* (Banks, 1898); loc. typ.: USA, Alaska, Mt. St. Elias, Malaspina Glacier. **Remarks.** Changes to the original spelling “*bryantii*” are prohibited (ICZN 33.4). The generic placement of *bryantii* remains to be investigated. It appears to have morphological traits of both *Sabacon* and *Taracus*, but new material is needed for further investigation (Shear 1975, 1986).

*Phlegmacera bryantii* Banks, 1898: 16.

*Tomicomerus bryantii*—Roewer 1914: 127.

*Tomicomerus bispinosus* Pavesi, 1899: 533;—syn. Roewer 1914: 127.

*Tomicomerus bryanti*—Shear 1975: 26 (incorrect subsequent spelling).

*Sabacon bryanti*—Shear 1986: 5.

*cavicolens* (Packard, 1884); loc. typ.: USA, Kentucky, Carter Co., Bat Cave.

*Phlegmacera cavicolens* Packard, 1884: 203.

*Phlegmacera cavicoleus*—Banks 1894b: 52; Banks 1901: 677 (misspellings).

*Nemastoma inops* Packard, 1884: 203;—syn. Shear 2010b: 107.

*Sabacon spinosus* Weed, 1893: 575;—syn. Banks 1894b: 40.

*Sabacon jonesi* Goodnight & Goodnight, 1942: 1; **syn. n. Remarks.** Shear (1975: 8) tentatively placed *jonesi* close to *cavicolens* which is accepted and the synonymy formally established here.

*Hesperonemastoma inops*—Gruber 1970: 138.

*Sabacon cavicolens*—Shear 1975: 13.

*chomolongmae* Martens, 1972: 312; loc. typ.: Nepal, Khumbu, Dhud-Kosi Valley, Lughla.

*crassipalpis* (L. Koch, 1879); loc. typ.: Siberia, Tunguska, 4 mi S om Podsk (see also Martens 1989: 370).

*Nemastoma crassipalpis* L. Koch, 1879: 111.

*Sabacon crassipalpis*—Roewer 1914: 125; Martens 1989: 370 (redescr.); Chemeris & Logunov 2000: 207 (redescr.).

*dentipalpis* Suzuki, 1949; loc. typ.: Japan, Kyoto suburbs, vicinity of Kibuné Shrine.

*Sabacon dentipalpe* Suzuki, 1949: 8; **new ending.**

*dhaulagiri* Martens, 1972: 314; loc. typ.: Nepal, Thakkola, ascend to Dapa-Col.

*distinctus* Suzuki, 1974a; loc. typ.: Japan, Kumamoto Pref., Kamimashiki-gun, Yabé-cho, Fusé-dô Cave.

*Sabacon distinctum* Suzuki, 1974a: 105; **new ending.**

- franzi* Roewer, 1953a: 208; loc. typ.: Spain, Sierra de Ancares.
- gonggashan* Tsurusaki & Song, 1993: 158; loc. typ.: China, Sichuan Prov., Kangding, W slope of Mount Gong-gashan.
- imamurai* Suzuki, 1964: 58; loc. typ.: Japan, Tokyo Pref., Nippara-dô Cave.
- iriei* Suzuki, 1974a: 103; loc. typ.: Japan, Kumamoto Pref., Yatsushiro-gun, Izumi-son, Ochiai, Yayama-daké-notateana.
- jiriensis* Martens, 1972: 317; loc. typ.: Nepal, Jiri, ascend to Chordung.
- ishizuchi* Suzuki, 1974a: 100; loc. typ.: Japan, Ehime Pref., Mount Ishizuchi.
- makinoi makinoi* Suzuki, 1949; loc. typ.: Japan, Hokkaido, Nopporo.  
*Sabacon makinoi* Suzuki, 1949: 15.  
*Sabacon habeii* Suzuki, 1965: 41;—syn. Suzuki 1974a: 90.  
*Sabacon makinoi makinoi*—Suzuki & Tsurusaki 1983: 232.
- makinoi sugimotoi* Suzuki & Tsurusaki, 1983: 232; loc. typ.: Japan, Akita Pref., L. Towada, Haka camping site.
- martensi* Tsurusaki & Song, 1993: 155; loc. typ.: China, Sichuan Prov., Kangding, W slope of Mount Gong-gashan.
- mitchelli* Crosby & Bishop, 1924; loc. typ.: USA, North Carolina, Yancey Co., Mt. Mitchell.  
*Sabacon mitchelli* Crosby & Bishop, 1924: 23;—Shear 1975: 17 (redescr.).
- occidentalis* (Banks, 1894b); loc. typ.: USA, Washington, Olympia.  
*Phlegmacera occidentalis* Banks, 1894b: 51.  
*Sabacon occidentalis*—Shear 1975: 19 (redescr.).
- okadai* Suzuki, 1941: 16; loc. typ.: China, Manchukuo, Moukden.
- palpogranulatus* Martens, 1972; loc. typ.: Nepal, Khumbu, Lughla.  
*Sabacon palpogranulatum* Martens, 1972: 319; **new ending**.
- paradoxus* Simon, 1879a; loc. typ.: France, Dép. Hérault, caves.  
*Sabacon paradoxus* Simon, 1879a: 266;—Gruber 2003: 6; Prieto 2008: 51.  
*Sabacon paradoxum*—Roewer 1914: 124; 1923: 695; Martens 1983: 274.
- pasonianus* Luque, 1991; loc. typ.: Spain, Cantabria, Alto Asón-Miera.  
*Sabacon picosantrum p-asonianum* Luque, 1991: 18.  
*Sabacon picosantrum asonianum*—Luque 1992: 144 (misspelling).  
*Sabacon picosantrum asoniarum*—Luque 1992: 144 (misspelling).  
*Sabacon p-asonianum*—Luque 1992: errata.  
*Sabacon pasonianum*—Luque 1993: 131.  
*Sabacon pasonianus*—Prieto 2008: 51.  
**Remarks.** The different spellings in Luque (1992) are listed in the errata of the same paper and probably reflect no flaw by the author.
- picosantrum* Martens, 1983: 292; loc. typ.: Spain, Picos de Europa, Asturias, “Walking Stick Pot” Cave. **Remarks.** Gruber (in Prieto 2008: 51) considered the species epithet a noun in apposition and therefore did not alter the ending (IUCN 31.2.1).

*pygmaeus* Miyosi, 1942a; loc. typ.: Japan, Ehime Pref., Saraga-Miné Mountains.

*Sabacon pygmaeum* Miyosi, 1942a: 165; **new ending**.

*relictus* Marten, 1972; loc. typ.: Nepal, Kathmandu Valley, Mount Phulchoki.

*Sabacon relictum* Marten, 1972: 320; **new ending**.

*satoikioi* Miyosi, 1942b; loc. typ.: Japan, Ehime Pref., Saraga-Miné Mountains.

*Sabacon sato-ikioi* Miyosi, 1942b: 49.

*Sabacon satoikioi*—Suzuki 1974a: 100.

*sergeidedicatus* Martens, 1989; loc. typ.: Siberia, Altai Mountains, Cherga, Artybash, Teletskoye Lake.

*Sabacon sergeidedicatum* Martens, 1989: 372;—Chemeris & Logunov 2000: 210 (redescr.); **new ending**.

*sheari* Cokendolpher, 1984: 989; loc. typ.: USA, Oregon, Benton Co., Marys Peak.

*simoni* Dresco, 1952: 123; loc. typ.: France, Dép. Alpes-Maritimes, Fôret de Turini.

*siskiyou* Shear, 1975: 22; loc. typ.: USA, California, Siskiyou Co., 3mi N McCloud.

*unicornis* Martens, 1972: 316; loc. typ.: Nepal, Gorapani Pass, betw. Pokhara and Kali-Gandaki Valley.

*viscayanus viscayanus* Simon, 1881a; loc. typ.: Spain, Orduña, Cueva de la Embajada.

*Sabacon viscayanus* Simon, 1881a: 128.

*Sabacon vizcayanus*—Dresco 1952: 122; Gruber 2003: 6; Prieto 2008: 51.

*Sabacon viscayanum viscayanum*—Martens 1983: 277.

*Sabacon viscayasanum viscayasanum*—Luque 1992: 143.

*Sabacon inflatus* **nomen nudum**. **Remarks.** Dresco (1952: 118) found a specimen labelled *inflatus* in Simon's collection to be identical with *viscayanus*. The name reappears as a mere notice in Dresco (1955: 42) and Rambla (1967: 10).

*viscayanus ramblaianus* Martens, 1983; loc. typ.: France, SW Lourdes, Val d'Ouzon, N. Ferrières.

*Sabacon viscayanum ramblaianum* Martens, 1983: 278.

*Sabacon viscayanus ramblaianus*—Prieto 2008: 51.

## Family Taracidae fam. n.

Compr. *Crosbycus* (tentatively), *Hesperonemastoma*, *Taracus*; type genus *Taracus* Simon, 1879b.

**Diagnosis.** Dyspnoi of the superfamily Ischyropsalidoidea with predominantly Nearctic distribution; *Crosbycus* and one *Taracus* species in eastern Asia. Palps elongated, slender and segments not markedly inflated (except for species of *Hesperonemastoma* where males exhibit glandular structures in the palpal femur), set with bottlebrush-shaped hairs, tarsus movable to ventral side only. Chelicerae comparatively large to very large, segments elongated, pincer equipped with mainly diaphanous teeth and few coarse teeth, these predominantly in basal third. Glandular field on first cheliceral segment absent. Truncus penis simple and straight, filled for two thirds with a single muscle; muscular tendon short; base of truncus divided into two broad, root-like structures in line with truncus; truncus base partly opening to a wide cavity (*Hesperonemastoma*) but never exposing the muscle like in *Sabacon*. Glans penis simple and conical, without marked constriction towards truncus, mostly forming a uniformly sclerotised capsule set with uniform spines, tapering into the stylus. Stylus usually simple, relatively short, often bent to the side and sometimes with species-specific modifications (some elaborate, clasper-like mechanisms in *Taracus*). Ventral region moderately to strongly sclerotised. Coxae II with coxal apophyses; labium small. Frontal margin of opisthosoma with (*Taracus*) or without a median furrow. One prominent spine-like metapeltidial structures or none.

*Crosbycus* is here considered to belong to the Taracidae as it partly matches the given diagnosis, especially the similar structure of the penis and the presence of bottlebrush-shaped hairs on slender palps support this placement (Gruber 2007, Shear 1975). As character reduction in the minute *Crosbycus* is likely, its placement is tentative and should be verified by molecular evidence. *Tomicomerus bryantii*, here retained in its current placement in the genus *Sabacon*, shows affinities to Taracidae as well, yet material for a comprehensive re-investigation is lacking.

### Genus *Crosbycus* Roewer, 1914 (1 species)

*Crosbycus* Roewer, 1914: 168; type species *Nemastoma dasyncnemum* Crosby, 1911 by monotypy.

**Etymology.** Gender masculine; in honour of C.R. Crosby, who described the type species.

***dasyncnemus*** (Crosby, 1911); loc. typ.: USA, Columbia State, Hinkson Creek. **Remarks.** The amphi-pacific populations of *Crosbycus dasyncnemus* require investigation for specific distinction.

*Nemastoma dasyncnemum* Crosby, 1911: 20.

*Crosbycus dasyncnemus*—Roewer 1914: 168.

***Crosbycus* considered as invalid:** Gruber and Martens (1968) investigated most of the types of nominal *Crosbycus* species or revisited original literature, concluding that most of them belong to *Nemastoma* or other genera of Nemastomatidae, and thereby excluded *Crosbycus* from the European fauna. If discernible, names are assigned to distinct taxa in the Nemastomatidae. Non-assignable names are listed here. All three of these “species” were described by Roewer in 1951, one from Pentelikon and likely artificially assigned to this locality. This nominal species had not been considered for description before 1951, although Roewer claimed to have collected at this locality in 1927 and immediately described material from that expedition (see also Helversen & Martens 1972: *Ischyropsalis pentelica* Roewer 1950 is *I. carli*). Shear (2008: 67) assumed that the type locality of *Crosbycus goodnighti* is incorrect.

*Crosbycus goodnighti* Roewer, 1951: 151;—Gruber & Martens 1968: 138.

*Crosbycus goodnightorum*—Shear 2008: 67 (incorrect subsequent spelling).

*Crosbycus pentelicus* Roewer, 1951: 152;—Gruber & Martens 1968: 138.

*Crosbycus speluncarum* Roewer, 1951: 152;—Gruber & Martens 1968: 138.

### Genus *Hesperonemastoma* Gruber, 1970 (5 species)

*Hesperonemastoma* Gruber, 1970: 129; type species *Nemastoma pallidimaculosa* Goodnight & Goodnight, 1945 by subsequent designation (Gruber 1970: 130).

**Etymology.** Gender neuter, from Greek “hesperos” (western) combined with “*Nemastoma*“, referring to the Western distribution and the similarity to *Nemastoma*.

***kepharti*** (Crosby & Bishop, 1924); loc. typ.: USA, North Carolina, Buncombe Co., Mt. Pisgah, South Hominy Creek.

*Nemastoma kepharti* Crosby & Bishop, 1924: 24.

*Hesperonemastoma kepharti*—Gruber 1970: 138.

***modestum*** (Banks, 1894b); loc. typ.: USA, California and Washington (indifferent).

*Nemastoma modesta* Banks, 1894b: 52.

*Nemastoma modestum*—Roewer 1923: 677.

*Hesperonemastoma modestum*—Gruber 1970: 140.

*packardi* Roewer, 1914; loc. typ.: USA, Utah, E Lake Point, Clinton's Cave.

*Nemastoma troglodytes* Packard, 1877: 160.

*Nemastoma packardi* Roewer, 1914: 163 (replacement name).

*Hesperonemastoma packardi*—Gruber 1970: 142; Shear 2010b: 106.

**Remarks.** Roewer (1914: 163) applied the new name *packardi*, because he found that *Nemastoma troglodytes* is preoccupied by *Leiobunum troglodytes* Wankel, 1861, a species that Roewer also considered to belong in *Nemastoma*. While today these two would be placed in different genera, the replacement name is valid, being established before 1961 and in use (ICZN 59.3). Shear (2010b: 107) stated that *H. packardi* as redescribed by Gruber (1970) may represent a new species.

*pallidimaculosum* (Goodnight & Goodnight, 1945); loc. typ.: USA, Alabama, Marshall Co., S Oleander, Rock House Cave.

*Nemastoma pallidimaculosa* Goodnight & Goodnight, 1945: 241.

*Hesperonemastoma pallidimaculosum*—Gruber 1970: 134.

*smilax* Shear, 2010b: 107; loc. typ.: USA, West Virginia, Greenbrier Co., McClung's Cave.

### Genus *Taracus* Simon, 1879b (8 species)

*Taracus* Simon, 1879b: 74; type species *Taracus packardi* Simon, 1879b by monotypy;—Roewer 1950: 52.

**Remarks.** Many species descriptions lack explicit type localities and are partly based on juvenile specimens. A revision is overdue and in progress (Shear pers. comm.).

**Etymology.** Gender masculine; from Greek “Tarakus”, an Egyptian king (Gruber 2003).

*birsteini* Ljovuschkin, 1971: 127; loc. typ.: Far East Russia, southern Primorsky Krai, Belii Dvoretz Cave.

**Remarks.** A redescription was erroneously published under *Nipponopsalis coreana* (Chemeric 2000: 47).

*gertschi* Goodnight & Goodnight, 1942: 1; loc. typ.: USA, eastern Oregon.

*malkini* Goodnight & Goodnight, 1945: 242; loc. typ.: USA, California, Shasta Co., Lassen NP, Manzanita Lake.

*nigripes* Goodnight & Goodnight, 1943: 647; loc. typ.: USA, Colorado, Mineral Co., Wolf Creek Pass.

*packardi* Simon, 1879b: 74; loc. typ.: USA, Colorado.

*pallipes* Banks, 1894c: 161; loc. typ.: USA, Washington. **Remarks.** From 1914: 123 on Roewer states “Olympia” as type locality and added “Mt. Shasta” in 1923: 694, both likely errors. Banks (1894c: 161) mentioned only Washington State as locus typicus, while acknowledging T. Kincaid from Olympia to have sent him the material (Banks 1894c: 160). The label of the paratype in the Roewer collection (SMF RII/984) may not be reliable and should be checked against Banks' original label.

*silvestrii* Roewer, 1929: 10; loc. typ.: USA, Oregon, Josephine Co., Oregon Cave. **Remarks.** Frequently cited as 1930, the valid publication date is 06.Aug.1929.

*spinusus* Banks, 1894b; loc. typ.: USA, California. **Remarks.** Roewer (1914: 121) states “Southern California” without having seen material; probably an error.

*Taracus spinosa* Banks, 1894b: 51.

*Taracus spinusus*—Roewer 1914: 121.

## Superfamily Troguloidea Sundevall, 1833

Trogulides Sundevall, 1833: 35 (defined as one of three families in Opiliones); type genus *Trogulus* Latreille, 1802 as inferable from the stem of the family name (ICZN 11.7.1.1).

Nemastomoidae—Thorell 1876: 466 (compr. *Anelasma*, *Dicranolasma*, *Ischyropsalis*, *Nemastoma*, *Trogulus*).

Troguloidea—Shear 1974: 67 (compr. Ischyropsalidae, Nemastomatidae, Trogulidae, Sabaconidae); Martens 1976: 64; 1978: 55, 186 (compr. Dicranolasmatidae, Nemastomatidae, Nipponopsalididae, Trogulidae).

## Family Dicranolasmatidae Simon, 1879a

Dicranolasmatinae Simon, 1879a: 290 (compr. *Dicranolasma*, *Amopaum*); type genus *Dicranolasma* Sørensen, 1873 as inferable from the stem of the family name (ICZN 11.7.1.1);—Šilhavý, 1967: 176 (compr. *Dicranolasma*, genera of the Ortholasmatinae established later).

Dicranolasmatidae—Pocock 1902: 509 (contains only *Dicranolasma*); Gruber 1974b: 34.

Dicranolasmatidae—Gruber 1974b: 36.

## Genus *Dicranolasma* Sørensen, 1873 (16 species)

*Dicranolasma* Sørensen, 1873: 516; type species *Opilio scaber* Herbst, 1799 by subsequent designation (Martens 1978: 152);—Gruber 1974b: 34.

*Amopaum* Sørensen, 1873: 517; type species *Amopaum spinipalpe* Sørensen, 1873 by monotypy;—syn. Dahl 1903: 282.

*Dicranolasma*—Goodnight & Goodnight 1944: 3 (misspelling).

**Remarks.** Sørensen (1873: 516) assigned *scabrum* as type species for *Dicranolasma*, while he used a specimen of *opilionoides* for the morphological delineation of his genus. Thorell recognised additional species, also *D. opilionoides*, but confirmed the type species as *scabrum* (1876: 467). Later, Šilhavý (1956a) cited *opilionoides* as type, but without reference to ICZN 70.3.2 or further explanation, not qualifying this act as correcting the type species to the species used for the genus definition (ICZN 70.3). Martens (1978: 152; in reference to J. Gruber) suggested to use the original species *scabrum* sensu Herbst (1799) as type, which is in agreement with ICZN 70.3.1., and should be followed. Martens (1978) stabilised the situation further by redefining *scabrum*, giving a thorough description and specifying its type locality.

**Etymology.** Gender neuter; Greek from „di” (two) “kranion” (head) and “elasma” (plate), referring to the bifurcate head cap carrying the eyes and appearing like a split head.

*apuanum* Marcellino, 1971: 368; loc. typ.: Italy, Alpi Apuane, Pizzo Baldozzana.

*cretaeum* Gruber, 1998: 524; loc. typ.: Greece, Crete, Nomos Rethímnis, Perama.

*cristatum* Thorell, 1876; Italy, Florence.

*Dicranolasma cristatum* Thorell, 1876: 506;—Martens 1978: 160 (redescr.).

*giljarovi* Šilhavý, 1966b: 153; loc. typ.: Russia, Krasnodar, Krasnaja Poljana.

*hirtum* Loman, 1894: loc. typ.: Sumatra (erroneous; see Remarks).

*Dicranolasma hirtum* Loman, 1894: 156;—Chemini 1995: 4.

*Dicranolasma diomedaeum* Kulczyński, 1907: 583; **syn. n.** by J. Gruber (see Remarks).

*Dicranolasma napoli* Goodnight & Goodnight, 1944: 3;—syn. Brignoli 1968: 288 (with *diomedaeum*).

*Dicranolasma diomedaem*—Brignoli 1968: 285 (misspelling).

**Remarks.** According to J. Gruber (pers. comm.) *D. diomedaeum* has to be considered as a junior synonym of *D. hirtum*, and this nomenclatural act is here attributed to him. While the type locality of *D. hirtum* (Sumatra) is obviously an error, Gruber suggested considering “Southern Italy” as the real type locality. A narrower definition is proposed here, using the type locality of *D. diomedaeum* (Italy, Tremiti Islands, S. Domino) for *D. hirtum*. Chemini (1995: 4) probably learned from Gruber about the synonymy and listed only *D. hirtum*.

*hoberlandti* Šilhavý, 1956b: 32; loc. typ.: Turkey, East Taurus, Suluhan.

*kurdistanum* Staręga, 1970: 475; loc. typ.: Iraq, Kurdistan, Erbil, Salahaddin.

*mladeni* Karaman, 1990: 144; loc. typ.: Montenegro, Manastir Morača.

*opilionoides* (L. Koch, 1867); loc. typ.: Greece, Corfu.

*Trogulus opilionoides* L. Koch, 1867: 883.

*Amopaum spinipalpe* Sørensen, 1873: 518;—syn. Dahl 1903: 291.

*Dicranolasma kettyi* Marcellino, 1968: 122;—syn. Gruber 1998: 535.

*Dicranolasma kettyae*—Staręga 1970: 276 (misspelling).

*pauper* Dahl, 1903; loc. typ.: Italy, NW of Lake Garda.

*Dicranolasma pauper* Dahl, 1903: 290;—Martens 1978: 161 (redescr.).

*ponticum* Gruber, 1998: 513; loc. typ.: Turkey, Vilayet Ordu, ca. 5 km NE Ulubey.

*ressli* Gruber, 1998: 507; loc. typ.: Turkey, Vilayet Konya, Sultandağ W Akşehir.

*scabrum* (Herbst, 1799); loc. typ.: Hungary. **Remarks.** Martens (1978: 156) redefined the type locality to be Romania, Sibiu, which was within the borders of Hungary in 1799.

*Opilio scaber* Herbst, 1799: 15.

*Dicranolasma scabrum*—Sørensen 1873: 516; Martens 1978: 153 (redescr.).

*Dicranolasma schmidtii* Hadži, 1928: 11;—syn. Martens 1978: 153. **Remarks.** Martens (1978) stated to have received information from J. Gruber that led to this synonymisation.

*soerensenii* Thorell, 1876; loc. typ.: France, Nice. **Remarks.** Changing the original spelling “*soerensenii*” is prohibited (ICZN 33.4).

*Dicranolasma soerensenii* Thorell, 1876: 505.

*Dicranolasma latifrons* Simon, 1879a: 295;—syn. Martens 1978: 157.

*Dicranolasma wiehlei* Kraus, 1959: 295;—syn. Martens 1978: 157. **Remarks.** Martens (1978) stated to have received information from J. Gruber that led to this synonymisation.

*Dicranolasma soerenseni*—Marcellino 1980: 325 and most subsequent authors (incorrect subsequent spelling).

*thracium* Staręga, 1976; loc. typ.: Bulgaria, Isval near Čirpan.

*Dicranolasma thracium* Staręga, 1976: 308—Gruber 1998: 498. **Remarks.** Staręga (1976) stated *D. thracium* to be a nomen nudum and to be formally described by Gruber, but provided characters qualifying a description. Gruber (1980) later accepted Staręga as author (ICZN 50), designated a lectotype and depicted more typical penes of the species.

*verhoeffi* Dahl, 1903: 291; loc. typ.: not specified by Dahl (1903). Gruber (in Moritz 1971: 213) designated a lectotype from Southern Herzegovina, thereby fixing the type locality.

## Family Nemastomatidae Simon, 1872a

Nemastomidae Simon, 1872a: 226 (compr. *Nemastoma*, *Ischyropsalis*); type genus *Nemastoma* C.L. Koch, 1836b as inferable from the stem of the family name (ICZN 11.7.1.1).

Nemastomatidae Simon, 1879a: 277 (*Nemastoma*).

**Remarks.** Later definitions of Nemastomatidae mostly added the many subsequently described genera, but did not feature substantial transfers between families. These changes in the composition of the family are not further listed,

except for the following: described earlier, members of today's Ortholasmatinae were placed in Trogludidae (Banks 1894a: 11) and transferred to Nemastomatidae by Martens (1969: 185).

### **Subfamily Ortholasmatinae Shear & Gruber, 1983**

Ortholasmatinae Shear & Gruber, 1983: 13; type genus *Ortholasma* Banks, 1894a by original designation;—Shear 2006: 192; Shear 2010a: 15.

**Remarks.** Gruber (1976) suggested organising Nemastomatidae in only two subfamilies which Martens (1978) followed, giving a new definition of Kratochvíl's (1958) Nemastomatinae. Martens (1978) stated Ortholasmatinae to be officially described by Gruber, who effected this in 1983 together with Shear. Shear and Gruber (1983) considered the names ending in “-lasma” as derived from *Dicranolasma*, therefore neuter, and changed endings of species names accordingly.

The Ortholasmatinae were partly revised by Shear (2010a), who expected more undiscovered species to occur in Central America and Asia, some of them presently studied.

### **Genus *Cladolasma* Suzuki, 1963 (2 species)**

*Cladolasma* Suzuki, 1963: 40; Shear 2010a: 17; type species *Cladolasma parvula* Suzuki, 1963 by monotypy and original designation.

**Remarks.** Suzuki (1974b) synonymised *Cladolasma* with *Dendrolasma* when he was able to compare adult specimens of both genera. Revising the Ortholasmatinae, Shear (2010a) re-established *Cladolasma* for the Asian species.

**Etymology.** Gender neuter; Greek from “klados” (branch), referring to the multi-branched hood, and “elasma” (plate), both in reference to *Dendrolasma*.

**angka** (Schwendinger & Gruber, 1992); loc. typ.: Thailand, Chiang Mai Province, Doi Inthanon National Park.

*Dendrolasma angka* Schwendinger & Gruber, 1992: 57.

*Cladolasma angka*—Shear 2010a: 17.

**parvulum** Suzuki, 1963; loc. typ.: Japan, Shikoku, Ehime, Mt. Ishizuchi.

*Cladolasma parvula* Suzuki, 1963: 41.

*Dendrolasma parvula*—Suzuki 1974b: 122.

*Dendrolasma parvulum*—Shear & Gruber, 1983: 60.

*Cladolasma parvulum*—Shear 2010a: 17.

### **Genus *Dendrolasma* Banks, 1894a (2 species)**

*Dendrolasma* Banks, 1894a: 12; type species *Dendrolasma mirabilis* Banks, 1894a by monotypy.

**Etymology.** Gender neuter; from Greek “dendron” (tree), referring to the multi-branched hood, and “elasma” (plate).

**mirabile** Banks, 1894a; loc. typ.: USA, Washington, Olympia.

*Dendrolasma mirabilis* Banks, 1894a: 12.

*Dendrolasma mirabile*—Martens 1978: 38; Shear & Gruber 1983: 51 (redescr.).

**dentipalpe** Shear & Gruber, 1983: 58; loc. typ.: USA, California, Humboldt Co., Carlotta.



### Genus *Martensolasma* Shear, 2006 (1 species)

*Martensolasma* Shear, 2006: 192; type species *Martensolasma jocheni* Shear, 2006 by monotypy and original designation.

**Etymology.** Gender neuter; formed from “Martens” (German opilionologist) and „elasma“.

*jocheni* Shear, 2006: 193; typ. loc.: Mexico, Aguascalientes, Ciudad Aguascalientes.

### Genus *Ortholasma* Banks, 1894a (5 species)

*Ortholasma* Banks, 1894a: 11; type species *Ortholasma rugosa* Banks, 1894a by monotypy.

**Etymology.** Gender neuter; combination of Greek “orthos” (straight), referring to the hood pointing horizontally, and “elasma” (plate).

*colossus* Shear, 2010a: 19; loc. typ.: USA, California, Tulare Co., Sequoia National Park, Bear Den Cave.

*coronadense* Cockerell, 1916; loc. typ.: USA, California, Coronado Islands, South Island.

*Ortholasma coronadense* Cockerell, 1916: 158.

*Ortholasma coronadensis*—Roewer 1923: 649.

*Ortholasma setulipes* Shear & Gruber, 1983: 38;—syn. Shear & Gruber 1987: 135.

*levipes* Shear & Gruber, 1983: 31; loc. typ.: USA, California, San Luis Obispo Co., Los Padres National Forest, La Panza, Navajo Camp.

*pictipes* Banks, 1911; loc. typ.: USA, California, Humboldt Co. (Humboldt Co. specified by Shear & Gruber 1983: 25 (redescr.)).

*Ortholasma pictipes* Banks, 1911: 417;—Shear & Gruber 1983: 25 (redescr.).

*rugosum* Banks, 1894a; loc. typ.: USA, Central California. **Remarks.** Shear and Gruber (1983: 15) restricted the type locality of *rugosum* to Central California. However, the type locality may be further specified, as they reported the syntype series of *rugosum* to include specimens of *levipes*, both known to co-occur in Sonoma County, only.

*Ortholasma rugosa* Banks, 1894a: 12; Roewer 1923: 648.

*Ortholasma rugosum*—Shear & Gruber 1983: 15 (redescr.).

### Genus *Trilasma* Goodnight & Goodnight, 1942 (9 species)

*Trilasma* Goodnight & Goodnight, 1942: 7; type species *Trilasma bolivari* Goodnight & Goodnight, 1942 by monotypy and original designation;—Shear 2010a: 11.

*Ruaxphilos* Goodnight & Goodnight, 1945: 249; type species *Ruaxphilos petrunkevitchou* Goodnight & Goodnight, 1945 by monotypy and original designation;—syn. Gruber 1978: 106.

**Remarks.** Shear and Gruber (1983: 42) stated that they synonymised *Ruaxphilos*, effected earlier by Gruber (1978: 106), who tentatively assigned *Ruaxphilos petrunkevitchou* to *Ortholasma bolivari*.

**Etymology.** Gender neuter; combination of Greek “tria” (three) and „elasma“ (plate), referring to the three linear hood elements.

*bolivari* Goodnight & Goodnight, 1942; loc. typ.: Mexico, Puebla, Rio Friu.

*Trilasma bolivari* Goodnight & Goodnight, 1942: 7;—Shear 2010a: 38.

*Ortholasma bolivari*—Shear & Gruber 1983: 42 (redescr.).

*Ruaxphilos petrunkevitchou* Goodnight & Goodnight, 1945: 250;—syn. Gruber 1978: 106; Shear 2010a: 26. **Remarks.** Shear (2010a: 26) questioned the assignment of *petrunkevitchou* to *bolivari* because the localities seem very distant from each other.

*chipinquensis* Shear, 2010a: 37; loc. typ.: Mexico, Nuevo León, Monterrey, Chipinque Mesa.

*hidalgo* Shear, 2010a: 39; loc. typ.: Mexico, Hidalgo, Pachuco, El Chico.

*petersprousei* Shear, 2010a: 35; loc. typ.: Mexico, San Luis Potosí, S Aquismón, Hoya de las Guaguas.

*ranchonuevo* Shear, 2010a: 27; loc. typ.: Mexico, Tamaulipas, Rancho Nuevo.

*sbordonii* Šilhavý, 1973: 191; loc. typ.: Mexico, Tamaulipas, Gomez Farias, Cueva de la Perra. **Remarks.** *Trilasma sbordoni* differs in many respects from other *Trilasma* and also *Ortholasma*, as e.g. in exhibiting long, blade-like spines on a penial glans that seems inflated in comparison to the truncus (Šilhavý, 1973). Further investigation is recommended if *sbordonii* is to be treated as an independent lineage.

*tempestado* Shear, 2010a: 32; loc. typ.: Mexico, Nuevo León, S San Josecito, Cueva de Polvo Tempestado.

*trispinosum* Shear, 2010a: 29; loc. typ.: Mexico, Veracruz, Puerto del Aire.

*tropicum* Shear, 2010a: 41; loc. typ.: Honduras, “Las Ventas”. **Remarks.** Shear (2010a) could not locate Las Ventas in Honduras and advised to treat the geographical information with care.

## Subfamily Nemastomatinae Simon, 1872a

Nemastomidae Simon, 1872a: 226; see Nemastomidae.

Nemastomatinae—Kratochvíl 1958: 530; type genus *Nemastoma* by subsequent designation (see Remarks); Gruber 1976: 800; Martens 1978: 93 (see Nemastomatidae).

Giljaroviinae Kratochvíl, 1958: 530; type species *Giljarovia rossica* Kratochvíl, 1958 by original designation;—syn. Gruber 1976: 800.

Mitostominae Kratochvíl, 1958: 530; type species *Phalangium chrysomelas* Hermann, 1804 by original designation;—syn. Gruber 1976: 800.

**Remarks.** The genus *Nemastoma* was redefined to contain only a small set of mainly Central European species (Gruber & Martens 1968), but up to now many other species of Nemastomatidae resided in their original placement as *Nemastoma*. Species are here pragmatically removed from *Nemastoma* sensu Gruber and Martens and assigned to other genera, while it is acknowledged that other authors were more careful in transferring species from *Nemastoma* to other genera (e.g. to *Nemastomella*; Prieto 2004).

Kratochvíl (1958) investigated many of the species known in his days and established a widely accepted taxonomy. He unfortunately only provided species counts for his genera and rarely listed species names. Generic assignment is only attributed to Kratochvíl when clearly perceivable.

## Genus *Acromitostoma* Roewer, 1951 (2 species)

*Acromitostoma* Roewer, 1951: 150; type species *Acromitostoma rhinoceros* Roewer, 1951 by monotypy and original designation;—Kratochvíl 1958: 530; Gruber 1976: 799; Rambla 1983: 22.

*Carinostoma* (*Hispanostoma*) Kratochvíl, 1958: 530; type species *Carinostoma* (*Hispanostoma*) *hispanum* Roewer, 1917 by monotypy;—syn. Gruber 1976: 799; Rambla 1983: 22.

**Etymology.** Gender neuter; combination of the Greek “akros” (pointed), referring to the long, spine-like tubercle on the eye mound of the type species, combined with the genus name „mitostoma“.

**hispanum** (Roewer, 1917); loc. typ.: Spain, vicinity of Granada.

*Nemastoma hispanum* Roewer, 1917: 156.

*Carinostoma (Hispanostoma) hispanum*—Kratochvíl 1958: 530.

*Acromitostoma hispanum*—Gruber 1976: 799; Rambla 1983: 22, 24 (redescr.).

**Remarks.** Gruber (1976: 799) synonymised *Carinostoma (Hispanostoma)* with *Acromitostoma* while Rambla (1983: 22) assumed he did not, yet she reconfirmed the synonymy.

**rhinoceros** (Roewer, 1917); loc. typ.: Spain, near Malaga.

*Nemastoma rhinoceros* Roewer, 1917: 157.

*Acromitostoma rhinoceros*—Roewer 1951: 150; Kratochvíl 1958: 530; Gruber 1976: 799.

*Acromitostoma rhinocerus*—Rambla 1983: 21 (misspelling, redescr.).

### Genus *Carinostoma* Kratochvíl, 1958 (3 species)

*Mitostoma (Carinostoma)* Kratochvíl, 1958: 530; type species *Nemastoma carinatum* Roewer, 1914 by original designation.

*Carinostoma*—Staręga 1976: 342; Martens 1978: 135.

**Etymology.** Gender neuter; combination of the Latin “carina” (keel), referring to the keels formed by anvil-shaped tubercles, and „stoma“, in reference to *Nemastoma*.

**carinatum** (Roewer, 1914); loc. typ.: Herzegovina, Jablanica.

*Nemastoma carinatum* Roewer, 1914: 165.

*Mitostoma (Carinostoma) carinatum*—Kratochvíl 1958: 530; Hadži 1973b: 14.

*Carinostoma carinatum*—Martens 1978: 135.

**elegans** (Sørensen, 1894); loc. typ.: Hungary (not further specified).

*Nemastoma elegans* Sørensen in Lendl, 1894: 29

*Nemastoma elegans* var. *batorligetiense* Szalay, 1952: 308;—syn. Martens 1978: 137.

*Mitostoma (Carinostoma) elegans*—Kratochvíl 1958: 572.

*Carinostoma elegans*—Martens 1978: 137.

*Carinostoma elegans batorligetiense*—Loksa 1991: 685.

**Remarks.** Loksa (1991: 685) re-established *batorligetiense* as a subspecies, which is not followed here as the outlined characters should be considered as variants.

**ornatum** (Hadži, 1940); loc. typ.: S Serbia (now Kosovo), Šar-Mountains, Kačanik.

*Nemastoma ornatum* Hadži, 1940: 8.

*Mitostoma (Mitostoma) ornatum*—Hadži 1973b: 14.

*Carinostoma ornatum*—Staręga 1976: 342.

**Remarks.** When defining *Carinostoma*, Kratochvíl (1958) listed only *carinatum* and *elegans*. One can assume that he also included *Nemastoma ornatum* in *Carinostoma* as he mentioned three species in this well-defined group. Staręga (1976) formally placed *ornatum* in *Carinostoma*.

### Genus *Caucnemastoma* Martens, 2006 (2 species)

*Caucnemastoma* Martens, 2006: 180; type species *Caucnemastoma golovatchi* Martens, 2006 by monotypy and original designation.

**Etymology.** Gender neuter; abbreviation of “Caucasus”, referring to the geographic origin, combined with “Nemastoma”.

**golovatchi** Martens, 2006: 180; loc. typ.: Russia, Krasnodar Prov., pasture Abago near Guzeripl.

*martensi* Snegovaya, 2011 (in Snegovaya & Chumachenko 2011: 118); loc. typ.: Russia, Sochi, N Khosta, Caucasian State Natural Biospheric Reserve, yew and box-tree grove.

### Genus *Centetostoma* Kratochvíl, 1958 (4 species)

*Centetostoma* (*Centetostoma*) Kratochvíl, 1958: 530; type species *Nemastoma centetes* Simon, 1881b by monotypy and original designation;—Martens 1978: 139; 2011: 38.

**Remarks.** Without providing species names, Martens (1978: 140) included *Nemastoma* of the *bacilliferum* group discussed by Dresco (1967b) and Rambla (1968) within *Centetostoma*. Staręga (1986: 303) assigned the older available name *Nemastomella* to this assembly, gave a full list of species (1986: 304) but mentioned *centetes* as relatively isolated. Prieto (2004: 108) resolved this heterogeneity by restoring *Centetostoma* for *centetes* and Martens (2011: 38) finally redefined *Centetostoma*, including *centetes* and three species previously in *Nemastoma*.

**Etymology.** Gender neuter; combination of probably Greek “kentetes” (piercer), repeating and referencing the type species’ name (having rows of long, spine-like cones on the dorsal side) and „stoma“, in reference to *Nemastoma*.

*centetes* (Simon, 1881b); loc. typ.: France, Dép. Alpes-Maritimes, St. Martin Lantosque.

*Nemastoma centetes* Simon, 1881b: 89;—Roewer 1923: 674.

*Centetostoma centetes*—Kratochvíl 1958: 530; Martens 1978: 140 (redescr.); 2011: 38; Prieto 2004: 108.

*Mitostoma centetes*—Marcellino 1975: 124.

*Nemastomella centetes*—Staręga 1986: 304.

*juberthiei* Martens, 2011: 47; loc. typ.: France, Dép. Pyrénées-Orientales, SW Quillan, Lac des Bouillouses.

*scabriculum* (Simon, 1879a); loc. typ.: France, Dép. Hautes-Pyrénées, Saint-Sauveur.

*Nemastoma scabriculum* Simon, 1879a: 284;—Rambla 1980: 198.

*Centetostoma scabriculum*—Martens 2011: 39 (redescr.).

*ventalloi* (Mello-Leitao, 1936); loc. typ.: Spain, Lleida Prov., Val d’Aran.

*Nemastoma ventalloi* Mello-Leitao, 1936: 9.

*Centetostoma ventalloi*—Martens 2011: 41 (redescr.).

### Genus *Giljarovia* Kratochvíl, 1958 (10 species)

*Giljarovia* Kratochvíl, 1958: 530; type species *Giljarovia rossica* Kratochvíl, 1958 by monotypy;—Kratochvíl 1959: 1348; Gruber 1976: 797; Martens 2006: 151.

*Malekia* Kratochvíl, 1958: 530; type species *Malekia stridula* Kratochvíl, 1958 by monotypy;—syn. Gruber 1976: 797.

**Remarks.** Kratochvíl (1958) introduced and briefly defined *Giljarovia* and *Malekia* as new genera in 1958, but gave full descriptions in 1959, which was erroneously cited as the year of description by Martens (2006). Kratochvíl (1958) summarised both genera as Giljaroviinae on the basis of their unique stridulatory mechanism. Gruber (1976) rejected the subfamily and synonymised *Malekia* with *Giljarovia*, by claiming that stridulatory organs are not relevant at genus level.

**Etymology.** Gender feminine, as inferred from the feminine ending of species described together with the genus; in honour of the Russian arachnologist M.S. Giljarov.

*kratochvili* Snegovaya, 2011 (in Snegovaya & Chumachenko 2011: 119); loc. typ.: Russia, Sochi, N Khosta, Caucasian State Natural Biospheric Reserve, yew and box-tree grove.

**redikorzevi** (Charitonov, 1946); loc. typ.: Georgia, Sataplia Cave near Kutaissi.

*Nemastoma redikorzevi* Charitonov, 1946: 145;—Roewer 1951: 125.

*Malekia redikorzevi*—Staręga 1978: 201.

*Giljarovia redikorzevi*—Martens 2006: 165 (redescr.).

**rossica** Kratochvíl, 1958; loc. typ.: Russia, Krasnodar Prov., Koteh Mt. near Gorjacij Kljuc; *Giljarovia rossica* Kratochvíl, 1958: 530;—Kratochvíl 1959: 1344; Martens 2006: 167 (redescr.).

**stridula** (Kratochvíl, 1958); loc. typ.: Russia, Krasnodar Prov., Krasnaja Poljana.

*Malekia stridula* Kratochvíl, 1958: 530;—Kratochvíl 1959: 1348.

*Giljarovia stridula*—Gruber 1976: 798; Martens 2006: 151 (redescr.).

**tenebricosa** (Redikortsev, 1936); loc. typ.: Russia, Suchumi Distr., upper Tsebelda Valley.

*Nemastoma tenebricosum* Redikortsev, 1936: 34;—Staręga 1978, 204.

*Giljarovia tenebricosa*—Martens 2006: 152 (redescr.). **Remarks.** Martens (2006: 155) proposed an isolated position within the genus as this species is missing a stridulatory apparatus.

**thoracocornuta** Martens, 2006: 167; loc. typ.: Russia, Daghestan, upper Gunib.

**triangula** Martens, 2006: 156; loc. typ.: Georgia, Caucasus Major, Kazbegi.

**trianguloides** Martens, 2006: 159; loc. typ.: Russia, Krasnodar Prov., Caucasian State Reserve, Pslukh, ca. 20 km E of Krasnaya Polyana.

**turcica** Gruber, 1976: 782; loc. typ.: Turkey, Vilayet Amasya, S Amasya.

**vestita** Martens, 2006: 161; loc. typ.: Russia, Krasnodar Prov., Caucasian State Reserve, Pslukh, ca. 20 km E of Krasnaya Polyana, Mt. Kogot.

### Genus *Hadzinia* Šilhavý, 1966a (1 species)

*Hadzinia* Šilhavý, 1966a: 71; type species *Nemastoma karamani* Hadži, 1940 by monotypy and original designation.

**Remarks.** Novak (2005: 313) erroneously gave Roewer as describing author.

**Etymology.** Gender feminine (not specified, inferred from ending; ICZN 30.2.4). In honour of the Yugoslavian zoologist J. Hadži, who described the type species.

**karamani** (Hadži, 1940); loc. typ.: SW Bosnia, Drvar, cave Resanovačka špilja Ledenica (clarification by Novak 2005: 313).

*Nemastoma karamani* Hadži, 1940: 2.

*Buresiolla karamani*—Kratochvíl 1958: 532.

*Hadzinia karamani*—Šilhavý 1966a: 71; Novak 2005: 313.

*Hadzinia caramani*—Šilhavý 1966a: 71 (misspelling).

### Genus *Histicostoma* Kratochvíl, 1958 (8 species)

*Histicostoma* (*Histicostoma*) Kratochvíl, 1958: 529; type species *Histicostoma drenskii* Kratochvíl, 1958 by original designation.

*Centetostoma* (*Cretostoma*) Kratochvíl, 1958: 530; type species *Cretostoma creticum* Roewer, 1927 by monotypy and original designation;—syn. Martens 1978: 129.

*Histicostoma*—Gruber 1976: 799.

**Remarks.** Gruber (1976) rejected Kratochvíl's subgenera and restricted *Histicostoma* to include *argenteolunulatum*, *dentipalpe* and *drenskii*. By including *creticum*, Martens (1978) synonymised the monotypic *Cretostoma* (see *creticum*).

**Etymology.** Neuter; probably derived from Latin "histrio" (actor) combined with „stoma“ in reference to *Nemastoma*. Maybe derived from "hystrix" (porcupine). The origin of this name remains uncertain.

**anatolicum** (Roewer, 1962); loc. typ.: Turkey, Western Taurus, two caves 20 km NW Dag (the small one referred to as "piccola", the large one as "In Dag", Turkish for "Dag Cave"). Dag is on the road from Antalya to Isparta, at the border of both provinces. **Remarks.** Brignoli reported details about the type locality to Gruber, who made the information available for this catalogue.

*Nemastoma anatolicum* Roewer, 1962: 15.

*Histicostoma anatolicum* **comb. n.:** The syntype series (SMF 13903) comprises females and juveniles only. Females are very characteristic in exhibiting transverse rows of anvil-shaped tubercles and pairs of very long spines which terminate into one or two smaller spines. According to Gruber (pers. comm.) the leg microsculpture is similar to that of *H. creticum* and the presence of similar *Histicostoma* from Anatolia is confirmed. Until males are available, a tentative placement in *Histicostoma* is advised. Staręga (1973: 132) mentioning *anatolicum* close to *Mediostoma cypricum*, which should be considered when revising these species.

**argenteolunulatum** (Canestrini, 1875); loc. typ.: Italy, Calabria.

*Nemastoma dentipalpe* var. *argenteo-lunulata* Canestrini, 1875: 4.

*Nemastoma argenteolunulatum*—Roewer 1923: 668.

*Carinostoma argenteolunulatum*—Šilhavý 1969: 496.

*Histicostoma argenteolunulatum*—Gruber 1976: 799.

**caucasicum** (Redikortsev, 1936); loc. typ.: Georgia, Adsharia, Suchumi Distr., Ažary and Lata.

*Nemastoma caucasicum* Redikortsev, 1936: 54.

*Histicostoma (Histicostoma) caucasicum*—Staręga 1966a: 394.

*Histicostoma caucasicum*—Staręga 1978: 201; Martens 2006: 192 (redescr).

**creticum** (Roewer, 1927); loc. typ.: Greece, Crete, Topolia.

*Nemastoma creticum* Roewer, 1927: 454;—Gruber 1963: 310.

*Mitostoma creticum*—Roewer 1951: 148; Martens 1966: 350 (redescr.).

*Centetostoma (Cretostoma) creticum*—Kratochvíl 1958: 530.

*Histicostoma creticum*—Martens 1978: 129; Gruber 1978: 569.

**dentipalpe** (Ausserer, 1867); loc. typ.: Austria, Innsbruck, Stubai-Valley, locality Husslhof.

*Nemastoma dentipalpe* Ausserer, 1867: 168.

*Carinostoma dentipalpe*—Šilhavý 1969: 496.

*Nemastoma (Lugubrostoma) dentipalpe*—Kratochvíl 1958: 539.

*Histicostoma slovenicum* Hadži, 1973a: 49;—syn. Martens 1978: 130.

*Histicostoma dentipalpe*—Gruber 1976: 799.

**drenskii** Kratochvíl, 1958: 570; loc. typ.: Bulgaria, Rhodope Mountains, Chvojna, locality "Peštera".

**gruberi** Snegovaya & Marusik, 2012: 62; loc. typ.: Turkey, Aydın, Kuşadası, Dilek Peninsula, Büyük Menderes Delta National Park.

**mitovi** Snegovaya & Marusik, 2012: 61; loc. typ.: Turkey, Bursa, İnegöl, Great Oylat Cave.

## Genus *Mediostoma* Kratochvíl, 1958 (11 species)

*Histicostoma* (*Basostoma*) Kratochvíl, 1958: 529; type species *Nemastoma topolium* Roewer, 1951 by original designation;—syn. Gruber 1976: 799.

*Histicostoma* (*Mediostoma*) Kratochvíl, 1958: 529; type species *Nemastoma graecum* Roewer, 1917 by original designation (see *humerales*).

*Mediostoma*—Gruber 1976: 799.

**Etymology.** Gender neuter; Latin “medius” (in the middle) combined with „stoma“, in reference to *Nemastoma*. The name probably refers to the position of pseudoarticulations in the middle of the leg femora. In the original composition of subgenera in *Histicostoma* (Kratochvíl 1958) it was compared to the basal-positioned pseudoarticulations in *Basostoma*.

*armatum* Martens, 2006: 189; loc. typ.: Iran, Mazandaran, S Alamdeh.

*ceratocephalum* Gruber, 1976: 790. loc. typ.: Turkey, S Anatolia, Vilayet İçel, 10 km NE Silifke. **Remarks.** Gruber (1976: 794) discussed a placement of *ceratocephalum* in either *Giljarovia* or *Mediostoma* and decided for a tentative placement in the latter. Males of *ceratocephalum* are unavailable to confirm other generic characters.

*cypricum* (Roewer, 1951) loc. typ.: Cyprus (not further specified).

*Nemastoma cypricum* Roewer, 1951: 136.

*Histicostoma* (*Mediostoma*) *cypricum*—Kratochvíl 1958: 569.

*Mediostoma cypricum*—Gruber 1976: 799; Martens 2006: 184.

*globuliferum* (L. Koch, 1867); loc. typ.: Greece, Syros (=Syra).

*Nemastoma globuliferum* L. Koch, 1867: 893—Roewer 1923: 656.

*Mediostoma globuliferum* **comb. n.:** According to existing descriptions (L. Koch 1867: 893, Roewer 1923: 656) and the geographic origin of the type, this is most likely a *Mediostoma* species. The type seems lost (Roewer 1923: 656). Roewer’s re-description is based on material from Naxos. It is here tentatively transferred to *Mediostoma* to exclude it from *Nemastoma* where it certainly does not belong. A revision is necessary.

*haasi* (Roewer, 1953a); loc. typ.: Israel, Jerusalem.

*Mitostoma haasi* Roewer, 1953a: 209.

*Nemastoma haasi*—Staręga 1973: 132.

*Mediostoma haasi*—Gruber 1976: 799; Martens 2006: 184.

*humerales* (C.L. Koch, 1839b); loc. typ.: Greece, Nauplia.

*Nemastoma humerales* C.L. Koch, 1839b: 38;—C.L. Koch 1847: 66.

*Nemastoma quadripunctatum humerales*—Roewer 1914: 148.

*Nemastoma graecum* Roewer, 1917: 152;—syn. Gruber 1976: 799.

*Histicostoma* (*Mediostoma*) *graecum*—Kratochvíl 1958: 529

*Mediostoma humerales*—Gruber 1976: 799; Mitov 2002: 1640.

*nigrum* Martens, 2006: 190; loc. typ.: Iran, Gilan Prov., seaside of Talysch Mountains.

*pamiricum* Staręga, 1986; loc. typ.: Tajikistan, West-Pamir, Vanč River Valley.

*Centetostoma pamiricum*—Staręga 1978: 200 (as nomen nudum).

*Mediostoma pamiricum* Staręga, 1986: 301.

**Remarks.** Staręga (1978: 200) mentioned the species name without giving a description) and tentatively placed it in *Centetostoma*. The intended description (cited as “Staręga 1979” in Staręga 1978) was postponed until 1986, objecting to the previous generic placement, as only a female was available. Snegovaya (2010: 353)

had no females to compare *pamiricum* with *Starengovia* which both occur in geographic proximity in an area with no other known members of the family.

**stussineri** (Simon, 1885a); loc. typ.: Greece, Ossa Mountains, Kokkino Vrachio Cave.

*Nemastoma stussineri* Simon, 1885a: 217.

*Histicostoma (Mediostoma) stussineri*—Kratochvíl 1958: 569.

*Mediostoma stussineri*—Gruber 1976: 799; Mitov 2002: 1639.

**Remarks.** *M. stussineri* is the largest species within *Mediostoma*, matching body size of the related genus *Pyza* and also showing some genital-morphological affinities (Gruber 1979, Mitov 2002). Its relationships should be reinvestigated.

**variabile** Martens, 2006: 185; loc. typ.: Iran, Azerbaijan, Makidi near Kaleybar.

**vitynae** (Roewer, 1927); loc. typ.: Greece, Crete, Topolia Canyon.

*Nemastoma vitynae* Roewer, 1927: 455.

*Mitostoma omalosum* Roewer, 1951: 146;—syn. Martens 1966: 350.

*Nemastoma topolium* Roewer, 1951: 135;—syn. Gruber 1976: 799.

*Mediostoma vitynae*—Gruber 1976: 799.

**Remarks.** Gruber (1976) stated that two of the three species of *Basostoma*, *topolium* and *vitynae* (excluding *funebre*), are synonymous, and referred to Martens (1966). Martens listed only *vitynae* and Gruber probably referred to his description, thus synonymy of *topolium* with *vitynae* has to be attributed to Gruber. The type localities of *topolium* (Crete) and *vitynae* (Peleponnes) are geographically isolated and warrant reinvestigation.

## Genus *Mitostoma* Roewer, 1951 (17 species, 3 subspecies)

*Mitostoma* Roewer, 1951: 140; type species *Phalangium chrysomelas* Hermann, 1804 by original designation;—Tedeschi & Sciaky 1997: 504.

*Mitostoma (Mitostoma)*—Kratochvíl 1958: 530.

**Remarks.** *Mitostoma* stands out of the bulk of Nemastomatidae in exhibiting a very complex, three-dimensionally structured penial glans. Molecular data (Schönhofer & Martens 2010a) corroborated a placement of *Mitostoma* in a basal and isolated position to the rest of the Palearctic Nemastomatinae. However, Kratochvíl's (1958) Mitostomatinae have not been accepted (Gruber 1976: 800), as his definition included unrelated genera. Martens (1978) synonymised many of Hadži's (1973b) late nominal species. However, several species from the Central Balkan, rarely mentioned subsequently, appear to be valid (I. Karaman, pers. comm.) and are here treated as such. Types of Hadži are mainly lost or in bad shape (T. Novak, pers. comm.), so collecting at the type localities is necessary to redefine these species.

**Etymology.** Gender neuter; from Greek „mitos“ (thread) and „stoma“ (mouth) referring to the slender, glistening pedipalps, with regards to the etymology of *Nemastoma*.

**alpinum** (Hadži, 1931); loc. typ.: Slovenia, Triglav Massiv.

*Nemastoma chrysomelas alpinum* Hadži, 1931: 109.

*Mitostoma chrysomelas multidenticulatum* Hadži, 1973a: 54;—syn. Martens 1978: 147.

*Mitostoma chrysomelas michielii* Hadži, 1973a: 55;—syn. Martens 1978: 147.

*Mitostoma alpinum*—Martens 1978: 147.

**anophthalmum** (Fage, 1946); loc. typ.: Italy, Bergamo, Grotta grande della Cava di Burligo.

*Nemastoma anophthalmum* Fage, 1946: 328.

*Buresiolla anophthalmum*—Kratochvíl 1958: 533.

*Mitostoma anophthalmum*—Martens 1978: 149; Tedeschi & Sciaky 1997: 507.

**Remarks.** From the complex penis of this otherwise character-poor troglobiont, Fage (1946: 328) already inferred a closer relationship to *chrysomelas*, which later became the type species of *Mitostoma*. Considerable



size difference within this species warrants further investigation (Martens 1978: 149, Tedeschi & Sciaky 1997: 507).

**atticum** (Roewer, 1927); loc. typ.: Greece, Pentelikon Mountain, way up to Penteli Monastery.

*Nemastoma atticum* Roewer, 1927: 453.

*Mitostoma atticum*—Roewer 1951: 144.

**Remarks.** The type (SMF RII/239) is a female with only two remaining legs. Judging from this poor material, it seems morphologically very similar to specimens of *Mitostoma chrysomelas*. The same type locality was given by Roewer in the description of several invalid species (see *Crosbycus pentelicus*; Helversen & Martens 1972). It should be neglected if collections at this site cannot confirm the presence of similar animals.

**cancellatum** (Roewer, 1917); loc. typ.: Bosnia and Herzegovina, Sarajevo.

*Nemastoma cancellatum* Roewer, 1917: 154.

*Mitostoma cancellatum*—Roewer 1951: 147; Mitov 2000: 161.

**carneluttii** Hadži, 1973a: 57; loc. typ.: Montenegro, Vasojevičkem Komu. **Remarks.** Martens (pers. comm.) investigated the type in the Hadži Collection and assumed that it is close to *cancellatum*. A revision of both species is recommended.

**chrysomelas** (Hermann, 1804); loc. typ.: France, Alsace, Strasbourg.

**Remarks.** Many names have been assigned to this widespread Central European species, based on differences in the variable colouration and pattern of anvil-shaped tubercles. Most of them were synonymised by Martens (1978). He also mentioned that all *Mitostoma* described by Avram (1969, 1970) fall within the variation of *chrysomelas*, but did not list them as synonyms, having not seen the type material. They were officially synonymised by Weiss (1996: 263) based on good knowledge of the Romanian fauna. Subsequent publications (e.g. by Weiss and Babalean) did only cite *chrysomelas* for Romania. Tedeschi and Sciaky (1997: 510) considered some alpine populations of *chrysomelas* as distinct species, which remained unattended.

*Phalangium chrysomelas* Hermann, 1804: 108.

*Nemastoma chrysomelas*—C.L. Koch 1839b: 38.

*Nemastoma quadricorne* L. Koch, 1861: 142;—syn. Roewer 1914: 159.

*Leiobunum troglodytes* Wankel, 1861: 257;—syn. Šilhavý 1956a: 79. **Remarks.** According to Wankel's (1861) drawings the type is a juvenile *Mitostoma*, and according to the type locality (Czech Republic, Moravia caves) only *chrysomelas* applies (for *troglodytes* being preoccupied see also *Hesperonemastoma packardi*). Šilhavý (1956a) did not list *troglodytes* in the synonymy of *chrysomelas*.

*Nemastoma troglodytes*—Roewer 1923: 657.

*Nemastoma saxonica* Hnatewytch in Kästner, 1928: 18;—syn. Spöck 1963: 17.

*Nemastoma spinosum* Hnatewytch, 1929: 231;—syn. Spöck 1963: 18. **Remarks.** Spöck (1963: 17) first placed *spinosum* in the synonymy of *saxonica* and later (1963: 18) both in *chrysomelas*. See also extensive discussion in Spöck (1963).

*Nemastoma janetscheki* Schenkel, 1950: 766;—syn. Martens 1978: 142.

*Mitostoma chrysomelas*—Roewer 1951: 142.

*Nemastoma silhavyi* Roewer, 1951: 143;—syn. Staręga 1976: 335.

*Mitostoma spinosum*—Kratochvíl (1934: 8): 146; syn. Spöck 1963: 18.

*Mitostoma hadzii* Roewer, 1951: 146;—syn. Martens 1978: 142.

*Nemastoma chrisomelas*—Cîrdei 1956: 74 (misspelling).

*Mitostoma vosagorum* Rambla, 1956: 152;—syn. Meijer 1973: 125.

*Mitostoma (Mitostoma) chrysomelas*—Kratochvíl 1958: 530.

*Crosbycus bükkensis* Loksa, 1962: 265;—syn. Martens 1978: 142.

*Crosbycus transdanubicus* Loksa, 1962: 267;—syn. Martens 1978: 142.

*Mitostoma chrysomelas confusum* Spöck, 1963: 21;—syn. Martens 1978: 142.

*Mitostoma chrysomelas romanicum* Avram, 1965: 181;—syn. Staręga 1976: 335.

*Mitostoma chrysomelas romanium*—Šilhavý 1966a: 70 (misspelling).

*Crosbycus buekkensis*—Gruber & Martens 1968: 138.

*Mitostoma dimitrescui* Avram, 1969: 140;—Martens 1978: 144; syn. Weiss 1996: 263.

*Mitostoma orghidani* Avram, 1969: 144;—Martens 1978: 144; syn. Weiss 1996: 263.

*Mitostoma moldavica* Avram, 1970: 172;—Martens 1978: 144; syn. Weiss 1996: 263.

*Mitostoma helenae* Avram, 1970: 174;—Martens 1978: 144; syn. Weiss 1996: 263.

*Mitostoma rodnae* Avram, 1970: 178;—Martens 1978: 144; syn. Weiss 1996: 263.

*Mitostoma (Mitostoma) sketi* Hadži, 1973a: 50; **syn. n.**: According to Hadži's (1973a: 51) drawings and the locality (Zlot, Serbia) this is very likely *Mitostoma chrysomelas*.

*Mitostoma chrysomelas francohorioni* Hadži, 1973a: 52;—syn. Martens 1978: 142.

*Mitostoma chrysomelas poleneci* Hadži, 1973a: 56;—syn. Martens 1978: 142.

*daccordii* Tedeschi & Sciaky, 1997: 511; loc. typ.: Italy, Venetia, Monti Lessini, Cima Posta.

*fabianae* Tedeschi & Sciaky, 1997: 513; loc. typ.: Italy, Tuscany, Elba, N slopes of Mt. Tambora.

*gracile* (Redikortsev, 1936); loc. typ.: Russia, Gagari, Sochi (restricted by Staręga 1978: 202).

*Nemastoma gracile* Redikortsev, 1936: 39.

*Mitostoma gracile*—Roewer 1951: 150; Staręga 1978: 202; Martens 2006: 207.

*macedonicum* Hadži, 1973a: 58; loc. typ.: Republic of Macedonia (not further specified).

*olgae olgae* (Šilhavý, 1939); loc. typ.: Montenegro, Risan, Golodražnica.

*Nemastoma olgae olgae* Šilhavý, 1939: 108 (for species), 109 (for subspecies).

*Mitostoma olgae olgae*—Roewer 1951: 144.

**Remarks.** Novak (2004) considered the subspecies *decorum* and *kratochvili* as invalid, being based on characters showing high variability. While his argumentation is reasonable, a reinvestigation might be worthwhile because these populations occur within a zone of high endemism (e.g. in *Trogulus*; Schönhofer & Martens 2009). For this reason, the subspecies are maintained for the time being.

*olgae decorum* (Šilhavý, 1939): 109; loc. typ.: Montenegro, Nikšiće, Dragova Luka.

*Nemastoma olgae decorum* Šilhavý, 1939: 109.

*Mitostoma olgae decorum*—Roewer 1951: 144.

*olgae kratochvili* (Šilhavý, 1939): 109; loc. typ.: Croatia, Brač, Pučišća.

*Nemastoma olgae kratochvili* Šilhavý, 1939: 109.

*Mitostoma olgae kratochvili*—Roewer 1951: 144.

*olgae zorae* Hadži, 1973a: 60; loc. typ.: Republic of Macedonia, Šar Planina, Karaorman Mt.

*orobicum* (Caporiacco, 1949); loc. typ.: Italy, Bergamo, Monte Arera.

*Nemastoma orobicum* Caporiacco, 1949: 121.

*Mitostoma orobicum*—Chemini 1985: 72; Tedeschi & Sciaky 1997: 508.

**Remarks.** The species was transferred to *Mitostoma* and synonymised with *chrysomelas* by Martens (1978), stating that J. Gruber had seen the juvenile type. Chemini (1985) redescribed and revalidated *orobicum* based on adult males.

*patrizii* Roewer, 1953b; loc. typ.: Italy, Sicily, Grotta di San Giovanni Domusnovas.

*Mitostoma patrizii* Roewer, 1953b: 39;—Tedeschi & Sciaky, 1997: 505.

*pyrenaeum* (Simon, 1879a); loc. typ.: France, Ariège, Moulis, Château de la Brûlerie, Grotte d'Aubert.

*Nemastoma pyrenaeum* Simon, 1879a: 287.

*Mitostoma asturicum* Roewer, 1951: 147; **syn. n.**: The type locality (Spain, Asturias; Cave near Oviedo) is

doubtful as no new material from there is known (Prieto 2008). The male type was investigated (SMF RII/6210) and is very similar to specimens of *M. pyrenaeum*.

*Mitostoma pyrenaeum*—Roewer 1951: 149.

*sabbadinii* Tedeschi & Sciaky, 1997: 508; loc. typ.: Italy, Sardinia, Sassari, N slope of Mt. Limbara.

*valdemonense* Marcellino, 1974; loc. typ.: Italy, Sicily, Nebrodi, Portella di Femmina morta.

*Mitostoma valdemonense* Marcellino, 1974: 187;—Tedeschi & Sciaky 1997: 512.

*zmajevicae* Hadži, 1973a: 59; loc. typ.: Republic of Macedonia, Zmajevici.

### Genus *Nemaspela* Šilhavý, 1966a (7 species)

*Nemaspela* Šilhavý, 1966a: 72; type species *Burešiolla sokolovi* Ljovuschkin & Starobogatov, 1963 by original designation;—Martens 2006: 169; Chemeris 2009: 286.

**Remarks.** Šilhavý mentioned only *Nemaspela sokolovi* in the definition of the genus, but also illustrated *abchastica* and *caeca* as *Nemaspela* (1966a: 68).

**Etymology.** Gender neuter; combination of “*Nemastoma*” and Latin “*spelaeum*” (cave), indicating a cave adaptation within Nemastomatidae.

*abchastica* (Ljovuschkin & Starobogatov, 1963); loc. typ.: Abchasia, Niznaja Sakuranskaja Cave.

*Burešiolla abchastica* Ljovuschkin & Starobogatov, 1963: 47.

*Nemaspela abchastica*—Šilhavý 1966a: 68; Martens 2006: 173; Chemeris 2009: 287.

*birsteini* Ljovuschkin, 1972; loc. typ.: Abchasia, Gudauta, Tarkiladze Caves.

*Nemaspela birsteini* Ljovuschkin, 1972: 66;—Chemeris 2009: 289 (redescr.).

*caeca* (Grese, 1911); loc. typ.: Ukraine, Crimea, unnamed cave near Skelja.

*Nemastoma caecum* Grese, 1911: 108.

*Burešiolla caecum*—Ljovuschkin & Starobogatov 1963: 43.

*Nemaspela coeca*—Šilhavý 1966a: 68 (misspelling).

*Nemaspela caeca*—Ljovuschkin 1972: 66; Chemeris 2009: 289 (redescr.).

*femorecurvata* Martens, 2006: 171; Georgia, Ratscha Mt. Range, Ambrolauri Distr., Sakishore Cave near Upper Tlugi.

*kovali* Chemeris, 2009: 293; loc. typ.: Russia, Central Caucasus, Kabardino-Balkaria, source of Belaya River, Fontanka Cave.

*sokolovi* (Ljovuschkin & Starobogatov, 1963); loc. typ.: Russia, Krasnodar Prov., Sochi, 15 km N of Khosta, Vorontsovskaya Cave.

*Burešiolla sokolovi* Ljovuschkin & Starobogatov, 1963: 47.

*Nemaspela sokolovi*—Šilhavý 1966a: 72; Martens 2006: 175; Chemeris 2009: 294.

*taurica* (Lebedinski, 1914); loc. typ.: Ukraine, Crimea, Ajutišik Cave.

*Phalangodes taurica* Lebedinski, 1914: 115;—Ljovuschkin 1972: 65.

*Nemaspela taurica*—Staręga 1978: 202; Martens 2006: 169.

**Remarks.** Ljovuschkin (1972) mentioned *Phalangodes taurica* but excluded it from species he listed under *Nemaspela*.

## Genus *Nemastoma* C.L. Koch, 1836b (7 species, 4 subspecies)

*Nemastoma* C.L. Koch, 1836b: 70; type species *Phalangium bimaculatum* Fabricius, 1775 by subsequent fixation (Thorell 1876: 467) and subsequent delineation of the type species (Gruber & Martens 1968: 139).

*Nemastoma* (*Lugubrostoma*) Kratochvíl, 1958: 529; type species *Phalangium lugubre* Müller, 1776 by original designation;—syn. Gruber & Martens 1968: 139.

*Nemastoma* (*Stridulostoma*) Hadži, 1973a: 48; type species *Nemastoma* (*Stridulostoma*) *seliskari* Hadži, 1973a by monotypy;—syn. Gruber 1976: 797.

**Remarks.** *Nemastoma* has long been the sole genus of the family, and accumulated large numbers of species. The subsequent decline of species assigned to *Nemastoma* is directly correlated with elaborating the systematics and taxonomy of the family. After Roewer (1951) assigned the first *Nemastoma* species to new genera, the original genus still comprised 107 species. Kratochvíl (1958) further elaborated the systematics, but counted 86 *Nemastoma* species, of which he included 23 in the subgenus *Lugubrostoma*, that came closest to today's definition of *Nemastoma*. Gruber and Martens (1968) clarified the type species of *Nemastoma* (not *Paranemastoma quadripunctatum* as stated by Kratochvíl 1958) and restricted the generic name to a defined number of seven species.

**Etymology.** Gender neuter; from Greek „nema“ (thread) and „stoma“ (mouth), likely referring to the threadlike and glistening pedipalps.

*bidentatum bidentatum* Roewer, 1914; loc. typ.: The locality information (Romania, Comana Vlasca) was considered erroneous, as the type series also contained *triste* and *bidentatum sparsum*, with only the latter occurring in Romania, but not *bidentatum bidentatum* (Gruber & Martens 1968: 143). The type locality is to be corrected, but should await a revision of the subspecies complex and use a locality within the known distribution.

*Nemastoma bidentatum* Roewer, 1914: 141;—Gruber & Martens 1968: 141 (redescri.).

*bidentatum pluridentatum* Hadži, 1973a; loc. typ.: Bosnia, Mt. Vlašić.

*Nemastoma* (*Lugubrostoma*) *triste pluridentatum* Hadži, 1973a: 43.

*Nemastoma* (*Stridulostoma*) *seliskari* Hadži, 1973a: 48;—syn. Gruber 1976: 797.

*Nemastoma seliskari*—Gruber 1976: 797.

*Nemastoma bidentatum pluridentatum*—Novak 2005: 314.

**Remarks.** Hadži (1973a) mentioned *Stridulostoma seliskari* as distinct from *N. (L.) triste pluridentatum* by the presence or absence of assumed stridulatory structures only. Gruber (1976: 797) therefore rejected the subgenus *Stridulostoma* within *Nemastoma* and suggested a reinvestigation of the two “species”. Later, the sole type specimen of *seliskari* was assumed to be a hybrid between *b. bidentatum* and *b. sparsum* (Novak & Gruber 2000: 286). Novak (2005) placed *pluridentatum* in the synonymy of *N. bidentatum* and regarded it as a valid subspecies, which is followed here. The subspecies in *bidentatum* are currently re-investigated.

*bidentatum sparsum* Gruber & Martens, 1968: 146; loc. typ.: Austria, Leitha Mountains, Sonnenberg.

*bidentatum relictum* Gruber & Martens, 1968: 147; loc. typ.: Austria, Salzburg, Kleinartal, Tappenkarsee.

*bimaculatum* (Fabricius, 1775); loc. typ.: Great Britain (not further specified).

*Phalangium bimaculatum* Fabricius, 1775: 440.

*Nemastoma lugubre bimaculatum*—Roewer 1923: 654.

*Nemastoma bimaculatum*—C.L. Koch 1836b: 71; Meade 1855: 412; Gruber & Martens 1968: 150 (redescri.).

*dentigerum* Canestrini, 1873: 51; loc. typ.: Italy, Padova, Altichiero.

*Nemastoma dentigerum* Canestrini, 1873: 51;—Gruber & Martens 1968: 153 (redescri.).

*lugubre* (Müller, 1776); loc. typ.: Denmark (not further specified).

*Phalangium lugubre* Müller, 1776: 192.

*Nemastoma lugubre*—Simon 1879a: 281; Gruber & Martens 1968: 156 (redescr.).  
*Nemastoma lugubre helvetica* Lessert, 1917: 57;—syn. Gruber & Martens 1968: 156.  
*Nemastoma lugubre* var. *striatum* Morin, 1934: 36;—syn. Gruber & Martens 1968: 156.  
*Nemastoma lugubre striatum*—Roewer 1951: 127.  
*Nemastoma (Lugubrostoma) lugubre*—Kratochvíl 1958: 529.  
*Lugubrostoma lugubre*—Šilhavý 1966a: 68.

*schuelleri* Gruber & Martens, 1968: 160; loc. typ.: Austria, Muhr, Lungau.

*transylvanicum* Gruber & Martens, 1968: 165; loc. typ.: Romania, Valea Galbenii.

*triste* (C.L. Koch, 1835); loc. typ.: Germany, Bavaria, Regensburg.

*Phalangium triste* C.L. Koch, 1835: 20.

*Nemastoma triste*—C.L. Koch 1847: 63; Gruber & Martens 1968: 167 (redescr.).

*Nemastoma lugubre unicolor* Roewer, 1914: 134;—syn. Gruber 1966: 45.

*Nemastoma (Lugubrostoma) triste*—Gruber 1966: 45; Gruber & Martens 1968: 167.

*Lugubrostoma triste*—Šilhavý 1966a: 68; Gruber & Martens 1968: 167.

### Genus *Nemastomella* Mello-Leitão, 1936 (14 species, 2 subspecies)

*Nemastomella* Mello-Leitão, 1936: 10; type species *Nemastomella integripes* Mello-Leitão, 1936 by monotypy and original designation;—Staręga 1986: 303; Prieto 2004; 2008.

**Remarks.** Staręga (1986: 303) used *Nemastomella integripes* as type species to make the genus name available, while he synonymised *integripes* with *dubia* in the same paper.

Prieto (2004, 2008) used a narrow and careful concept for *Nemastomella*, which is acknowledged but extended here, assuming the secondary loss of male cheliceral apophyses (as in *cristinae*, close to *bacilliferum* and *dubium* regarding genital morphology; in *sexmucronata* probably secondary loss because of cave adaptation) and allowing more variation in dorsal armament, to remove species from their definitely erroneous placement in *Nemastoma*. The species *cristinae*, *maarebensis*, *monchiquensis* and *sexmucronata* are hereby tentatively included in *Nemastomella* (see respective Remarks).

**Etymology.** Gender feminine; diminutive form of *Nemastoma*, using the suffix “-ella”.

*armatissima* (Roewer, 1962); loc. typ.: Portugal, Coimbra.

*Mitostoma armatissimum* Roewer, 1962: 15;—Prieto 2008: 62.

*Nemastomella armatissima* **comb. n.:** The type (SMF RII/11156) seems to be a female of *Nemastomella* close to *spinosissima*, but differs in being uniformly dark in colour, the first two areae having a row of anvil-shaped tubercles and the cones terminating in two large, fork-like spines. A full redescription has to await the collection of males, and placement and locality data require confirmation.

*bacillifera bacillifera* (Simon, 1879a); loc. typ.: France, Gers, Condom, La Plaigne du Mage.

*Nemastoma bacilliferum* Simon, 1879a: 287.

*Nemastomella bacillifera simoni* Roewer, 1914: 155;—syn. Dresco 1967b: 368.

*Nemastomella bacillifera simplex* Simon, 1913: 385;—syn. Dresco 1967b: 368.

*Nemastoma formosum* Roewer, 1951: 134; **syn. n.:** After investigating the type (SMF RII/9525, France, Biarritz), this is certainly *bacillifera*.

*Histicostoma (Mediostoma) bacilliferum*—Kratochvíl 1958: 569.

*Histicostoma bacillifera*—Šilhavý 1966a: 69.

*Nemastomella bacillifera*—Staręga 1986: 304; Prieto 2004: 110.

*bacillifera carbonaria* (Simon, 1907); loc. typ.: Spain, Huesca, Vio, Llobrica Cave.

*Nemastoma carbonarium* Simon, 1907: 553.

*Histicostoma (Mediostoma) carbonarium*—Kratochvíl 1958: 569.

*Nemastomella carbonaria*—Staręga 1986: 304.

*Nemastomella bacillifera carbonaria*—Prieto 2004: 111.

**cristinae** (Rambla, 1969); loc. typ.: Spain, León, Puerto de Piedrafita.

*Nemastoma cristinae* Rambla, 1969: 91;—Prieto 2004: 119.

*Nemastomella cristinae*—Staręga 1986: 304.

**Remarks.** Oddly, Rambla (1969) did not mention the name of her new species throughout the written text but only in the legends of the figures. Staręga (1986) transferred the species to *Nemastomella* but Prieto (2004) placed it back in *Nemastoma* as it did not fit a number of external characters, e.g. having no cheliceral apophysis in males, and differences in granulation. External characters, as cheliceral apophyses, can get lost within a genus, as known from *Giljarovia* and *Nemaspela* (Martens 2006). The genital morphology of *cristinae* conforms with that of *bacilliferum* and *dubium*, and *cristinae* is best placed in *Nemastomella* and Staręga's combination is hereby revived.

**dentipatellae** (Dresco, 1967b); loc. typ.: Spain, Santander, Arredondo, Cueva La Cañuela.

*Nemastoma dentipatellae* Dresco, 1967b: 382.

*Nemastomella dentipatellae*—Staręga 1986: 304; Prieto 2004: 112.

**dipentata** (Rambla, 1959); loc. typ.: Spain, Sierra Guadarrama, Lozoya Springs.

*Nemastoma bacilliferum dipentatum* Rambla, 1959: 79.

*Nemastoma hermanni* Kraus, 1959: 297;—syn. Kraus 1961: 345.

*Nemastomella dipentata*—Staręga 1986: 304; Prieto 2004: 113.

**dubia** (Mello-Leitao, 1936); loc. typ.: Catalogne (not further specified).

*Nemastoma dubium* Mello-Leitao, 1936: 8.

*Nemastomella integripes* Mello-Leitao, 1936: 11;—syn. Staręga 1986: 304.

*Nemastoma franzi* Kraus, 1959: 299;—syn. Kraus 1961: 346.

*Nemastomella dubia*—Staręga 1986: 304.

**gevia** Prieto, 2004: 114; loc. typ.: Spain, Jaén, Peal de Becerro: Complejo del Arroyo de la Rambla.

**hankiewiczii** (Kulczyński, 1909); loc. typ.: Portugal, Torres Vedras, Barro.

*Nemastoma hankiewiczii* Kulczyński, 1909: 465.

*Nemastoma roeweri* Kraus, 1961: 341;—syn. Rambla 1980: 199.

*Nemastomella hankiewiczii* **comb. n.:** Rambla (1980: 199) regarded the differences between *N. roeweri* and *N. hankiewiczii* as intraspecific variation, while Kraus (1961: 343) depicted differences in the structure of the male cheliceral apophyses that, based on current systematics, would warrant placement in different genera. The issue cannot be resolved without checking more material and meanwhile Rambla's synonymy is retained. It is not clear what Kraus (1961) or Rambla (1980) perceived when discussing these species, but both forms show characters present in the Iberian radiation of Nemastomatidae, and a tentative placement in *Nemastomella* seems reasonable.

**iberica** (Rambla in Dresco, 1967b); loc. typ.: Spain, Sierra de Guadarrama (see Remarks).

*Nemastoma ibericus* Rambla in Dresco, 1967b: 382.

*Nemastomella iberica*—Staręga 1986: 304; Prieto 2004: 117. **Remarks.** The species was established based on material used for a re-description of *N. bacilliferum bacilliferum* based on non-type material (Rambla 1959: 73). Dresco (1967b) recognised differences to the original *bacilliferum*, suggested the name *ibericus* and assigned Rambla as official author. Dresco specified the year of description as 1965, recited by Rambla (1967: 7), but it was not published in that year. Prieto (2004: 117) interprets the authorship of the species as “Rambla in Dresco, 1967” which is followed here. Dresco (1967) did not specify types or a type locality, but pointed solely to Rambla's description, of which the illustrated male of the two series used for the description is to be

preferred as lectotype (Collection Rambla, Barcelona: specimens n°335, 336). Depending on the formal lectotype selection, a more specific type locality is either Regajo del puerto de Navacerrada or Sanatorio Forest. Prieto (2004: 117) mentioned the species to be poorly characterised and advised revision.

**maarebensis** (Simon, 1913); loc. typ.: Algier, Ifri Maareb, near Djebel Azerou Tidjer.

*Nemastoma maarebense* Simon, 1913: 385.

*Nemastomella maarebensis* **comb. n.:** Known from one female only, any generic association remains preliminary, while placement within *Nemastoma* can be rejected. The type shows superficial similarity with *Nemastomella sexmucronatum* and is therefore tentatively placed in *Nemastomella*. Delfosse (2004: 48) erroneously reported the species for France.

**manicata** (Simon, 1913); loc. typ.: Spain, Lérida, Llastarri, Minas dei Canal-B.

*Nemastoma manicata* Simon, 1913: 386.

*Nemastomella manicata*—Prieto 2004: 112.

**monchiquensis** (Kraus, 1961); loc. typ. Portugal: N slope Sierra de Monchique.

*Nemastoma monchiquense* Kraus, 1961: 342;—Rambla 1967: 6.

*Nemastomella monchiquensis* **comb. n.:** According to the form of the cheliceral apophysis and the penial stylus (Rambla 1967) *monchiquense* is clearly a member of the Iberian radiation including *Acromitostoma*, *Centetostoma* and *Nemastomella*. However, it differs from the first two genera by the lack of characteristic penial wings, further from *Acromitostoma* in lacking anvil-shaped tubercles, and from *Centetostoma* in lacking large, knob-like tubercles on the dorsum and on the suprachelical sclerites. *N. monchiquense* is transferred to *Nemastomella* for lacking these characters, but also for the penial glans armed with long, slender spines, for possessing rows of elongated papillae on the dorsal opisthosoma and for having a similar body size (Kraus 1961, Rambla 1967).

**sexmucronata** (Simon, 1911); loc. typ.: Spain, Santander, Santillana del Mar, Cueva de Altamira.

*Nemastoma sexmucronatum* Simon, 1911: 205;—Prieto 2004: 119

*Nemastomella sexmucronata*—Staręga 1986: 304. **Remarks.** Placing *sexmucronatum* in *Nemastoma* has to be rejected and it is tentatively reinstated in *Nemastomella* following Staręga 1986. Still, several features of *sexmucronatum* deviate from this genus. The penial truncus is narrowed below the glans, with deep lateral furrows, a stylus is almost absent, and large spines are missing from the glans (Prieto 2004). Dorsal spines and male cheliceral apophyses may be reduced in this cave-dwelling species, but its position in *Nemastomella* is isolated, requiring investigation, as acknowledged by Prieto (2004).

**spinosissima** (Kraus, 1961); typ. loc.: Spain, Navarra, Picos de Europa, foot of Peña Vieja Mt.

*Nemastoma spinosissima* Kraus, 1961: 345.

*Nemastomella spinosissima*—Staręga 1986: 304; Prieto 2004: 117.

## Genus *Paranemastoma* Redikorzev, 1936 (21 species, 5 subspecies)

*Paranemastoma* Redikorzev, 1936: 40; type species *Paranemastoma superbum* Redikorzev, 1936 by monotypy and original designation;—Mcheidze 1959: 111; Staręga 1966a: 392; Gruber & Martens 1968: 139; Martens 1978: 116.

*Nemastoma (Dromedostoma)* Kratochvíl, 1958: 529, 538; type species *Nemastoma radewi* Roewer, 1926 by monotypy;—syn. Staręga 1966a: 392.

*Buresiolla* Kratochvíl, 1958: 529; type species *Nemastoma bureschi* Roewer, 1926 by original designation.

*Paranemastoma (Buresiolla)*—Staręga 1976: 332. **Remarks.** Staręga (1976: 332) transferred the type of *Buresiolla, bureschi*, to *Paranemastoma*, thus effecting synonymy with *Paranemastoma* (ICZN 61.3.1). Preserving the subgenus was not subsequently approved (Mitov 2011).

**Remarks.** While the genus *Paranemastoma* is nowadays accepted and well-defined upon genital morphology, its revalidation and redefinition are difficult to pinpoint. Roewer (1951: 95) and Kratochvíl (1958: 526) rejected *Paranemastoma* as defined by Redikorzev (1936), who delineated his monotypic genus upon the presence or

absence of pseudosegmentation of the legs. Based on genital morphology, and also on large body size, Šilhavý (1966a: 70) assumed close relationship between seven *Nemastoma* species, including *quadripunctatum*, all later accepted as *Paranemastoma*. He further delineated this assembly from species which are today in the sister genera *Carinostoma* (*elegans*) and *Histicostoma* (*dentipalpe*). Mcheidze (1959: 111) re-established *Paranemastoma* as a subgenus for *superbum*, and Staręga (1966a: 392) placed *Dromedostoma* in its synonymy. Staręga did so for *superbum* only, while *quadripunctatum* and others remained in the subgenus *Nemastoma*. In 1968, Gruber and Martens redefined *Nemastoma* for a narrow ensemble of species. To reinforce this, they associated the earlier concepts of *Nemastoma* by Kratochvíl (1958: 529; excluding *Lugubrostoma*), Roewer and Šilhavý (for the latter two no explicit references were given) to conform better to *Paranemastoma* and its type *superbum*. While this could be regarded as redefining *Paranemastoma*, the concepts of Kratochvíl, Roewer and Šilhavý can hardly be seen in agreement, and Gruber and Martens (1968) gave no further definition or listed associated species. Yet, later authors have followed their proposal (see statement in Avram 1973a: 31), using mainly the conclusive concept of Šilhavý (1966a), and accepted species close to *quadripunctatum* as *Paranemastoma* (Helvesen & Martens 1971, Dumitrescu 1972, Avram 1973a). Martens (1978: 116) redefined the genus, stating the species-count to be twenty, but did not present a list, and his bibliography for *Paranemastoma* and the four discussed species is unusually incomplete (e.g. not listing his own contributions: Gruber & Martens 1968, Helvesen & Martens 1971). In summary, assignment of species to *Paranemastoma* has always been a stepwise process, adding single species or small groups of species, and a complete list of species was never published. Taxonomy represents a nightmare, having to deal with about 100 names, often based on variable external characters as spination and colouration. Informative characters for species delineation, as male genital morphology and cheliceral apophysis structures, are complex and need careful re-evaluation.

**Etymology.** Gender neuter; Greek; combination of “para” (“close to”) and “*Nemastoma*” indicating the close relationship perceived at the time of separation.

***ancae*** Avram, 1973b; loc. typ.: Romania, Apuseni Mountains, Răcaș region (from different mines; no explicit type or type locality was specified).

*Paranemastoma ancae* Avram, 1973b: 135;—Babalean & Ilie 2003: 64; Weiss 1996: 265. **Remarks.** Weiss (1996: 265) treated *P. ancae* as valid and related to *P. quadripunctatum* but suggested reinvestigation.

***armatum*** (Kulczyński, 1909); loc. typ.: Hercegovina, Domanović.

*Nemastoma armatum* Kulczyński, 1909: 468.

*Nemastoma quadripunctatum armatum*—Roewer 1923: 661.

*Paranemastoma armatum*—Novak 2005: 316 (stated revision needed).

***aurigerum aurigerum*** (Roewer, 1951); loc. typ.: Bulgaria, Burgas.

*Nemastoma aurigerum* Roewer, 1951: 119.

*Paranemastoma aurigerum aurigerum*—Staręga 1976: 322.

***aurigerum ryla*** (Roewer, 1951); loc. typ.: Bulgaria, Tscham Kuria, Borovec (restricted by Staręga 1976: 324).

*Nemastoma ryla* Roewer, 1951: 120.

*Nemastoma (Dromedostom) ryla*—Kratochvíl 1958: 562.

*Paranemastoma aurigerum ryla*—Staręga 1976: 323.

***aurigerum joannae*** Staręga, 1976: 324; loc. typ.: Bulgaria, Belasica Mt., 30 km WSW Petrič, Ključ.

***aurosum*** (L. Koch, 1869); loc. typ.: Greece.

*Nemastoma aurosum* L. Koch, 1869: 165.

*Nemastoma quadripunctatum aurosum*—Roewer 1951: 661.

*Paranemastoma aurosum*—Novak 2005: 318 (stated revision needed).

***beroni*** Mitov, 2011: 304; loc. typ.: Bulgaria, Sandanski Distr., Slavyanka Mountains, cave Stoykova Dupka 1.



- bicuspidatum** (C.L. Koch, 1835); loc. typ.: Austria, Salzburg, Gastein.  
*Phalangium bicuspidatum* C.L. Koch, 1835: 16.  
*Nemastoma bicuspidatum*—C.L. Koch 1836b: 70; Šilhavý 1956a: 124, 141 (erroneously listed as type species of *Nemastoma*).  
*Nemastoma quadripunctatum bicuspidatum*—Roewer 1923: 663.  
*Nemastoma reimoseri* Roewer, 1951: 108; **syn. n.:** According to size, colouration and distribution stated for *reimoseri*, species other than *biscupidatum* can be excluded.  
*Paranemastoma bicuspidatum*—Avram 1973a: 31; Martens 1978: 121 (redescr.).
- buresschi** (Roewer, 1926); loc. typ.: Bulgaria, Isker Defilé, cave above Tzerowo.  
*Nemastoma buresschi* Roewer, 1926: 300.  
*Nemastoma tunetanum* Roewer, 1951: 130; **syn. n.:** Investigation of the syntypes of *N. tunetanum* (SMF RII/241) show that these are without doubt *Paranemastoma* that perfectly fit the redescription of *P. buresschi* by Mitov (2011). *N. tunetanum* from “Tunisia” is another misplaced Roewer species.  
*Crosbycus buresschi*—Roewer 1951: 152.  
*Buresiolla buresschi*—Kratochvíl 1958: 529.  
*Buresiolla tunetorum*—Kratochvíl 1958: 527 (misspelling).  
*Buresiolla tunetanum*—Kratochvíl 1958: 532.  
*Paranemastoma (Buresiolla) buresschi*—Staręga 1976: 332.  
*Paranemastoma buresschi*—Karaman 1995b: 334; Mitov 2011: 303 (redescr.).
- corcyraeum** (Roewer, 1917); loc. typ.: Greece, Corfu.  
*Nemastoma quadripunctatum corcyraeum* Roewer, 1917: 143.  
*Paranemastoma corcyraeum*—Novak 2004: 248.
- filipes** (Roewer, 1917); loc. typ.: Azerbaijan, Lenkoran.  
*Nemastoma quadripunctatum* var. *filipes* Roewer, 1917: 144.  
*Nemastoma filipes*—Roewer 1923: 665.  
*Nemastoma (Dromedostoma) filipes*—Kratochvíl 1958: 538.  
*Paranemastoma filipes*—Martens 2006: 203 (redescr.).
- iranicum** Martens, 2006: 204; loc. typ.: Iran, Mazandaran, 11 km E Alasht.
- kalischevskyi** (Roewer, 1951); loc. typ.: Georgia, Suchumi Distr., Azhazy.  
*Nemastoma kalischevskyi* Roewer, 1951: 122.  
*Nemastoma suchumium* Roewer, 1951: 122;—syn. Martens 2006: 196.  
*Nemastoma charitonovi* Mcheidze, 1952: 545;—syn. Martens 2006: 196.  
*Paranemastoma kalischevskyi*—Staręga 1966a: 390.  
*Paranemastoma charitonovi*—Staręga 1978: 204.  
*Paranemastoma suchumium*—Staręga 1978: 205.
- kochii** (Nowicki, 1870); loc. typ.: High Tatras Mountains (mostly in Slovakia).  
*Nemastoma kochii* Nowicki, 1870: 57.  
*Nemastoma quadripunctatum kochii*—Roewer 1923: 662.  
*Nemastoma nicaeum* Roewer, 1951: 110;—syn. Martens 1978: 124.  
*Nemastoma hungaricum* Roewer, 1951: 114;—syn. Martens 1978: 124.  
*Paranemastoma kochii*—Avram 1973a: 31; Martens 1978: 124 (redescr.).
- longipes** (Schenkel, 1947); loc. typ.: Albania, Tirana.  
*Nemastoma gigas longipes* Schenkel, 1947: 10.  
*Nemastoma longipes*—Roewer 1951: 116.  
*Nemastoma tenue* Hadži, 1973a: 31;—syn. Novak 2004: 248.

*Paranemastoma longipes*—Novak 2004: 248; Mitov, 2000: 160. **Remarks.** Novak (2004) considers *longipes* as valid and related it to *corcyraeum*.

**quadripunctatum** (Perty, 1833); loc. typ.: Germany, vicinity of Munich.

*Phalangium quadripunctatum* Perty, 1833: 204.

*Phalangium flavimanum* C.L. Koch, 1835: 22; **syn. n.:** Judging from the description (C.L. Koch 1835) and the area it was collected from (between Bad Gastein and Triest), a *Paranemastoma*, already associated with *quadripunctatum* by Roewer (1914: 144).

*Nemastoma flavimanum*—C.L. Koch 1847: 64; Roewer 1914: 144.

*Nemastoma quadripunctatum*—Simon 1879a: 279.

*Nemastoma quadripunctatum* var. *moesiicum* Roewer, 1917: 143; **syn.** Novak & Gruber 2000: 286.

*Nemastoma quadripunctatum quadripunctatum*—Roewer 1923: 660.

*Nemastoma nervosum* Roewer, 1923: 668;—**syn.** Martens 1978: 117.

*Nemastoma quadripunctatum* var. *lessinensis* Caporiacco, 1940: 34;—**syn.** Martens 1978: 117.

*Nemastoma chaucicum* Roewer, 1951: 105;—**syn.** Martens 1978: 117.

*Nemastoma alfkeni* Roewer, 1951: 106;—**syn.** Martens 1978: 117.

*Nemastoma gertschi* Roewer, 1951: 107;—**syn.** Martens 1978: 117.

*Nemastoma austriacum* Roewer, 1951: 108;—**syn.** Martens 1978: 117.

*Nemastoma lessinensis*—Roewer 1951: 110.

*Nemastoma strasseri* Roewer, 1951: 110;—**syn.** Novak 2005: 318.

*Nemastoma armeniacum* Roewer, 1951: 122;—**syn.** Martens 2006: 206. **Remarks.** Martens (2006) did not propose the synonymy but pointed to the similarity with *quadripunctatum* and the high possibility of the type locality of *armeniicum* being wrong. Martens is followed here, and the synonymy attributed to him.

*Crosbycus lengersdorfi* Roewer, 1951: 152;—**syn.** Martens 1978: 117.

*Paranemastoma quadripunctatum*—Helvesen & Martens 1971: 380; redescr. Martens 1978: 117.

*Nemastoma mediosignatum* Hadži, 1973a: 24;—**syn.** Martens 1978: 117.

*Nemastoma slovenicum* Hadži, 1973a: 26;—**syn.** Martens 1978: 117.

*Nemastoma triglavense* Hadži, 1973a: 27;—**syn.** Martens 1978: 117.

*Nemastoma quadripunctatum carniolicum* Hadži, 1973a: 28;—**syn.** Martens 1978: 117.

*Nemastoma emonense* Hadži, 1973a: 29;—**syn.** Martens 1978: 117.

**radewi** (Roewer, 1926); loc. typ.: Bulgaria, Trnowo Distr., near Monastir Dranowski, Wodnata Pestera Cave.

*Nemastoma radewi* Roewer, 1926: 299.

*Nemastoma radevi*—Wolf 1938: 630 (misspelling); Šilhavý 1966a: 68.

*Nemastoma riparium* Roewer, 1951: 108;—**syn.** Komposch & Gruber 2004: 525.

*Nemastoma schenkeli* Roewer, 1951: 108;—**syn.** Komposch & Gruber 2004: 525.

*Nemastoma polonicum* Roewer, 1951: 112;—**syn.** Novak & Gruber 2000: 287.

*Nemastoma insulare* Roewer, 1951: 116;—**syn.** Novak 2004: 247. **Remarks.** Roewer used specimens of *radewi* for several false or questionable descriptions of new species. Gruber (in Novak 2004: 247) mentioned the type locality Hvar (Lesina) as “dubious”.

*Nemastoma (Dromedostoma) radewi*—Kratohvíl, 1958: 555.

*Nemastoma (Dromedostoma) atanasovi* Kratochvíl, 1958: 562;—**syn.** Staręga 1976: 326.

*Nemastoma (Dromedostoma) markovi* Kratochvíl, 1958: 548;—**syn.** Staręga 1976: 326.

*Nemastoma markovi*—Šilhavý 1966a: 68.

*Nemastoma (Dromedostoma) paspalevi* Kratochvíl, 1958: 558;—**syn.** Staręga 1976: 326.

*Nemastoma (Dromedostoma) paspalevi* var. *nigrum* Kratochvíl, 1958: 560;—**syn.** Staręga 1976: 326.

*Nemastoma (Dromedostoma) atanasovi balcanica* Kratochvíl, 1958: 562;—**syn.** Staręga 1976: 326.

*Paranemastoma radevi*—Avram 1973a: 34.

*Paranemastoma atanasovi*—Avram 1973a: 35.

*Paranemastoma paspalevi*—Avram 1973a: 35.

*Nemastoma (Dromedostoma) megarae* Hadži, 1973a: 42;—**syn.** Novak 2005: 317.

***sillii sillii*** (Herman, 1871); loc. typ.: Romania, Sibiu.

*Nemastoma sillii* Herman, 1871: 28.

*Nemastoma lineatum* Sørensen in Lendl 1894: 20—syn. Martens 1978: 126.

*Nemastoma gigas* Sørensen in Lendl 1894: 28—syn. Staręga 1978: 205.

*Nemastoma quadripunctatum sillii*—Roewer 1923: 662.

*Nemastoma bishopi* Roewer, 1951: 106;—syn. Martens 1978: 126. **Remarks.** The type locality (Germany, Black Forest, Titi Lake) is situated within the geographical range of *P. quadripunctatum*, not of *sillii*. The issue is only of academic interest as it would place *bishopi* in the synonymy of another *Paranemastoma* species.

*Nemastoma carpathicum* Roewer, 1951: 112;—syn. Avram 1973a: 60.

*Nemastoma politum* Roewer, 1951: 112;—syn. Staręga 1978: 205.

*Nemastoma wiehlei* Roewer, 1951: 114;—syn. Martens 1978: 126.

*Nemastoma zilchi* Roewer, 1951: 120;—syn. Martens 1978: 126.

*Nemastoma bulgaricum* Roewer, 1951: 120;—syn. Staręga 1976: 331.

*Nemastoma rumelium* Roewer, 1951: 120;—syn. Staręga 1976: 331.

*Nemastoma mohilevum* Roewer, 1951: 125;—syn. Staręga 1978: 205.

*Nemastoma romanium* Roewer, 1951: 125;—syn. Martens 1978: 126.

*Nemastoma rumanicum*—Martens 1978: 126 (misspelling).

*Crosbycus cavernae* Roewer, 1951: 152;—syn. Staręga 1978: 205.

*Paranemastoma sillii*—Avram 1973a: 31; Martens 1978: 126; (both: redescr.).

*Paranemastoma gigas*—Avram 1973a: 30.

*Paranemastoma silli sillii* Babalean, 2011: 42.

***silli monticola*** Babalean, 2011: 42; loc. typ.: Romania, Parâng Mts., Mount Vârful Mohorul, at lake Câlcescu.

***simplex*** (Giltay, 1932); loc. typ.: Greece, Taygetos Mts., Ladas (orig. Lada).

*Nemastoma simplex* Giltay, 1932: 1; **comb. n.:** Roewer (1951) related *simplex* to *Nemastoma filipes*, which is unlikely for geographical reasons. He seems the only one to have discussed this species, which, according to the original description, is a *Paranemastoma* and distinct from others from the Greece mainland. *Paranemastoma* is confirmed for the Peloponnese (Martens pers. comm.).

*Crosbycus graecus* Giltay, 1932: 2; **syn. n.:** Judging from Giltay's (1932) drawings (single opisthosomal sclerite) and from the body size (3 mm), the type of *Crosbycus graecus* is a juvenile *Paranemastoma*. Rambla (1968: 69) and Gruber and Martens (1968: 138) came to the same conclusion, but did not assign *C. graecus* to a valid species, although it is likely conspecific with *P. simplex* specimens collected from the very same spot.

***superbum*** Redikorzev, 1936; loc. typ.: Georgia, Batumi (Batum).

*Paranemastoma superbum* Redikorzev, 1936: 40;—Gruber & Martens 1968: 139 (see remarks on *Paranemastoma*); Martens 2006: 200 (redescr.).

*Nemastoma supersum* Roewer, 1951: 126 (invalid nomen novum for *superbum*);—Staręga 1978: 206.

*Nemastoma superbum bacuriana* Mcheidze, 1959: 111;—syn. Staręga 1978: 206.

*Nemastoma superbum bacurianum*—Mcheidze 1964: 117 (misspelling).

*Nemastoma (Paranemastoma) superbum*—Staręga 1966a: 392.

***thessalum*** (Simon, 1885a); loc. typ.: Greece, Ossa Mountains, summit.

*Nemastoma thessalum* Simon, 1885a: 216.

*Nemastoma quadripunctatum thessalum*—Roewer 1923: 662.

*Paranemastoma teshalum*—Avram 1973a: 31 (misspelling).

*Paranemastoma thessalum*—Novak 2005: 318.

***titaniacum*** (Roewer, 1914); loc. typ.: Bosnia (not further specified).

*Nemastoma titaniacum* Roewer, 1914: 162.

*Nemastoma bimaculosum* Roewer, 1951: 118; **syn. n.:** Novak 2005: 316 related *bimaculosum* to *P. titaniacum*, which is followed here.

*Nemastoma acrospinosum* Roewer, 1951: 125. **Remarks.** Novak (2004: 248) referred to the thesis of Karaman (1995a: 33) who cited Gruber (in litt.) to be responsible for this synonymy, though he never officially published it.

*Nemastoma (Dromedostoma) titaniacum*—Kratochvíl 1958: 538.

*Nemastoma acrospinosum pretneri* Hadži, 1973a: 34;—syn. Karaman 1995a: 35.

*Nemastoma grabovicæ* Hadži, 1973a: 37;—syn. Karaman 1995a: 35.

*Nemastoma bipunctatum* Hadži, 1973a: 36;—syn. Karaman 1995a: 35.

*Paranemastoma titaniacum*—Karaman 1995b: 334; Mitov 2000: 161.

**weneri** (Kulczyński, 1903); loc. typ.: Turkey, Uludağ Mt. (orig. Olympus Bithynicus).

*Nemastoma weneri* Kulczyński, 1903: 673;—Cîrdei 1960: 80.

*Nemastoma quadripunctatum weneri*—Roewer 1923: 663.

*Paranemastoma quadripunctatum weneri*—Cîrdei 1960: 80.

*Paranemastoma weneri*; **new rank:** Cîrdei (1960: 80) recorded *weneri* from former Yugoslavia and Šilhavý (1956a: 142) cited the name for Poland. Staręga (1978: 205) interpreted these specimens as *silli*, and regarded *weneri*, described from the Anatolian Peninsula, as separate. Unlikely to be a subspecies of *quadripunctatum* for geographical reasons, *weneri* is treated here as species until it is revised. The presence of *Paranemastoma* at the type locality has been confirmed (NHMW).

***Paranemastoma* considered as nomina dubia:** Most of the following names have never been mentioned following the original publication and are not identifiable as distinct species. On the basis of their descriptions, e.g. body size and spination, they can be transferred to *Paranemastoma*. Many have been described by Roewer (1951), in detail difficult to recognise for likely using false localities and already described species. Others were described by Hadži (1973a) upon variants and many of his types are lost and, thus recognition of his species is also difficult. If these names cannot be assigned to distinct species, they should be treated as invalid.

***aeginum*** (Roewer, 1951).

*Nemastoma aeginum* Roewer, 1951: 121.

*Paranemastoma aeginum* **comb. n.**

***amseli*** (Roewer, 1951).

*Nemastoma amseli* Roewer, 1951: 123.

*Paranemastoma amseli*—Marcellino 1980: 333. **Remarks.** Never collected again, *Paranemastoma* probably does not occur in Sardinia and *amseli* is likely to be another “misplaced” Roewer species.

***amuelleri*** (Roewer, 1951).

*Nemastoma amuelleri* Roewer, 1951: 118.

*Paranemastoma amuelleri* **comb. n.**

***bolei*** (Hadži, 1973a).

*Nemastoma (Dromedostoma) bolei* Hadži, 1973a: 38.

*Paranemastoma bolei* **comb. n.**

***brevipalpatum*** (Roewer, 1951).

*Nemastoma brevipalpatum* Roewer, 1951: 122.

*Paranemastoma brevipalpatum*—Prieto 2008: 56 (assumed false loc. typ.; not Spain).

***caporiacoi*** (Roewer, 1951).

*Nemastoma caporiacoi* Roewer, 1951: 123.

*Paranemastoma caporiacoi* **comb. n.:** According to the original illustrations and size, it is definitely a *Paranemastoma*, a genus not present in Sicily.

*carneluttii* (Hadži, 1973a).

*Nemastoma carneluttii* Hadži, 1973a: 39.

*Paranemastoma carneluttii* **comb. n.**

*emigratum* (Roewer, 1959).

*Nemastoma emigratum* Roewer, 1959: 37.

*Paranemastoma emigratum* **comb. n.:** According to Roewer's drawings (1959: 38) this is most likely a *Paranemastoma*. While the collector K. Lindberg insisted that his specimen is from India, this is unlikely given the known distribution of the genus and family. Confusion with Lindberg's rich collections from Greece and Turkey, where *Paranemastoma* is present, seems likely.

*ferkeri* (Roewer, 1951).

*Nemastoma ferkeri* Roewer, 1951: 121.

*Paranemastoma ferkeri* **comb. n.**

*gigas montenegrinum* (Nosek, 1904)

*Nemastoma gigas montenegrinum* Nosek, 1904: 4.

*Paranemastoma gigas montenegrinum* **comb. n.:** The name seemingly was not used after the original description and the type locality, Montenegro, is not in the distribution area of *silli*, with which *gigas* was synonymised. Avram (1973a), discussing the synonymy of *gigas*, did not mention subspecies of *gigas*, some of which were later accepted as species (e.g. *longipes*). According to the description, *montenegrinum* could conform to *titaniacum*, rendering the latter synonymous. For the lack of an explicit type locality and the likely loss of the *montenegrinum* type, *titaniacum* is preserved for now.

*gostivarensis* (Hadži, 1973a).

*Nemastoma gostivarensis* Hadži, 1973a: 32.

*Paranemastoma gostivarensis* **comb. n.**

*ikarium* (Roewer, 1951).

*Nemastoma ikarium* Roewer, 1951: 125.

*Paranemastoma ikarium* **comb. n.**

*ios* (Roewer, 1917).

*Nemastoma quadripunctatum ios* Roewer, 1917: 143.

*Nemastoma ios*—Roewer 1951: 121.

*Paranemastoma ios* **comb. n.**

*kaestneri* (Roewer, 1951).

*Nemastoma kästneri* Roewer, 1951: 121.

*Paranemastoma kaestneri* **comb. n.**

*longipalpatum* (Roewer, 1951).

*Nemastoma longipalpatum* Roewer, 1951: 116;

*Paranemastoma longipalpatum* **comb. n.**

*macedonicum* (Hadži, 1973a).

*Nemastoma macedonicum* Hadži, 1973a: 25.

*Paranemastoma macedonicum* **comb. n.**

*machadoi* (Roewer, 1951).

*Nemastoma machadoi* Roewer, 1951: 123.

*Paranemastoma machadoi*—Prieto 2008: 55 (excluded from Spain).

*mackenseni* (Roewer, 1923).

*Nemastoma mackenseni* Roewer, 1923: 668.

*Paranemastoma mackenseni* **comb. n.**

*multisignatum* (Hadži, 1973a).

*Nemastoma (Dromedostoma) multisignatum* Hadži, 1973a: 35

*Paranemastoma multisignatum* **comb. n.**

*nigrum* (Hadži, 1973a).

*Nemastoma (Dromedostoma) nigrum* Hadži, 1973a: 32.

*Paranemastoma nigrum* **comb. n.**

*perfugium* (Roewer, 1951).

*Nemastoma perfugium* Roewer, 1951: 110.

*Paranemastoma perfugium* **comb. n.**: Roewer (1951) placed *perfugium* in the group of *Paranemastoma*-like *Nemastomatidae*. The type locality (Elba, Italy) is otherwise not known to be inhabited by *Paranemastoma* and hence doubtful.

*redikorzevi* (Roewer, 1951).

*Nemastoma redikorzevi* Roewer, 1951: 125.

*Paranemastoma redikorzevi*—Staręga 1978: 205.

*Paranemastoma roeweri* Staręga, 1978: 205;—Chevrizov 1979: 14; **syn. n.**: Staręga (1978: 205) found *Nemastoma redikorzevi* Roewer (loc. typ. Ukraine “Krim”) to be preoccupied by *Nemastoma redikorzevi* Charitonov, renamed it *roeweri* and transferred it to *Paranemastoma*. In this case of primary homonymy, the younger name is not to be automatically replaced, as Staręga transferred the species to different genera in the same paper, not notifying the commission (ICZN 23.9.5).

*santorinum* (Roewer, 1951).

*Nemastoma santorinum* Roewer, 1951: 124.

*Paranemastoma santorinum* **comb. n.**

*senussium* (Roewer, 1951).

*Nemastoma senussium* Roewer, 1951: 123.

*Paranemastoma senussium* **comb. n.**: According to drawing and size, it is definitely a *Paranemastoma* unlikely to occur in the North African Kufra Oasis.

*sketi* (Hadži, 1973a).

*Nemastoma (Dromedostoma) sketi* Hadži, 1973a: 41.

*Paranemastoma sketi* **comb. n.**

*spinosulum* (L. Koch, 1869).

*Nemastoma spinosulum* L. Koch, 1869: 165.

*Nemastoma spinulosum*—Roewer 1951: 140 (misspelling).

*Paranemastoma spinosulum* **comb. n. Remarks.** L. Koch (1869) provided descriptions as a determination key, allowing association with *Paranemastoma* from the mentioned pair of prominent spines only. Roewer (1951: 140) mentioned it as *N. spinulosum*, while the species seems not recognisable any more.

*umbo* (Roewer, 1951).

*Nemastoma umbo* Roewer, 1951: 122.

*Paranemastoma umbo*—Staręga 1978: 206; Martens 2006: 206. **Remarks.** Described from the Caucasus, Martens (2006: 207) questioned that *umbo* originates from this geographic area, but was unable to assign it to another species.

### Genus *Pyza* Staręga, 1976 (4 species)

*Pyza* Staręga, 1976: 315; type species *Nemastoma bosnicum* Roewer, 1917 by monotypy and original designation;—Gruber 1979: 559.

**Remarks.** Gruber (1979) revised the genus and mentioned that the type species, *P. bosnica*, is distantly related to the remaining species and only tentatively placed them in *Pyza*. A phylogenetic comparison with *Mediostoma* and *Vestiferum* is advised.

**Etymology.** Gender feminine; although sounding similar to modern Neapolitan fast food, the true titular saints are globular Polish potato dumplings, in resemblance to the body form of these opilionids.

*anatolica* (Roewer, 1959); loc. typ.: Turkey, Cheykhán, caves 30 km N Mardine.

*Crosbycus anaticus* Roewer, 1959: 38.

*Pyza anatolica*—Gruber 1979: 572.

*bosnica* (Roewer, 1917); loc. typ.: Bosnia, Miljačka River Valley near Sarajevo.

*Nemastoma bosnicum* Roewer, 1917: 150.

*Nemastoma gallwitzii* Roewer, 1923: 667;—syn. Staręga 1976: 315.

*Nemastoma (Lugubrostoma) bosnicum orientale* Kratochvíl, 1958: 565;—syn. Staręga 1976: 316.

*Nemastoma (Lugubrostoma) goliae* Hadži, 1973a: 45;—syn. Gruber 1979: 560.

*Nemastoma (Lugubrostoma) sarae* Hadži, 1973a: 46;—syn. Gruber 1979: 560.

*Pyza bosnica*—Staręga 1976: 315.

*navarrense* (Roewer, 1951); loc. typ.: Spain, Navarra. **Remarks.** According to Gruber (1979: 561) the type locality is incorrect. He showed that the species is widely distributed in Greece and subsequent records from the Pyrenees are absent.

*Nemastoma navarrense* Roewer, 1951: 130.

*Nemastoma lindbergi* Roewer, 1959: 36;—syn. Gruber 1979: 561.

*Pyza navarrense*—Gruber 1979: 561.

*taurica* Gruber, 1979: 566; Turkey; loc. typ.: Turkey, Vilayet Antalya, 18 km W Topraktepe, E Manavgat.

### Genus *Saccarella* Schönhofer & Martens, 2012 (1 species)

*Saccarella* Schönhofer & Martens, 2012: 412; type species *Saccarella schilleri* Schönhofer & Martens, 2012 by monotypy and original designation.

**Etymology.** Gender feminine; derived from the name of the type locality Monte Saccarello.

*schilleri* Schönhofer & Martens, 2012: 412; typ. loc.: Italy, Liguria, Imperia Prov., Monte Saccarello, Monesi di Triora.

### Genus *Starengovia* Snegovaya, 2010 (1 species)

*Starengovia* Snegovaya, 2010: 351; type species *Starengovia kirgizica* Snegovaya, 2010 by monotypy and original designation.

**Etymology.** Gender feminine; in honor of the Polish arachnologist Wojciech Staręga.

*kirgizica* Snegovaya, 2010; typ. loc.: Kyrgyzstan, Alash Mountain Ridge and River valley, near Alash.

*Starengovia kirgizica* Snegovaya, 2010: 352.

*Starengovia kirgisica*—Snegovaya, 2010: 353. **Remarks.** The spelling is hereby fixed to *kirgizica* (ICZN 24.2.3).

## Genus *Vestiferum* Martens, 2006 (2 species)

*Vestiferum* Martens, 2006: 175; type species *Nemastoma funebre* Redikorzev, 1936 by original designation.

**Remarks.** Martens (2006) united two species in *Vestiferum*, which he considered as not very closely related. He mentioned affinities of *alatum* to the Turkish species of the heterogenous *Pyza*.

**Etymology.** Gender neuter; Latin “vestis” (dress, blanket) and the ending „ferum“ (bearing) referring to the soil incrustated body, which is unusual within Nemastomatidae.

*alatum* Martens, 2006: 176; loc. typ.: Georgia, Ajaria, Kintrish State Reserve, Zeraboseli.

*funebre* (Redikorzev, 1936); loc. typ.: Abchasia, Gagra, Kvemo-Ažara near Tkvarčeli.

*Nemastoma funebre* Redikorzev, 1936: 36;—Šilhavý 1966a: 69; Staręga 1966a: 391; 1978: 203.

*Nemastoma brunneum* Redikorzev, 1936: 35;—syn. Staręga 1978: 203.

*Vestiferum funebre*—Martens 2006: 175.

**Remarks.** As both names were published in the same paper, Staręga (1978; as first revising author) gave *funebre* precedence over *brunneum* (ICZN 24.2.2).

## Nemastomatinae incertae sedis (3 species)

Species listed here are not assignable to any genus and do not belong in *Nemastoma* sensu Gruber and Martens (1968). Formally excluded from *Nemastoma*, they require re-definition.

*daciscum* L. Koch, 1869: 164; loc. typ.: not given. **Remarks.** L. Koch (1869) described this *Nemastoma* in a short key. Roewer (1914: 144) listed it with *Nemastoma quadripunctatum* but found it not recognisable. It is recommended to not use *daciscum* any further.

*lilliputanum* Lucas, 1849; loc. typ.: Algeria, Oran, Djebel Santon Mountain.

*Goniosoma lilliputanum* Lucas, 1849: 302.

*Nemastoma lilliputanum*—Simon 1879a: 289; Roewer 1914: 138.

*Nemastoma (Lugubrostoma) lilliputanum*—Kratochvíl 1958: 539.

**Remarks.** The cheliceral apophysis of the type (depicted by Roewer 1914: 138) is very unique and may point to separate generic status.

*rude* Simon, 1881b: 90; loc. typ.: France, Dép. Alpes-Maritimes, St. Martin Lantosque. **Remarks.** The body length of 9 mm stated for this *Nemastoma* (Simon 1881b) exceeds that of any other species in the family and is therefore most likely an error. The description faintly suggests *Nemastoma dentigerum*, the type needs reinvestigation.

## Family Nipponopsalididae Martens, 1976

Nipponopsalididae Martens, 1976: 66; type genus *Nipponopsalis* Martens & Suzuki, 1966, by monotypy and original designation.

## Genus *Nipponopsalis* Martens & Suzuki, 1966 (3 species, 2 subspecies)

*Nipponopsalis* Martens & Suzuki, 1966: 215; type species *Ischyropsalis abei* Sato & Suzuki, 1939 by original designation.

**Etymology.** Gender feminine; from Kanji “Nippon” (Japan) and Greek “psalis” (scissors), referring to the enlarged chelicerae and the partly Japanese distribution.



*abei abei* (Sato & Suzuki, 1939); loc. typ.: Japan, Iwakuni, Yamaguti-Ken.

*Ischyropsalis abei* Sato & Suzuki, 1939: 29.

*Nipponopsalis abei*—Martens & Suzuki 1966: 218.

*Nipponopsalis abei abei*—Suzuki 1973: 264.

*abei longipes* Suzuki, 1973: 264; loc. typ.: Japan, Amami-ôshima Island, Mt. Yuwan-dake.

*coreana* (Suzuki, 1966); loc. typ.: South Korea, Chungbuk, Chungju, Betal Cave.

*Ischyropsalis coreana* Suzuki, 1966: 95.

*Nipponopsalis coreana*—Martens & Suzuki 1966: 220. **Remarks.** The redescription by Chemeris (2000: 47) actually deals with *Taracus birsteini*.

*yezoensis* (Suzuki, 1958); loc. typ.: Japan, Hokkaido, Orofure-tôge.

*Ischyropsalis yezoensis* Suzuki, 1958: 167.

*Nipponopsalis yezoensis*—Martens & Suzuki 1966: 220.

### Family Trogulidae Sundevall, 1833

Trogulides Sundevall, 1833: 35 (proposed as family; compr. *Trogulus*, *Caeculus*); type genus *Trogulus* Latreille, 1802, inferable from the stem of the family name (ICZN 11.7.1.1);—C.L. Koch 1839b: 7 (compr. *Trogulus*).

Trogulidae—Simon 1872a: 239 (compr. *Trogulus*, *Cyphophthalmus*); Roewer 1940: 26 (compr. *Anelasmacephalus*, *Calathocratus*, *Kofiniotis*, *Platybessobius*, *Trogulocratus*, *Trogulus*); Šilhavý 1967: 176 (compr. *Anarthrotarsus*, *Anelasmacephalus*, *Calathocratus*, *Kofiniotis*, *Platybessobius*, *Trogulocratus*, *Trogulus*); Schönhofer & Martens 2010a: 71 (compr. *Anarthrotarsus*, *Anelasmacephalus*, *Calathocratus*, *Kofiniotis*, *Trogulus*).

Trogulini—Sørensen 1873: 515; Thorell 1876: 468 (as subfamily; compr. *Anelasma*, *Trogulus*).

Trogulinae—Simon 1879a: 289 (compr. *Trogulus*, *Anelasmacephalus*, *Calathocratus*, *Metopoctea*); Šilhavý, 1967: 175.

**Remarks.** *Trogulus* is understood as the type genus since Sundevall (1833: 35). Albeit C.L. Koch (1850: 98) indirectly designated *Trogulus* when assuming the group monotypic, Shear (1974: 67) seems the first to explicitly state *Trogulus* as the type genus. Some of the suggested changes in this family originate from a PhD thesis (Schönhofer 2009), which may not qualify as a valid taxonomic publication, hence they are given as new.

### Genus *Anarthrotarsus* Šilhavý, 1967 (1 species)

*Anarthrotarsus* Šilhavý, 1967: 176; type species *Anarthrotarsus martensi* Šilhavý, 1967 by monotypy and original designation.

**Etymology.** Gender masculine; Greek, from „an“ (no), “arthron” (joint) and “tarsus” referring to the one-segmented tarsi of all legs.

*martensi* Šilhavý, 1967: 176; loc. typ.: The original type locality Greece, Corfu, provided by Roewer, is doubtful for his known meddling with localities (Helvesen & Martens 1972) and because the species was never collected there again. If it can't be confirmed, the affirmed paratype locality (Greece, Crete, Bay of Sithia) should be preferred (ICZN 76A.2).

### Genus *Anelasmacephalus* Simon, 1879a (13 species)

*Anelasma* Sørensen, 1873: 519; type species *Anelasma lycosinum* Sørensen, 1873 by subsequent designation (Thorell 1876: 468).

*Anelasmacephalus* Simon, 1879a: 297; replacement name for *Anelasma* Sørensen, 1873, preoccupied by *Anelasma* Darwin, 1854.

*Rhexana* Sørensen, 1879: 124; the other suggested replacement name, *Anelasmacephalus* Simon, 1879a, has priority.

**Etymology.** Gender masculine; Greek, from „an“ (no) and “elasma” (plate) “kephalé” (head) referring to the small head cap in comparison to *Dicranolasma* (Sørensen 1873).

*balearicus* Martens & Chemini, 1988: 35; loc. typ.: Spain, Mallorca, settlement near Palma.

*brignolii* Martens & Chemini, 1988: 29; loc. typ.: Italy, Sardinia, Nuoro, Macomer, Borore.

*calcaneatus* Martens & Chemini, 1988: 31; loc. typ.: Italy, Sicily, Palermo, Corleone, Bosco della Ficuzza.

*cambridgei* (Westwood, 1874); **nomen protectum**; loc. typ.: Great Britain, Dorset, Bloxworth near Blandford.

*Trogulus violaceus* Gervais, 1844: 130; **nomen oblitum**: Assigned to *Anelasmaocephalus* by Schönhofer (2009: 187). Pabst (1953: 22) mentioned the striking colouration as characteristic for all juveniles of this species. Being the older name it is here suggested to treat *violaceus* as nomen oblitum in favour of the established name *cambridgei* (nomen protectum; ICZN 23.9.1). *Trogulus violaceus* has not been used as valid name after its year of description (ICZN 23.9.1.1) and at least 150 works list the name *Anelasmaocephalus cambridgei* (ICZN 23.9.1.2).

*Trogulus cambridgei* Westwood, 1874: 202; citation misspelled as *cambridgii* in Martens & Chemini 1988: 36.

*Anelasma sorensoni* L. Koch, 1877: 195;—syn. Simon 1879a: 299.

*Anelasma sorensoni*—Simon 1879a: 299.

*Anelasmaocephalus cambridgei*—Simon 1879a: 299; Martens 1978: 176; Martens & Chemini 1988: 36 (redescr.).

*crassipes* (Lucas, 1849); loc. typ.: Algeria, Eastern part. **Remarks.** The syntype series most likely comprises material pooled from four localities mentioned in the original description (according to the number of individuals and the label stating “Algérie”; for other examples of mixed Simon series see Schönhofer & Martens 2008, e.g. p. 548). According to ICZN 73.2.3, the type locality comprises all these localities until a lectotype is designated.

*Trogulus crassipes* Lucas, 1849: 305.

*Trogulus annulipes* Lucas, 1849: 306;—syn. Martens & Chemini 1988: 26.

*Anelasma oblongum* Sørensen, 1873: 519;—syn. Martens & Chemini 1988: 26.

*Anelasmaocephalus bicarinatus* Simon, 1879a: 298;—syn. Martens & Chemini 1988: 26.

*Anelasmaocephalus oblongus*—Simon 1879a: 301.

*Metopoctea annulipes*—Simon 1879a: 311.

*Anelasmaocephalus crassipes*—Roewer 1923: 646; Martens & Chemini 1988: 26 (redescr.).

*hadzii* Martens, 1978; loc. typ.: Austria, Karawanken, Eisenkappel.

*Anelasmaocephalus hadzii* Martens, 1978: 181;—Martens & Chemini 1988: 18.

*lycosinus* (Sørensen, 1873); loc. typ.: Italy, Prov. Rome, Gennazzano.

*Anelasma lycosinum* Sørensen, 1873: 521.

*Anelasmaocephalus lycosinus*—Simon, 1879a: 297; Martens & Chemini 1988: 12 (redescr.).

*osellai* Martens & Chemini, 1988: 33; loc. typ.: Italy, L'Aquila, Parco Nazionale d'Abruzzo, Marsicano Mountain.

*pusillus* Simon, 1879a; loc. typ.: France, Corsica (not further specified).

*Anelasmaocephalus pusillus* Simon, 1879a: 300;—Martens & Chemini 1988: 11 (redescr.).

*pyrenaicus* Martens, 1978; loc. typ.: Spain, Central Pyrenees, Ordesa Valley.

*Anelasmaocephalus pyrenaicus* Martens, 1978: 184;—Martens & Chemini 1988: 39.

*rufitarsis* Simon, 1879a; loc. typ.: France, Basses-Alpes, Digne.

*Anelasmoecephalus rufitarsis* Simon, 1879a: 298;—Martens 1978: 180; Martens & Chemini 1988: 41 (redescri.).

*tenuiglandis* Martens & Chemini, 1988: 16; loc. typ.: France, Dép. Alpes-Maritimes, W St. Martin.

*tuscus* Martens & Chemini, 1988: 22; loc. typ.: Italy, Abetone, Cimone Mountain.

### Genus *Calathocratus* Simon, 1879a (9 species)

*Calathocratus* Simon, 1879a: 301; type species *Trogulus africanus* Lucas, 1849 by monotypy.

*Platybessobius* Roewer, 1940: 27; type species *Platybessobius singularis* Roewer, 1940 by monotypy;—syn. Schönhofer & Martens 2010a: 71.

*Trogulocratus* Roewer, 1940: 27; type species *Trogulocratus intermedius* Roewer, 1940 by monotypy;—syn. Schönhofer & Martens 2010a: 71.

**Remarks.** When describing *Calathocratus*, Simon (1879a) defined *Trogulus africanus* as the type species, but based the description of the genus on a different species, rendering the description invalid. The genus name remained available by specification of the type species and a redescription of the genus should consider the original type series of *africanus* (MHNP 2201; Schönhofer 2009: 172).

Schönhofer and Martens (2010a) united three poly- and paraphyletic genera within *Calathocratus*. A list of taxonomic changes deemed unnecessary. The same authors also showed cryptic diversity to be extraordinarily high, while clear species delineation on the basis of molecular genetics or morphology could not be realised.

**Etymology.** Gender masculine; maybe from Greek „kalathos“ (flared fruit basket borne on the head as a symbol of fruitfulness in Greek and Egyptian mythology; compare Gruber 2003 for Simon’s preference to integrate Egyptian mythology in taxonomy) and “kratos” (authority, maybe in terms of “head of”), likely circumscribing the conspicuous head cap of these opilionids.

*africanus* (Lucas, 1849); loc. typ.: Algeria, surroundings of Algiers (as specified on the label of the type series MHNP 2201; Schönhofer 2009: 173).

*Trogulus africanus* Lucas, 1849: 304.

*Calathocratus africanus*—Simon 1879a: 301.

*Trogulocratus tunetanus* Roewer, 1950; **syn. n.:** Schönhofer (2009: 173) found the types of *tunetanus* to be conspecific with the types of *africanus*.

*beieri* Gruber, 1968: 435; loc. typ.: Turkey, Anatolia, Vilayet İçel, Namrun (?amliyyayla).

*caucasicus* (Šilhavý, 1966b); loc. typ.: Russia, Kuban, Michajlov.

*Platybessobius caucasicus* Šilhavý, 1966b: 151.

*Calathocratus caucasicus*—Schönhofer & Martens 2010a: 71.

*hirsutus* Snegovaya, 2011 (in Snegovaya & Chumachenko 2011: 117); loc. typ.: Russia, Sochi, N Khosta, Caucasian State Natural Biospheric Reserve, yew and box-tree grove.

*intermedius* (Roewer, 1940); loc. typ.: Greece, Crete, Meskla. **Remarks.** The locality is doubtful for reasons explained under *Anarthrotarsus* and *Kofiniotis*, and because the species has never been recollected on Crete.

*Trogulocratus intermedius* Roewer, 1940: 28.

*Calathocratus intermedius*—Schönhofer & Martens 2010a: 71; Schönhofer 2009: 173.

*minutus* Snegovaya, 2011 (in Snegovaya & Chumachenko 2011: 117); loc. typ.: Russia, Sochi, N Khosta, Caucasian State Natural Biospheric Reserve, yew and box-tree grove.

*rhodiensis* (Gruber, 1963); loc. typ.: Greece, Rhodos, Apollo Temple on Smith Mountain.

*Trogulocratus rhodiensis* Gruber, 1963: 308.

*Calathocratus rhodiensis*—Schönhofer & Martens 2010a: 71.

*singularis* (Roewer, 1940); loc. typ.: Greece, Crete, Topolia Gorge.

*Platybessobius singularis* Roewer, 1940: 27.

*Calathocratus singularis*—Schönhofer & Martens 2010a: 71.

*sinuosus* (Sørensen, 1873); loc. typ.: Italy, Prov. Rome, Gennazzano.

*Trogulus sinuosus* Sørensen, 1873: 522.

*Trogulus albicerus* Sørensen, 1873: 523; **syn. n.:** Described from the same locality, *albicerus* is based on juveniles of *sinuosus* (Schönhofer 2009: 173).

*Trogulocratus apenninicus* Marcellino, 1965: 327;—syn. Chemini & Gruber 1976: 132.

*Trogulocratus sinuosus*—Chemini & Gruber 1976: 132.

*Calathocratus sinuosus*—Schönhofer & Martens 2010a: 71.

**Remarks.** Brignoli and Raffaelli (1978: 94) synonymised the Italian *apenninicus* with the supposedly Greek *intermedius*, but given the geographic distance, it is unlikely that both are conspecific. Chemini and Gruber (1976: 132) redirected the synonymy of *apenninicus* to the Italian *sinuosus*.

### Genus *Kofiniotis* Roewer, 1940 (1 species)

*Kofiniotis* Roewer, 1940: 29; type species *Kofiniotis creticus* Roewer, 1940 by monotypy and original designation;—Roewer 1950: 56; Šilhavý 1967: 176.

*Konfiniotis*—Roewer, 1940: 29.

**Etymology.** Gender masculine; Roewer (1940) spelled “*Konfiniotis*” in the header of the genus description and “*Kofiniotis*” elsewhere. No meaning for *Kofiniotis* was given, but *Konfiniotis*, derived from the Latin “confinium”, the “bordered” or “limited”, is reasonable in view of the species exhibiting rows of long papillae along the legs to “confine” several of the distal segments. However, Roewer did not explain the etymology to infer a spelling error. According to ICZN 24.2.4, Roewer (1950: 56) as first revising author fixed *Kofiniotis* by listing only this name. The gender of the species-name *creticus* specifies the gender of the genus as masculine (ICZN 30.2.3).

***creticus*** Roewer, 1940: 29; loc. typ.: Greece, Crete, Meskla. **Remarks.** The type locality is likely erroneous as the species was never collected again on Crete and as the type label states “Topolia Cave”, a locality which Roewer used for several problematic species (Helvesen & Martens 1972). It is advised to use “Greece, Levkas Island”, the second reported (Roewer 1950) and reconfirmed locality (Schönhofer & Martens 2010a) as type locality.

### Genus *Trogulus* Latreille, 1802 (32 species)

*Trogulus* Latreille, 1802: 61; type species *Acarus nepaeformis* Scopoli, 1763 by subsequent designation (Thorell 1876: 468).

*Metopoctea* Simon, 1879a: 309; type species *Phalangium melanotarsum* Hermann, 1804, here designated type species as none was designated before;—syn. Dahl, 1903: 283.

*Trogolus*—C.L. Koch 1839a: 7 (misspelling).

**Remarks.** Schönhofer and Martens (2010a) showed that cryptic diversity was largely underestimated. The revision of the genus is a tedious process due to its homogeneous morphology.

**Etymology.** Gender masculine; Latreille (1802: 61) stated the chelicerae and palps to be hidden under a small hood (coqueluchon = petite capuchon) and applied the name “Trogule”. The exact meaning remains unclear, while in view of Latreille’s explanation the interpretation of Perrier *et al.* (1929; de “trogein”, rongé = gnawed) has to be rejected.

**aquaticus** Simon, 1879a; loc. typ.: France, Corsica, Haute Corse, Corte.

*Trogulus aquaticus* Simon, 1879a: 306;—Schönhofer & Martens 2008: 533 (redescr.).

*Metopoctea exarata* Simon, 1879a: 310; **syn. n.**

*Trogulus exaratus*—Schönhofer & Martens 2008: 553 (considered invalid).

**Remarks.** Simon's original description of *exarata* (1879a: 306) matches only the largest specimen of the syntype series, thereby identifiable as its lectotype (ICZN 74.4). The lectotype represents a juvenile of *aquaticus* (7.5 mm body length, length of the tarsal segments II almost equal), fixing the type locality to Corsica (ICZN 76.2). The other juvenile paralectotypes cannot be assigned and may originate from other localities mentioned in the description, e.g. the Pyrenees. *Metopoctea exarata* is hereby placed in the synonymy of *Trogulus aquaticus*, against Schönhofer and Martens' (2008: 553) recommendation to neglect *exarata* without affiliating it to a species. Schönhofer and Martens (2008: 553) specified a neotype for *aquaticus*, which, in fact, is a lectotype, because it originates from the syntype series.

**balearicus** Schönhofer & Martens, 2008: 537; loc. typ.: Spain, Balearic Islands, Ibiza, Sierra Grosa, valley facing to San José.

**banaticus** Avram, 1971; loc. typ.: Romania, Banat Mountains, Scorilla Valley, Poiana Mărului.

*Trogulus banaticus* Avram, 1971: 261;—Schönhofer & Novak 2011: 8; Schönhofer *et al.* 2013a: 371 (both redescr.).

**cisalpinus** Chemini & Martens, 1988: 71; loc. typ.: Italy, Como, Brunate.

**closanicus** Avram, 1971; loc. typ.: Romania, Carpathian, Plateau de Mehedintzi, Cloșani.

*Trogulus closanicus* Avram, 1971: 256;—Weiss 1978: 226; Chemini 1984: 57 (redescr.).

*Trogulus asperatus* C.L. Koch, 1839a: 146; **nomen oblitum**: The holotype of *asperatus* represents a not assignable juvenile of the *nepaeformis-squamatus*-complex, of which at the type locality of *asperatus* (Zweibrücken, Germany) only *closanicus* was found abundant. As the name never played a role in the taxonomic literature, it is proposed as a nomen oblitum and *closanicus* as a **nomen protectum** (see Remarks on *niger* under *nepaeformis*).

**coriziformis** C.L. Koch, 1839a; loc. typ.: Italy, Lazio, Roma Prov., Monti della Tolfa, between Tolfa and Rota (restricted by neotype locality; Schönhofer & Martens 2008: 538).

*Trogulus coriziformis* C.L. Koch, 1839a: 128;—Schönhofer & Martens 2008: 538 (redescr.).

*Trogulus salfi* De Lerma, 1948: 160;—syn. Schönhofer & Martens 2008: 538.

**cristatus** Simon, 1879a; loc. typ.: France, Provence, Dép. Alpes-Maritimes.

*Trogulus cristatus* Simon, 1879a: 308;—Schönhofer & Martens 2008: 543 (redescr.).

**falcipenis** Komposch, 2000; loc. typ.: Austria, Carinthia, Karawanken, Koschuta, S Zell-Pfarre.

*Trogulus falcipenis* Komposch, 2000: 2;—Schönhofer & Martens 2009: 1239 (redef.).

**graecus**, Dahl, 1903, loc. typ.: Greece (not further specified).

*Trogulus graecus* Dahl, 1903: 285.

*Trogulus corcyraeus* Dahl, 1903: 285;—syn. Starega 1976: 301. **Remarks.** Schönhofer and Martens (2010a) assumed that many cryptic species were summarised under the name *graecus*. *Trogulus corcyraeus* (loc. typ.: Greece, Corfu) likely belongs to one of these cryptic species and should be considered for a revision (Schönhofer 2009: 176).

**gypseus** Simon, 1879b: 75; loc. typ.: Jerusalem. **Remarks.** Schönhofer and Martens (2010) assumed several cryptic species summarised under this name.

*hirtus* Dahl, 1903; loc. typ.: Bosnia-Herzegovina, Konjsko.

*Trogulus tricarinatus* subspecies *hirta* Dahl, 1903: 289.

*Trogulus tricarinatus hirtus*—Roewer 1923: 641.

*Trogulus hirtus*—Schönhofer & Martens 2009: 1226 (redescr.).

*huberi* Schönhofer & Martens, 2008: 548; loc. typ.: Portugal, Algarve, 50 km N Faro, Alte.

*karamanorum* Schönhofer & Martens, 2009: 1244; loc. typ.: Republic of Macedonia, Gostivar, near Gjonovica Cave.

*lusitanicus* Giltay, 1931; loc. typ.: Portugal, Lisboa, Sintra (Cintra).

*Trogulus lusitanicus* Giltay, 1931: 1;—Schönhofer & Martens 2008: 549 (redescr.).

**Remarks.** *T. lusitanicus* includes cryptic species (Schönhofer & Martens 2008).

*martensi* Chemini, 1983; **nomen protectum**; loc. typ.: Italy, Trento, Pergine Valsugana.

*Trogulus martensi* Chemini, 1983: 125.

*Trogulus tuberculatus* Canestrini, 1874: 221; **nomen oblitum**: Chemini (1986) did not mention *T. tuberculatus* from the Canestrini Collection, and the type can be presumed lost. *Trogulus martensi* is widespread and abundant in the Po-Valley and is the only species likely to occur at the type locality of *tuberculatus* (Italy, Padova, Cervarese). However, *tuberculatus* is not recognisable from the description, featuring a juvenile (e.g. body ash-grey, only tarsi dark) and compared with other *Trogulus* of questionable definition (*nepaeformis* sensu Koch 1839a; *squalidus*, *asperatus*). Furthermore, the name *Trogulus tuberculatus* has not played a role in taxonomic literature after 1899 (only once mentioned as a synonym; Roewer 1923: 639; ICZN 23.9.1.1) and a minimum of 25 works mention *T. martensi* (ICZN 23.9.1.2). *Trogulus tuberculatus* is suggested as nomen oblitum (ICZN 23.9) to favour the established name *Trogulus martensi* (nomen protectum).

*megaligrava* Schönhofer *et al.*, 2013a: 373; loc. typ.: Greece, Corfu, S Loutsos, Megali Grava Cave.

*melitensis* Schönhofer & Martens, 2009: 1236; loc. typ.: Croatia, Mljet Island, Soline, Bjejjajka, in pit Jama u uvali šume Bjejjajka.

*nepaeformis* (Scopoli, 1763); loc. typ.: Scopoli (1763) stated only “Discovered once in moss near beech roots”. T. Novak (pers. comm.) assumed that the type was collected at Scopolis workplace, Slovenia, Idrija, where the species is present and which should be fixed as type locality.

*Acarus nepaeformis* Scopoli, 1763 (in index without page numbers).

*Acarus nepeformis*—Scopoli, 1763: 390.

*Phalangium rostratum* Latreille, 1798: 114;—syn. Dahl 1903: 288.

*Trogulus nepaeformis*—Latreille 1802: 61.

*Trogulus rostratum*—Latreille 1802: 61.

*Phalangium melanotarsum* Hermann, 1804: 103;—syn. Dahl (1903: 288). **Remarks.** Hermann’s (1804) drawings of *melanotarsum* show an early instar not assignable to any species. At the locus typicus (Strasbourg, France) presence of four species is possible, but no later reference to *melanotarsum* can be clearly associated with any of these (e.g. Koch 1839a, Simon 1879a, Ausserer 1867, Kraepelin 1896) or other species. The type is lost and the name never played a role in systematic literature (Schönhofer 2009: 181). Here, Dahl (1903: 288) is followed, suggesting *T. melanotarsum* as a synonym of *T. nepaeformis*.

*Trogulus niger* C.L. Koch, 1836a: 136;—C.L. Koch 1839a: 138; syn. Dahl 1903: 287. **Remarks.** A *Trogulus* from BMNH is labelled *niger* and the museum data (not the label) states “Triest” as locality and “Graf Jeniston” as the collector, conforming to C.L. Koch’s data of the type. It is not labelled as type and should not be considered one to keep the name in synonymy, as it never played a role in taxonomic literature. *Trogulus niger* was already considered as a synonym of *nepaeformis* by Dahl (1903: 287) and Roewer (1923: 639), only discussed by Hadži (1928: 9), who confused *tingiformis* for *nepaeformis* and *nepaeformis* for *niger*. The BMNH specimen conforms to *Trogulus closanicus* Avram, 1971, a name in prevailing use since the species

was accepted by Weiss (1978) and redescribed by Chemini (1984). References for Germany alone (Staudt 2013) provide the required minimum of 25 works (ICZN 23.9.1.2). In case of doubt, protecting *closanicus* and considering *niger* as nomen oblitum is advised.

*Trogulus melanotarsus*—C.L. Koch 1839a: 148.

*Trogulus perforaticeps* Ausserer, 1867: 169;—syn. Dahl 1903: 288.

*Trogulus nepiformis*—Thorell 1876: 468; Latreille 1804: 328 (misspelling).

*Anelasmacephalus niger*—Simon 1879a: 301.

*Metopoctea melanotarsus*—Simon 1879a: 309.

*Siro inaequipes* Karsch, 1884: 146;—syn. Dahl 1903: 288.

*Trogulus galasensis* Avram, 1971: 255; **syn. n.:** Weiss doubted the species status of *galasensis* and pointed to the similarity with *T. nepaeformis* and *T. martensi* (Weiss 1978: 226; 1998: 26). Although the penis depicted by Avram (1971) is damaged, it is similar to that of *T. nepaeformis*. Until the species is collected again at the type locality (Romania, Apuseni Mountains, Vallée du Criş Repede) the name should be treated as a synonym of *T. nepaeformis* (contradictory to Schönhofer 2009: 177; proposed as a nomen oblitum).

*Trogulus roeweri* Avram, 1971: 257; **syn. n.:** The type locality of *roeweri* is vague (Bosnia), the type series is questionable (should contain a male and a female, but contains 3 females; the label states 8 specimens), and the description is based on a damaged male (Schönhofer 2009: 177). Weiss (1978: 226) questioned species status of *roeweri* and compared it with *nepaeformis*, which is here followed.

***oltenicus*** Avram, 1971: 242; loc. typ.: Romania, Carpathian, Plateau de Mehedintzi, Massif de Vîrotape, N Obîrşia Cloşani. **Remarks.** Recollected from Romania, *oltenicus* can be considered as valid. A redescription is necessary to explain what Avram (1971) meant and to delineate it from similar species summarised in *T. tricarinatus* (Schönhofer 2009: 182). As only one male was available for description, holotype and type locality are unambiguous, although they were not specified.

***ozimeci*** Schönhofer *et al.*, 2013a: 374; loc. typ.: Croatia, Dubrovnik, Osojnik, Močiljska špilja.

***pharensis*** Schönhofer & Martens, 2009: 1234; loc. typ.: Croatia, Hvar Island, entrance of road tunnel from Pitve to Zavala.

***prietoi*** Schönhofer & Martens, 2008: 551; loc. typ.: Spain, Andalucía, Málaga Prov., ruins 6 km S of Villanueva de la Concepcion.

***pyrenaicus*** Schönhofer & Martens, 2008: 552; loc. typ.: Spain, Aragón, Huesca Prov., Pyrenees, Parque Nacional de Ordesa-Monte Perdido, Monte Perdido, Torla.

***rossicus*** Šilhavý, 1968: 25; loc. typ.: Russia, Kuban, Gorjačij ključ.

***setosissimus*** Roewer, 1940; loc. typ.: Croatia, Hvar Island (Lesina).

*Trogulus setosissimus* Roewer, 1940: 28;—Schönhofer *et al.*, 2013a: 379 (redescr.).

***squamatus*** C.L. Koch, 1839a; loc. typ.: Dalmatia. **Remarks.** According to the historic definition of Dalmatia and known distribution of *T. squamatus*, the type locality narrows down to the coastal area between the Gulf of Kotor and the mouth of the Neretva River. The species is otherwise abundant in large parts of Montenegro.

*Trogulus squamatus* C.L. Koch, 1839a: 140;—Westwood (1874: 202).

*Trogulus squamatus*—C.L. Koch 1850: 98 (misspelling).

***tenuitarsus*** Schönhofer *et al.*, 2013a: 376; loc. typ.: Macedonia: Bistra Mountain, Monastir Sveti Jovan Bigorski near Rostuše.

***thaleri*** Schönhofer & Martens, 2009: 1230; loc. typ.: Croatia: Drvenik.

*tingiformis* C.L. Koch, 1847; loc. typ.: Germany, Upper Bavaria (not further specified).

*Trogulus tingiformis* C.L. Koch, 1847: 70 (not 1848; see Brignoli 1985);—Martens 1978: 172 (redescr.).

*Trogulus gruberi* Avram, 1971: 259;—syn. Martens 1978: 172.

*tricarinatus* (Linnaeus, 1767); loc. typ.: Germany, Saxony, Dresden.

*Phalangium tricarinatum* Linnaeus, 1767: 1029.

*Phalangium carinatum*—Olivier 1792: 460 (misspelling).

*Trogulus squalidus* C.L. Koch, 1839a: 143;—syn. Dahl 1903: 289.

*Trogulus tricarinatus*—C.L. Koch 1839a: 145 (redefinition).

**Remarks.** Schönhofer and Martens (2010a) assumed several cryptic species summarised under this name.

*torosus* Simon, 1885b; loc. typ.: Montenegro, Spica, Sutomore.

*Trogulus torosus* Simon, 1885b: 218;—Schönhofer *et al.* 2013a: 381 (redescr.).

*uncinatus* Gruber, 1969: 83; loc. typ.: Turkey, Yalova.

### ***Trogulus* considered as nomina dubia**

*coreiformis* C.L. Koch, 1839a: 133; loc. typ.: not specified. **Remarks.** Koch's (1839a) drawings do not allow identification of the species, and the type seems lost. Ausserer (1867: 160) mentioned *coreiformis* from Tyrol, Austria (Paschberg, Mühlau), but his data provide no evidence for a distinct species (see also Schönhofer 2009: 176).

*lygaeiformis* C.L. Koch, 1839a; loc. typ.: not specified.

*Trogulus lygaeiformis* C.L. Koch, 1839a: 130.

*Trogulus ligaeiformis*—C.L. Koch 1850: 98 (misspelling). **Remarks.** Koch's (1839a: 130) insufficient description compared *lygaeiformis* with *nepaeformis* which he understood to be much larger than *nepaeformis* as presently accepted. Dahl's (1903: 287) synonymisation of *lygaeiformis* with *nepaeformis* is therefore inappropriate. The type seems to be lost and it is advisable not to use this name any longer (Schönhofer 2009: 180) as no species is recognisable.

*templetonii* Westwood, 1833: 453; loc. typ.: Valparaiso. **Remarks.** Further listing restricted to Westwood (1874: 202) and Sherborn (1933: 1058). The species is not recognisable, and the type locality refers to either a city in Chile (unlikely) or Valparaíso de Abajo in Central Spain. The type is stated to be in the Belfast Natural History and Philosophical Society Museum and should be investigated.

### **Acknowledgements**

This revision has significantly benefited from the free availability of online sources. The most important is *OmniPaper Project* created by Adriano Kury (2003), who was also very helpful in providing other difficult to access papers. The second is the Biodiversity Heritage Library (2007), which became an important source over the last years, especially for old texts, often hard to access even as library copies, and which I hope will receive further funding for their valuable work. Many other independent digitalisation projects of libraries and scientific journals providing open access enabled almost full coverage of taxonomic and other literature on Dyspnoi. Julia Altmann, Jason Dunlop and Jürgen Gruber also helped to gather literature in Frankfurt am Main, Berlin and Vienna, respectively. Special thanks are given to the skilled and helpful staff of the Senckenberg Library in Frankfurt am Main who allowed me to access their comprehensive library for over a decade. Stefanie Emmling patiently helped cleaning and OCR-scanning numerous pdfs to make their content digitally available.

The complex systematics of the Dyspnoi is not easily tackled alone, and I have to thank especially Jochen Martens for his invaluable help and mentor-ship. He granted me unlimited access to his comprehensive library and further allowed to use old notes on collections he investigated. He and Peter Jäger helped with taxonomic questions



and ICZN code interpretation, provided discussion for a reasonable placement of problematic taxa, gave general advice for compiling the catalogue and partly read and commented on earlier versions of the manuscript. I am also indebted to Peter Jäger and Julia Altmann for support in investigating Roewer's type material in the Senckenberg collection Frankfurt am Main. Theo Blick aided in clarifying the exact publication dates of Hahn and C.L. Koch. Plamen Mitov provided information about his ongoing revision of the taxonomically complicated genus *Paranemastoma*, as did Jürgen Gruber with partly unpublished information on *Dicranolasma* and other groups. I am also very grateful to both for reviewing this manuscript. Especially J. Gruber supported me with his thorough advice, based on his extensive knowledge on the history of the group and morphological insight resulting from detailed work over half a century. Peter Schwendinger is heartily thanked for editing this extensive work. Finally, I want to thank Marshal Hedin for his supervision and for introducing me to the Tree of Life Project that initially sparked the idea for this manuscript. The Deutsche Forschungsgemeinschaft (DFG) provided funding to work and publish on the taxonomy and systematics of Dyspnoi in the frame-work of a Post Doc project at the San Diego State University.

## References

- Ausserer, A. (1867) Die Arachniden Tirols nach ihrer horizontalen und verticalen Verbreitung. *Verhandlungen der Zoologisch-Botanischen Gesellschaft in Wien*, 17, 130–170.
- Avram, S. (1965) *Mitostoma chrysomelas romanicum* nov. ssp. (Opiliones, Nemastomatidae). *Lucrările Institutului de Speologie „Emil Racoviță“*, 4, 181–186.
- Avram, S. (1969) Espèces d'Opiliones nouvelles pour la science: *Mitostoma dumitrescui* nov. sp. et *Mitostoma orghidani* nov. sp. (Opiliones, Nemastomatidae). *Acta Zoologica Cracoviensia*, 14 (6), 139–149.
- Avram, S. (1970) Trois nouvelles espèces du genre *Mitostoma*: *Mitostoma moldavica* n. sp., *Mitostoma helenae* n. sp. et *Mitostoma rodnae* n. sp. (Opiliones, Nemastomatidae). *Travaux de l'Institut de Spéologie “Émile Racovitza”*, 9, 171–181.
- Avram, S. (1971) Quelques espèces nouvelles ou connues du genre *Trogulus* Latr. (Opiliones). *Travaux de l'Institut de Spéologie “Émile Racovitza”*, 10, 245–272.
- Avram, S. (1973a) Sur *Paranemastoma sillii* Herman de Roumanie (Opiliones, Nemastomatidae). *Travaux de l'Institut de Spéologie “Émile Racovitza”*, 12, 31–61.
- Avram, S. (1973b) *Paranemastoma ancae* n. sp. (Opiliones, Nemastomatidae). *Travaux de l'Institut de Spéologie “Émile Racovitza”*, 12, 135–138.
- Babalean, A.F. (2011) *Opilioniidele din S-V României - determinant al speciilor*. Editura Sitech Craiova, România, 149 pp.
- Babalean A.F. & Ilie, V. (2003) New data on *Paranemastoma ancae* Avram, 1973 and *Astrobonus laevipes* (Canestrini, 1872) in Romania. *Analele Universității din Craiova, Seria: Biologie, Horticultură, TPPA*, 8 (44), 64–69.
- Banks, N. (1893) The Phalanginae of the United States. *The Canadian Entomologist*, 25 (8), 205–211.  
<http://dx.doi.org/10.4039/Ent25205-8>
- Banks, N. (1894a) The Nemastomatidae and Trogulidae of the United States. I. *Psyche*, 7 (213), 11–12.  
<http://dx.doi.org/10.1155/1894/37947>
- Banks, N. (1894b) The Nemastomatidae and Trogulidae of the United States. II. *Psyche*, 7 (215), 51–52.  
<http://dx.doi.org/10.1155/1894/65346>
- Banks, N. (1894c) Washington Phalangida, with description of a new southern *Liobunum*. *The Canadian Entomologist*, 26 (6), 160–164.  
<http://dx.doi.org/10.4039/Ent26160-6>
- Banks, N. (1898) Arachnida from the Malaspina Glacier, Alaska. *Entomological News*, 9 (1), 16.
- Banks, N. (1901) Synopses of North-American invertebrates. XVI. The Phalangida. *The American Naturalist*, 35 (416), 669–679.  
<http://dx.doi.org/10.1086/277984>
- Banks, N. (1911) The Phalangida of California. *Pomona College Journal of Entomology*, 3 (1), 412–421.
- Bartoš, E. (1938) Die Ischyropsaliden der Tschechoslowakischen Republik. *Zoologischer Anzeiger*, 123, 155–159.
- Bedel, L. & Simon, E. (1875) Liste générale des articulés cavernicoles de l'Europe. *Journal de zoologie*, 4, 110–178.
- Biodiversity Heritage Library (2007) *Biodiversity Heritage Library Consortium*. Available from: <http://www.biodiversitylibrary.org> (accessed 13 April 2013).
- Brignoli, P.M. (1968) Note su Sironidae, Phalangodidae e Trogulidae italiani, cavernicoli ed endogei (Opiliones). *Fragmenta Entomologica*, 5 (3), 259–293.
- Brignoli, P.M. (1985) On the correct dates of publication of the arachnid taxa described in some works by C. W. Hahn and C. L. Koch (Arachnida). *Bulletin of the British Arachnological Society*, 6 (9), 414–416.
- Brignoli, P.M. & Raffaelli, E. (1978) Nuovi dati e problemi aperti su alcuni Opilioni Italiani (Arachnida Opiliones). New data and open problems on some Italian Opiliones (Arachnida Opiliones). *Bollettino della Società Entomologica Italiana*, 110 (4–6), 86–99.

- Canestrini, G. (1872) Gli Opilioni Italiani. *Annali del Museo Civico di Storia Naturale di Genova*, 1 (2), 5–48.
- Canestrini, G. (1873) Nuove specie Italiane di Arachnidi. *Atti della Società Veneto-Trentina di Scienze Naturali di Padova*, 2 (1), 45–52.
- Canestrini, G. (1874) Osservazioni Arachnologiche. *Atti della Società Veneto-Trentina di Scienze Naturali di Padova*, 3 (2), 206–232.
- Canestrini, G. (1875) Intorno ai Chernetidi ed Opilioni della Calabria. *Atti della Accademia Scientifica Veneto-Trentino-Istria*, 4, 1–12.
- Caporiacco, L. di (1930) Un nuovo Opilione cavernicolo. *Monitore zoologico italiano*, 41 (5), 125–127.
- Caporiacco, L. di (1940) Arachniden aus der Provinz Verona (Norditalien). *Folia Zoologica et Hydrobiologica*, 10 (1), 1–37.
- Caporiacco, L. di (1947) Seconda nota su Aracnidi cavernicoli Veronesi. *Memorie del Museo Civico di Storia Naturale di Verona*, 1 (48), 133–140.
- Caporiacco, L. di (1949) Un nuova opilione e qualche altro Arachnide delle Alpi Orobie. *Atti del Museo Civico di Storia Naturale di Trieste*, 17 (7), 120–121.
- Charitonov D.E. (1946) Arachnoidea of the Cave of Sataple (Kutaissi). *Bulletin of the Academy of Sciences of the Georgian SSR, Zoology*, 7, 145–147.
- Chemeris, A.N. (2000) Contribution to the knowledge of the harvestman fauna in the Russian Far East and Eastern Siberia (Arachnida: Opiliones). *Arthropoda selecta*, 9 (1), 31–49.
- Chemeris, A.N. (2009) New data on the harvestman genus *Nemaspela* Šilhavý, 1966 (Arachnida: Opiliones). *Bulletin of the British Arachnological Society*, 14 (7), 286–296.
- Chemeris, A.N. & Logunov, D.V. (2000) Notes on two species of *Sabacon* Simon, 1879 from the mountains of South Siberia (Arachnida: Opiliones: Sabaconidae). *Arthropoda selecta*, 9 (3), 207–213.
- Chemini, C. (1983) *Trogulus martensi* n. sp. dall'Italia settentrionale (Arachnida, Opiliones). *Bollettino della Società Entomologica Italiana*, 115 (8–10), 125–129.
- Chemini, C. (1984) The occurrence of *Trogulus closanicus* Avram in Austria, Bavaria and Slovenia (Arachnida: Opiliones). *Berichte des Naturwissenschaftlich-Medizinischen Vereins in Innsbruck*, 71, 57–61.
- Chemini, C. (1985) Descrizione del maschio di *Peltonychia leprieuri* (Lucas) e ridescrizione di *Mitostoma orobicum* (Caporiacco) (Arachnida, Opiliones). *Bollettino della Società Entomologica Italiana*, 117 (4–7), 72–75.
- Chemini, C. (1986) La collezione Canestrini di Opilioni (Arachnida) presso il Museo Zoologico dell'Università di Padova: Revisione e designazione di lectotipi. *Lavori della Società Veneziana di Scienze Naturali*, 11, 121–134.
- Chemini, C. (1995) Arachnida Scorpionida, Palpigradi, Solifugae, Opiliones. In: Minelli, A., Ruffo, S. & La Posta, S. (Eds), *Checklist delle specie della fauna italiana*, 21. Calderini, Bologna, pp. 1–8.
- Chemini, C. & Gruber, J. (1976) Aracnidi opilioni della Riserva naturale di Torricchio (nota faunistica preliminare). *La Riserva Naturale di Torricchio*, 1 (7), 131–144.
- Chemini, C. & Martens, J. (1988) *Trogulus cisalpinus* n. sp. from the Italian Alps (Arachnida: Opiliones: Trogulidae). *Mitteilungen aus dem Zoologischen Museum in Berlin*, 64 (1), 71–81.  
<http://dx.doi.org/10.1002/mmnz.19880640103>
- Chevrizov, B.P. (1979) A brief key to the harvest-spiders (Opiliones) of the European territory of the USSR. *Fauna i ekologiya paukoobraznykh. Trudy Zoologicheskogo Instituta AN SSSR*, 85, 4–27.
- Cîrdei, F. (1956) Contribuții la fauna opilionidelor Cheile Bicazului. *Filiala Iași, Studii și cercetari științifice, Biologie și științe agricole*, 7 (1), 73–77.
- Cîrdei, F. (1960) Contribuții la studiul Opilionidelor din nord-vestul Țării și în bazinul superior al Prutului (subtitle, original title in Russian). *Analele Științifice ale Universității "Al. I. Cuza" din Iași, section 2, Științe Naturale*, 6 (1), 77–95.
- Cockerell, T.D.A. (1916) A new phalangid from the Coronados Islands (Arach.). *Entomological News*, 27 (4), 158.
- Cokendolpher, J.C. (1984) A new species of *Sabacon* Simon from Oregon (Arachnida: Opiliones: Sabaconidae). *Canadian Journal of Zoology*, 62 (5), 989–991.  
<http://dx.doi.org/10.1139/z84-138>
- Comstock, J.H. (1913) *The spider book*. Doubleday, Page, and Co., Garden City, 721 pp.
- Crosby, C.R. (1911) A new species of Phalangida from Missouri. *The Canadian Entomologist*, 43 (1), 20–22.  
<http://dx.doi.org/10.4039/Ent4320-1>
- Crosby, C.R. & Bishop, S.C. (1924) Notes on the Opiliones of the southeastern United States with descriptions of new species. *Journal of the Elisha Mitchell Scientific Society*, 40 (1/2), 8–26.
- Dahl, F. (1903) Eine eigenartige Metamorphose der Troguliden, eine Verwandlung von *Amopaum* in *Dicranolasma* und von *Metopoctea* in *Trogulus*. *Sitzungsberichte der Gesellschaft naturforschender Freunde zu Berlin*, 7, 278–292.
- Darwin, C. (1854) *A monograph on the sub-class Cirripedia with figures of all the species. The Balanidae, the Verrucidae, etc., etc.* Ray Society, London, 684 pp.
- De Lerma, B. (1948) Opilioni cavernicoli della Campania. Studi Speleologici e Faunistici sull'Italia Meridionale. *Supplemento al Bollettino della Società dei naturalisti in Napoli*, 57 (9), 160–164.
- Delfosse, E. (2004) La Faune de France et d'outre-mer. Catalogue préliminaire des Opilions de France métropolitaine (Arachnida, Opiliones). *Bulletin de Phyllie*, 20 (2) 34–56.
- Dresco, E. (1952) Étude du genre *Sabacon* (Opiliones). *Annales de la Société Entomologique de France, série 6*, 121, 117–126.
- Dresco, E. (1955) Deuxième note sur le genre *Sabacon* E. Simon (Opiliones). *Notes Biospéologiques*, 10, 41–44.

- Dresco, E. (1966) Recherches sur les Opilions du genre *Ischyropsalis* (Famille Ischyropsalidae). III. *Ischyropsalis superba* Simon et *Ischyropsalis lucantei* Simon. *Bulletin du Muséum national d'histoire naturelle, série 2e*, 38 (6), 801–816.
- Dresco, E. (1967a) Recherches sur les opilions du genre *Ischyropsalis* (Fam. Ischyropsalidae). VI. *Ischyropsalis pyrenaea* Simon. *Bulletin du Muséum national d'histoire naturelle, série 2e*, 39 (4), 665–679.
- Dresco, E. (1967b) *Nemastoma bacilliferum* Simon. Espèces voisines, espèces nouvelles. *Annales de Spéléologie*, 22 (2), 367–391.
- Dresco, E. (1968a) Recherches sur les opilions du genre *Ischyropsalis* (Fam. Ischyropsalidae) VII. *Ischyropsalis gigantea* sp. nov. *Bulletin du Muséum national d'histoire naturelle, série 2e*, 40 (2), 308–314.
- Dresco, E. (1968b) Recherches sur les opilions du genre *Ischyropsalis* (Fam. Ischyropsalidae). VIII. *Ischyropsalis apuanus* Caporiacco et *Ischyropsalis apuanus nanus* ssp. nov. *Bulletin du Muséum national d'histoire naturelle, série 2e*, 40 (4), 745–758.
- Dresco, E. (1968c) Recherches sur les opilions du genre *Ischyropsalis* (Fam. Ischyropsalidae). IX. *Ischyropsalis spagnoli* sp. nov. *Bulletin du Muséum national d'histoire naturelle, série 2e*, 40 (5), 962–967.
- Dresco, E. (1970) Recherches sur la variabilité et la phylogénie chez les opilions du genre *Ischyropsalis* C.L. Koch (Fam. Ischyropsalidae), avec création de la famille nouvelle des Sabaconidae. *Bulletin du Muséum national d'histoire naturelle, série 2e*, 41 (5), 1200–1213.
- Dresco, E. (1972) Recherches sur les opilions du genre *Ischyropsalis* (Fam. Ischyropsalidae) XI. *Ischyropsalis noltei* sp. nov. *Annales de Spéléologie*, 27 (2), 122–127.
- Dumitrescu, D. (1972) Contributions à la connaissance de la faune d'Opilions (Arachnida) de Roumanie. *Travaux du Muséum d'Historie naturelle „Grigore Antipa“*, 12, 69–83.
- Fabricius, J.C. (1775) *Systema Entomologiae, sistens insectorum classes, ordines, genera, species, adiectis synonymis, locis, descriptionibus, observationibus*. Officina Libraria Kortii, Flensburg and Leipzig, 32 + 832 pp.
- Fage, L. (1946) Description d'un Opilion aveugle des grottes de la Province de Bergame (*Nemastoma anophthalmum* n. sp.). *Bulletin du Muséum national d'histoire naturelle, 2eme Série*, 18 (4) 328–330.
- Gervais, P. (1844) Acères, Phrynéides, Scorpionides, Solpugides, Phalangides et Acarides; Dicères Épizoïques, Aphaniptères et Thysanoures. In: Walckenaer, C.A. (Ed.), *Histoire naturelle des Insectes Aptères*, 3. Librairie Encyclopédique de Roret, Paris, pp. 94–131.
- Giltay, L. (1931) Note sur une espèce nouvelle de *Trogulus* du Portugal. *Bulletin du Musée Royal d'Historie naturelle de Belgique*, 7 (27), 1–2.
- Giltay, L. (1932) Aracnides recueillis par M. D'Orchymont au cours de ses voyages aux Balkans et en Asie Mineure en 1929, 1930 et 1931. *Bulletin du Musée Royal d'Historie Naturelle de Belgique*, 8 (22), 1–40.
- Giribet, G., Edgecombe, G.D., Wheeler, W.C. & Babbitt, C. (2002) Phylogeny of the Arachnida and Opiliones: a combined approach using morphological and molecular sequence data. *Cladistics*, 18, 5–70.
- Giribet, G., Vogt, L., Pérez González, A., Sharma, P. & Kury, A.B. (2010) A multilocus approach to harvestman (Arachnida: Opiliones) phylogeny with emphasis on biogeography and the systematics of Laniatores. *Cladistics*, 26, 408–437. <http://dx.doi.org/10.1111/j.1096-0031.2009.00296.x>
- Goodnight, C.J. & Goodnight, M.L. (1942) New American Phalangida. *American Museum Novitates*, 1164, 1–4.
- Goodnight, C.J. & Goodnight, M.L. (1943) New and little known phalangids from the United States. *The American Midland Naturalist*, 29 (3), 643–656. <http://dx.doi.org/10.2307/2421154>
- Goodnight, C.J. & Goodnight, M.L. (1944) New phalangids from the Old World. *American Museum Novitates*, 1255, 1–6.
- Goodnight, C.J. & Goodnight, M.L. (1945) Phalangida from the United States. *Journal of the New York Entomological Society*, 53 (3), 239–245.
- Grese, N. (1911) Über eine blinde *Nemastoma*-Art aus einer Höhle in der Krim (*Nemastoma caecum* nov. sp.). *Zoologischer Anzeiger*, 37, 108.
- Gruber, J. (1963) Ergebnisse der von Dr. O. Paget und Dr. E. Kritscher auf Rhodos durchgeführten zoologischen Exkursionen. VII. Scorpiones und Opiliones. *Annalen des Naturhistorischen Museums in Wien*, 66, 307–316.
- Gruber, J. (1966) Neues zur österreichischen Opilionidenfauna (Arachnida). *Zeitschrift der Arbeitsgemeinschaft österreichischer Entomologen*, 18 (2/3), 43–47.
- Gruber, J. (1968) Ergebnisse zoologischer Sammelreisen in der Türkei: *Calathocratus beieri*, ein neuer Trogulide aus Anatolien (Opiliones, Arachnida). *Annalen des Naturhistorischen Museums in Wien*, 72, 435–441.
- Gruber, J. (1969) Ergebnisse der österreichisch-türkischen Anatolien Expeditionen 9. Weberknechte der Familien Sironidae und Trogulidae aus der Türkei (Opiliones, Arachnida). *Revue de la Faculté des Sciences de l'Université d'Istanbul, B*, 34 (1/2), 75–88.
- Gruber, J. (1970) Die "*Nemastoma*"-Arten Nordamerikas (Ischyropsalididae, Opiliones, Arachnida). *Annalen des Naturhistorischen Museums in Wien*, 74, 129–144.
- Gruber, J. (1974a) Bemerkungen zur Morphologie und systematischen Stellung von *Caddo*, *Acropsopilio* und verwandter Formen (Opiliones, Arachnida). *Annalen des Naturhistorischen Museums in Wien*, 78, 237–259.
- Gruber, J. (1974b) *Ein Beitrag zur Systematik, Morphologie und Bionomie der Gattung Dicranolasma Sørensen (Arachnida: Opiliones)*. Ph.D. thesis, University of Vienna, 184 pp.

- Gruber, J. (1976) Ergebnisse zoologischer Sammelreisen in der Türkei: Zwei neue Nemastomatidenarten mit Stridulationsorganen, nebst Anmerkungen zur systematischen Gliederung der Familie (Opiliones, Arachnida). *Annalen des Naturhistorischen Museums in Wien*, 80, 781–801.
- Gruber, J. (1978) Redescription of *Ceratolasma tricantha* Goodnight and Goodnight, with notes on the family Ischyropsalidae (Opiliones, Palpatores). *The Journal of Arachnology*, 6 (2), 105–124.
- Gruber, J. (1979) Ergebnisse zoologischer Sammelreisen in der Türkei. Über Nemastomatiden-Arten aus der Verwandtschaft von *Pyza* aus Südwestasien und Südosteuropa (Opiliones, Arachnida). *Annalen des Naturhistorischen Museums in Wien*, 82, 559–577.
- Gruber, J. (1998) Beiträge zur Systematik der Gattung *Dicranolasma* (Arachnida: Opiliones, Dicranolasmatidae). I. *Dicranolasma thracium* STAREGA und verwandte Formen aus Südosteuropa und Südwestasien. *Annalen des Naturhistorischen Museums in Wien*, B, 100, 489–537.
- Gruber, J. (2003) Origin and gender of the name *Sabacon* Simon, 1879 (Opiliones, Palpatores, Ischyropsalidoidea). *Newsletter of the British Arachnological Society*, 96, 6.
- Gruber, J. (2007) Dyspnoi - Historical systematic synopsis and family chapters. In: Pinto-da-Rocha, R., Machado, G. & Giribet, G. (Eds), *Harvestmen: the biology of Opiliones*. Harvard University Press, Cambridge, 597 pp.
- Gruber, J. & Martens, J. (1968) Morphologie, Systematik und Ökologie der Gattung *Nemastoma* C. L. Koch (s. str.) (Opiliones, Nemastomatidae). *Senckenbergiana biologica*, 49, 137–172.
- Hadži, J. (1928) Opilioni Schmidtove zbirke - Prilog poznavanju slovenackih opilionida. *Glasnik Muzejskega društva za Slovenijo*, 7/8, 1–49. [This paper is also referenced (1926/27)]
- Hadži, J. (1931) Opilioni Triglavskoga masiva (Die Opilionen des Triglavmassivs). *Prirodoslovne Razprave, Muzejsko Drustvo za Slovenijo*, 1, 107–154.
- Hadži, J. (1940) Zwei interessante neue Opilionenarten der Gattung *Nemastoma* (second title, first in Serbo-Croatian). *Glasnik, Bulletin de la Société Scientifique de Skoplie, Section des Sciences Naturelles*, 22, 1–17.
- Hadži, J. (1942) Raziskovanja o ishiropsalih (Opiliones). *Razprave Matematično-Prirodoslovnega Razreda Akademije Znanosti in Umetnosti v Ljubljana*, 2, 5–114.
- Hadži, J. (1954) Nadaljnja Raziskavanja o Ishiropsalidih (Opiliones). *Razprave Slovenska Akademija Znanosti in Umetnosti, Razred za Prirodoslovne Vede, Classis IV: Historia Naturalis, Razprave Dissertationes*, 2, 139–196.
- Hadži, J. (1973a) Novi taksoni suhih južin (Opilioneida) v Jugoslaviji. *Razprave Slovenska Akademija Znanosti in Umetnosti, Razred za Prirodoslovne Vede, Classis IV: Historia Naturalis, Razprave Dissertationes*, 16 (1), 1–120.
- Hadži, J. (1973b) Opilioneida. Catalogus Faunae Jugoslaviae. *Razprave Slovenska Akademija Znanosti in Umetnosti, Razred za Prirodoslovne Vede, Classis IV: Historia Naturalis, Razprave Dissertationes*, 3 (4), 1–24.
- Hallan, J. (2005) *The Biology Catalog - Opiliones*. Available from: <http://insects.tamu.edu/research/collection/hallan/OpilRpt2.txt> (version 3 July 2005, accessed 13 April 2013).
- Hamann, O. (1898) Mittheilungen zur Kenntnis der Höhlenfauna. *Zoologischer Anzeiger*, 21 (570), 533–536.
- Hansen, H.J. & Sørensen, W. (1904) *On two orders of Arachnida Opiliones, especially the suborder Cyphophthalmi, and Ricinulei, namely the family Cryptostemmatoidae*. Cambridge University Press, 178 pp.
- Hedin, M., Starrett, J., Akhter, S., Schönhofer, A.L. & Shultz, J.W. (2012) Phylogenomic Resolution of Paleozoic Divergences in Harvestmen (Arachnida, Opiliones) via Analysis of Next-Generation Transcriptome Data. *PLoS ONE*, 7 (8). <http://dx.doi.org/10.1371/journal.pone.0042888>
- Helversen, O. von & Martens, J. (1971) Pseudoskorpione und Weberknechte. In: Sauer, K.F.J., Schmetter, M. (Eds), *Die Wutach. Naturkundliche Monographie einer Flußlandschaft. Monographie einer Flußlandschaft. Badischer Landesverein für Naturkunde und Naturschutz, Freiburg im Breisgau. Die Natur- und Landschaftsschutzgebiete Baden-Württembergs*, 6, 377–385.
- Helversen, O. von & Martens, J. (1972) Unrichtige Fundort-Angaben in der Arachniden-Sammlung Roewer. *Senckenbergiana biologica*, 53 (1/2), 109–123.
- Herbst, J.F.W. (1799) Fortsetzung der Naturgeschichte der Insectengattung *Opilio*. In: Herbst, J.F.W. (Ed.), *Natursystem der ungeflügelten Insekten, Drittes Heft*. G.A. Lange, Berlin, 30 pp.
- Herman, O. (1871) Beitrag zur Kenntnis der Arachnidenfauna Siebenbürgens. *Verhandlungen und Mitteilungen des Siebenbürgischen Vereins für Naturwissenschaften zu Hermannstadt*, 21, 23–29.
- Hermann, J.F. (1804) *Mémoire aptérologique*. F.G. Levrault, Strasbourg, 8 + 144 pp. (published posthumously by Frédéric-Louis Hammer)
- Hnatewytch, B. (1929) Die Fauna der Erzgruben von Schneeberg im Erzgebirge. *Zoologische Jahrbücher, Abteilung für Systematik, Ökologie und Geographie der Tiere*, 56, 173–261.
- International Commission on Zoological Nomenclature (1999) *International code of zoological nomenclature (fourth edition)*. The International Trust for Zoological Nomenclature, c/o The Natural History Museum, London, 306 pp.
- Juberthie, C. (1963) Sur *Ischyropsalis strandi* Kratochvil (Opilions) des grottes du Monte Baldo et des Monti Lessini (Province de Vérone, Italie). *Annales de Spéléologie*, 18, 325–331.
- Juberthie, C., Lopez, A. & Juberthie-Juperau, L. (1981) Étude ultrastructurale des sensilles thoraciques dorsales et paramédianes chez *Sabacon paradoxum* Simon (Palpatores, Sabaconidae). In: Tongiorgi, P. & Balsamo, M. (Eds), VIème Colloque d'Arachnologie d'Expression Française (Modena-Pisa, 28 août–1 sept. 1981). *Memorie Atti della Società Toscana di Scienze Naturali, Pisa, ser. B, suppl.*, 88, 27–33.
- Kästner, A. (1928) Opiliones, Weberknechte, Kanker. *Die Tierwelt Deutschlands*, 8 (3), 1–5.

- Karaman, I.M. (1990) *Dicranolasma mladeni*, n. sp., a new Harvestman (Arachnida, Opiliones) from Yugoslavia. *Glasnik Prirodnjačkog Muzeja u Beogradu, Serija B*, 45, 143–148.
- Karaman, I.M. (1995a) *Fauna opilionida (Arachnida, Opiliones) durmitorskog područja*. Master thesis Univerzitet u Novom Sadu Prirodno-matematički fakultet Institut za Biologiju, Novi Sad, 73 pp.
- Karaman, I.M. (1995b) Diverzitet faune kosaca (Opiliones, Arachnida) Jugoslavije Sa pregledom vrsta od Medunarodnog Značaja. In: Stevanovic, V. & Vasic, V. (Eds), *Biodiverzitet Jugoslavije, Sa Pregledom Vrsta od Medunarodnog Značaja*. Biološki fakultet and Ecolibri, Beograd, pp. 329–335.
- Karsch, F. (1884) Ueber die Arachniden-Familie der Sironoiden und über einen neuen *Siro* aus Asturien. *Berliner Entomologische Zeitschrift*, 28 (1), 143–146.
- Koch C.L. (1835) Arachniden. In: Panzer, G.W.F. & Herrich-Schäffer, G.A.W. (Eds), *Faunae Insectorum Germaniae initia, Heft 124–128*. Friedrich Pustet, Regensburg (no page numbers, but numbers for each species description).
- Koch, C.L. (1836a) *Deutschlands Crustaceen, Myriapoden und Arachniden. Ein Beitrag zur Deutschen Fauna. Heft 4*. Friedrich Pustet, Regensburg (no page numbers, but numbers for each species description).
- Koch, C.L. (1836b) *Die Arachniden getreu nach der Natur abgebildet und beschrieben. Vol. 3*. C. H. Zeh'sche Buchhandlung, Nürnberg, 120 pp.
- Koch, C.L. (1839a) *Die Arachniden getreu nach der Natur abgebildet und beschrieben. Vol. 5*. C. H. Zeh'sche Buchhandlung, Nürnberg, 158 pp.
- Koch, C.L. (1839b) *Übersicht des Arachnidensystems. Zweites Heft*. C.H. Zeh'sche Buchhandlung, Nürnberg, 38 pp.
- Koch, C.L. (1840) *Die Arachniden getreu nach der Natur abgebildet und beschrieben. Vol. 8, Heft 1*. C. H. Zeh'sche Buchhandlung, Nürnberg, 20 pp.
- Koch, C.L. (1847) *Die Arachniden getreu nach der Natur abgebildet und beschrieben. Vol. 16*. J. L. Lotzbeck, Nürnberg, 80 pp.
- Koch, C.L. (1850) *Übersicht des Arachnidensystems. Fünftes Heft*. C.H. Zeh'sche Buchhandlung, Nürnberg, 104 pp.
- Koch, L. (1861) Bemerkungen zur Arachnidenfamilie der Opilioniden. *Correspondenz-Blatt des zoologisch-mineralogischen Vereines in Regensburg*, 15 (9), 131–144.
- Koch, L. (1867) Zur Arachniden und Myriapoden-Fauna Süd Europa's. *Verhandlungen der Kaiserlich-Königlichen zoologisch-botanischen Gesellschaft in Wien*, 17, 857–900.
- Koch, L. (1869) Beitrag zur Kenntniss der Arachnidenfauna Tirols. *Zeitschrift des Ferdinandeums für Tirol und Vorarlberg*, 3 (14), 149–206.
- Koch, L. (1877) Verzeichniss der bei Nürnberg bis jetzt beobachteten Arachniden (mit Ausschluß der Ixodiden und Acariden) und Beschreibungen von neuen, hier vorkommenden Arten. *Abhandlungen der naturhistorischen Gesellschaft zu Nürnberg*, 6, 113–198.
- Koch, L. (1879) Arachniden aus Sibirien und Novaya Semlya, eingesammelt von der Schwedischen Expedition im Jahre 1875. *Kongliga Svenska vetenskaps-akademiens handlingar, series 4*, 16 (5), 3–136.
- Komposch, C. (2000) *Trogulus falcipenis* spec. nov., ein neuer Brettkanker aus den Alpen und dem Dinarischen Gebirge. *Spixiana*, 23 (1), 1–14.
- Komposch, C. & Gruber, J. (2004) Die Weberknechte Österreichs (Arachnida: Opiliones). *Denisia 12, zugleich Kataloge der Oberösterreichischen Landesmuseen, Neue Serie*, 14, 485–534.
- Kraepelin, K. (1896) Phalangiden aus der Umgebung Hamburgs. *Mittheilungen aus dem Naturhistorischen Museum, Beiheft zum Jahrbuch der Hamburgischen Wissenschaftlichen Anstalten*, 13, 217–234.
- Kratochvíl, J. (1934) Sekáči (Opiliones) Československé republiky (Les Opilions de Tchécoslovaquie). *Práce Moravské Přírodovědecké Společnosti, Brno*, 9 (5), 1–35.
- Kratochvíl, J. (1936) *Ischyropsalis Strandii* nov. sp., un Opilion cavernicole nouveau d'Italie. *Festschrift zum 60. Geburtstage von Professor Dr. Embrik Strand*, 1, 248–251.
- Kratochvíl, J. (1958) Höhlenweberknechte Bulgariens (Palpatores-Nemastomatidae). *Práce Brněnské základny Československé akademie věd, Brno*, 30 (12), 523–576.
- Kratochvíl, J. (1959) Über eine neue Unterfamilie der Weberknechte (Giljaroviinae, Nemastomatidae) (subtitle, primary title in Russian). *Zoologicheskij Zhurnal, Moskva*, 38 (9), 1344–1352.
- Kraus, O. (1959) Weberknechte aus Spanien (Arachn., Opiliones). *Mitteilungen aus dem Zoologischen Museum in Berlin*, 35 (2), 293–304.  
<http://dx.doi.org/10.1002/mmnz.19590350205>
- Kraus, O. (1961) Die Weberknechte der Iberischen Halbinsel (Arach., Opiliones). *Senckenbergiana biologica*, 42, 331–363.
- Kulczyński, W. (1903) Arachnoidea in Asia Minore et ad Constantinopolim a Dre. F. Werner collecta. *Sitzungsberichte der kaiserlichen Akademie der Wissenschaften in Wien, mathematisch-naturwissenschaftliche Classe, Abt. 1, Mineralogie, Botanik, Zoologie, Anatomie, Geologie und Paläontologie*, 112, 627–680.
- Kulczyński, V. (1907) Fragmenta arachnologica, V, VIII. Arachnoidea nonnulla in Insulis Diomedeis (Isole di Tremiti) a Cel. Prof. Dre G. Cecconi lecta. *Bulletin international de l'Académie des Sciences de Cracovie, Classe des Sciences Mathématiques et Naturelles*, 1907, 570–596.
- Kulczyński, V. (1909) Fragmenta arachnologica, VII. *Bulletin international de l'Académie des Sciences de Cracovie, Classe des Sciences Mathématiques et Naturelles*, 1909, 427–472.
- Kury, A.B. (2003) *OmniPaper Project, The ARACNOLAB internet resource on opilionological taxonomic literature. Museu Nacional/ UFRJ website*. Available from: <http://www.museunacional.ufrj.br/mndi/Aracnologia/pdfliteratura/pdfs%20opiliones.htm> (Accessed 13 April 2013)

- Latreille, P.A. (1798) Mémoire pour servir de suite à l'histoire des insectes connus sous le nom de faucheurs. *Phalangium* L. *Bulletin des Sciences par la Société Philomathique*, 1 (15), 113–115.
- Latreille, P.A. (1802) Famille Troisième. Phalangiens. In: Latreille, P.A. & Sonnini, C.S. (Eds), *Histoire naturelle, générale et particulière des crustacés et des insectes. Volume 3*. F. Dufart, Paris, pp. 60–62.
- Latreille, P.A. (1804) Huitième genre–Dixième genre. In: Latreille, P.A. & Sonnini, C.S. (Eds), *Histoire naturelle, générale et particulière des crustacés et des insectes. Volume 7*. F. Dufart, Paris, pp. 314–329.
- Lebedinski, J. (1914) On the fauna of Crimean caves (subtitle, primary title in Russian) *Zapiski Novorossiiskogo obshchestva estestvoispytatelei*, 40, 113–129.
- Lebert, H. (1875) *Verzeichnis der schlesischen Spinnen mit Aufzählung der schlesischen Myriopoden*. Tübingen, 63 pp.
- Lendl, A. (1894) A Magyar Nemzeti Muzeum Kaszaspók-Gyűjteménye (Opiliones Musaei Nationalis Hungarici). *Természetrzaji Füzetek*, 17 (1–2), 1–33.
- Lessert, R. de (1905) Arachniden Graubündens. In: Carl, J. (Ed.), *Fauna der Rhätischen Alpen. Revue suisse de Zoologie*, 13, pp. 621–661.
- Lessert, R. de (1917) *Catalogue des Invertébrés de la Suisse. 9. Opilions*. Muséum d'Histoire naturelle de Genève, 80 pp.
- Linnaeus, C. (1758) *Systema naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis. Tomus I. Editio decima, reformata. Laurentii Salvii, Holmiae*, 824 pp.
- Linnaeus, C. (1767) *Systema naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis. Tomus I. Editio duodecima, reformata. L. Salvii, Holmiae*, 1327 pp.
- Ljovuschkin, S.I. (1971) Biospeologica Sovietica XLIII. Report on the first finding of the American genus *Taracus* Simon, 1879 (Opiliones, Ischyropsalididae) in Asia with a description of *T. birsteini* sp. n. from a cave of the southern part of the Primorsky kraj (summary title, primary title in Russian). *Bjulleten' Moskovskogo Obščestva Ispytatelej Prirody, Otdel biologičeskij*, 76 (3), 127–133.
- Lyovushkin, S.I. (1972) Biospeologica Sovietica XLVI. Family Nemastomatidae (Opiliones) from the caves of the USSR. *Sbornik trudov Zoologičeskogo Muzeja*, 12, 61–73.
- Lyovushkin, S.I. & Starobogatov, J.I. (1963) Biospeologica Sovietica XVIII. The cavernicolous Opilionidea in the Crimea and Caucasus (subtitle, primary title in Russian). *Bjulleten' Moskovskogo Obščestva Ispytatelej Prirody, Otdel biologičeskij*, 68 (1), 41–51.
- Loksa, I. (1962) Beiträge zur Kenntnis der Weberknecht-Fauna Ungarns, I. *Zoologischer Anzeiger*, 168 (7–10), 265–269.
- Loksa, I. (1991) The harvestmen (opiliones) fauna of the Bátorliget Natural Reserves (NE Hungary). In: Mahunka, S. (Ed.), *The Bátorliget Nature Reserves - after forty years, 1990*. Hungarian Natural History Museum, Budapest, pp. 685–689.
- Loman, J.C.C. (1894) Zwei neue Opilioniden aus Niederländisch Ost-Indien. *Tijdschrift voor entomologie*, 37, 153–157.
- Lucas, P.H. (1849) Crustacés, arachnides, myriopodes et hexapodes. *Exploration scientifique de l'Algérie, pendant les années 1840, 1841, 1842, publiée par ordre du gouvernement et avec le concours d'une commission académique. Série IV: Sciences physiques-Zoologie, Sous-série II. Histoire naturelle des animaux articulés*, 1, 1–403 pp.
- Lucas, P.H. (1866) Séances de la Société Entomologique de France. Séance du 12 Septembre 1866. *Annales de la Société Entomologique de France, série 4, Bulletin Entomologique*, 6, 42–44.
- Luque, C.G. (1991) Los Ischyropsalidoidea de la Cornisa Cantábrica: Cantabria. *Arquenas, Fauna Iberica Subterránea: Cantabria*, 1, 1–96.
- Luque, C.G. (1992) Contribución al conocimiento de los Opiliones epigeos e hipogeos de Cantabria (España). Primeras aportaciones al catálogo (Arachnida: Opiliones: Palpatores). In: Roldan, R.B. (Ed.), *Actas del V Congreso Español de Espeleología*. Copisan S.C., Santander, Spain, pp. 143–157.
- Luque, C.G. (1993) The slit sense organs. Contribution to the knowledge of species *Sabacon pasonianum* Luque 1991 (Opiliones: Palpatores: Sabaconidae). *Mémoires de Biospéologie*, 20, 131–137.
- Luque, C.G. & Labrada, L. (2012) A new cave-dwelling endemic *Ischyropsalis* C.L. Koch, 1839 (Opiliones: Dyspnoi: Ischyropsalididae) from the karstic region of Cantabria (Spain). *Zootaxa*, 3506, 26–42.
- Marcellino, I. (1965) Su alcuni Trogulidae (Arachnida, Opiliones) della Sicilia e dell' Appenino centrale. *Bollettino delle sedute dell'Accademia Gioenia di Scienze Naturali in Catania, ser. IV*, 8 (5), 323–340.
- Marcellino, I. (1968) Notizie su alcuni Trogulidae (Arachn. Opiliones) d'Italia. *Annali del Museo Civico di Storia Naturale di Genova*, 77, 115–127.
- Marcellino, I. (1971) Opilioni delle Alpi Apuane. *Lavori della Società Italiana di Biogeografia*, 1, 363–389.
- Marcellino, I. (1974) Nuovi dati sugli opilioni (Arachnida) di Sicilia e di altre isole del Mediterraneo. *Animalia*, 1 (1/3), 185–200.
- Marcellino, I. (1975) Opilioni (Arachnida) delle alpi occidentali. *Bollettino del Museo Civico di Storia Naturale di Verona*, 2, 119–144.
- Marcellino, I. (1980) Opiliones de Sardegna (Arachnida, Opiliones). *Lavori della Società Italiana di Biogeografia*, 8, 323–345.
- Martens, J. (1965) Verbreitung und Biologie des Schneckenkankers *Ischyropsalis hellwigi*. *Natur und Museum*, 95 (4), 143–149.
- Martens, J. (1966) Zoologische Aufsammlungen auf Kreta III. Opiliones. *Annalen des Naturhistorischen Museums in Wien*, 69, 347–362.
- Martens, J. (1969) Die Abgrenzung von Biospezies auf biologisch-ethologischer und morphologischer Grundlage am Beispiel der Gattung *Ischyropsalis* C.L. Koch 1839 (Opiliones, Ischyropsalididae). *Zoologische Jahrbücher, Systematik*, 96 (2), 133–264.

- Martens, J. (1972) Opiliones aus dem Nepal-Himalaya. I. Das Genus *Sabacon* Simon (Arachnida: Ischyropsalididae). *Senckenbergiana biologica*, 53 (3/4), 307–323.
- Martens, J. (1976) Genitalmorphologie, System und Phylogenie der Weberknechte (Arachnida: Opiliones). *Entomologica Germanica*, 3 (1/2), 51–68.
- Martens, J. (1978) Spinnentiere, Arachnida - Weberknechte, Opiliones. *Die Tierwelt Deutschlands*, 64, 1–464.
- Martens, J. (1983) Europäische Arten der Gattung *Sabacon* Simon 1879 (Arachnida: Opiliones: Sabaconidae). *Senckenbergiana biologica*, 63 (3/4), 265–296.
- Martens, J. (1989) Sibirische Arten der Gattung *Sabacon* Simon (Arachnida: Opiliones: Sabaconidae). *Senckenbergiana biologica*, 69 (4/6), 369–377.
- Martens, J. (2006) Weberknechte aus dem Kaukasus (Arachnida, Opiliones, Nemastomatidae). *Senckenbergiana biologica*, 86 (2), 145–210.
- Martens, J. (2011) The *Centetostoma scabriculum* complex - a group of three cryptic species (Arachnida: Opiliones: Nemastomatidae). *Zootaxa*, 2783, 35–51.
- Martens, J. & Chemini, C. (1988) Die Gattung *Anelasmacephalus* Simon, 1879. Biogeographie, Artgrenzen und Biospezies-Konzept (Opiliones: Trogludidae). *Zoologische Jahrbücher, Systematik*, 115, 1–48.
- Martens, J., Hoheisel, U. & Götze, M. (1981) Vergleichende Anatomie der Legeröhren der Opiliones als Beitrag zur Phylogenie der Ordnung (Arachnida). *Zoologische Jahrbücher, Abteilung für Anatomie und Ontogenie der Tiere*, 105 (1), 13–76.
- Martens, J. & Suzuki, S. (1966) Zur Systematischen Stellung Ostasiatischer Ischyropsaliden-Arten (Arachnoidea, Opiliones, Ischyropsalididae). *Annotationes zoologicae Japonensis*, 39 (4), 215–221.
- Mcheidze, T.S. (1952) New harvestmen species (Opiliones) from Georgia (translated, original title in Russian). *Soobshchenya Akademii Nauk Grusinskoi SSR*, 13, 545–548.
- Mcheidze, T.S. (1959) Materialy k izučeniju vidovogo sostava i rasprostraneniya senokoscev v Gruzii. *Trudy Tbilisskogo gosudarstvennogo universiteta imeni Stalina*, 70, 109–117.
- Mcheidze, T.S. (1964) Pechsachsrianebi (Arthropoda): Mtibavebi (Opiliones). *Sakartvelos echovelo samgare*, 2, 117–126.
- Meade, R.H. (1855) Monograph on the British species of Phalangiidae or harvestmen. *The Annals and Magazine of Natural History including Zoology, Botany and Geology, Ser. 2*, 15 (90), 393–416.
- Meijer, J. (1973) Some remarks on the systematics of the *Mitostoma chrysomelas*-group (Arachnida, Opiliones, Nemastomatidae). *Zoologische Mededelingen*, 46, 117–127.
- Mello-Leitao, C.F. de (1936) Les Opilions de Catalogne. *Treballs del Museu de Ciéncies Naturals de Barcelona, Série entomologica*, 11 (9), 3–18.
- Mitov, P.G. (2000) Contribution to the knowledge of the harvestmen (Arachnida: Opiliones) of Albania. *Ekológia*, 19 (Supplement 3), 159–169.
- Mitov, P.G. (2002) Rare and endemic harvestmen (Opiliones, Arachnida) species from the Balkan Peninsula. I. On *Mediostoma stussineri* (Simon 1885) (Nemastomatidae), a new species and genus for the Bulgarian fauna. *Linzer biologische Beiträge*, 34 (2), 1639–1648.
- Mitov, P.G. (2011) A new anophthalmous species of *Paranemastoma* from Bulgaria (Opiliones: Nemastomatidae). *The Journal of Arachnology*, 39, 303–319.  
<http://dx.doi.org/10.1636/CHA10-99.1>
- Miyosi, Y. (1942a) Eine neue Art von *Sabacon* aus Japan. *Dobutsugaku Zasshi*, 54 (4), 165–166.
- Miyosi, Y. (1942b) Eine (zweite) Art von *Sabacon* aus Nippon. *Acta Arachnologica*, 7, 49–53.
- Morin, S.M. (1934) Materiali do fauni Opilionid-kosariv Ukraïni. *Trudy Zoologo-biologichnogo Institutu, Odesa Universitet*, 1934, 11–38.
- Moritz, M. (1971) Die Typen der Arachniden-Sammlung des Zoologischen Museums Berlin. I. Opiliones. *Mitteilungen aus dem Zoologischen Museum in Berlin*, 47, 189–214.  
<http://dx.doi.org/10.1002/mmnz.19710470116>
- Müller, A. (1924) Zur Anatomie einiger Arten des Genus *Ischyropsalis* C.L. Koch nebst vergleichend-anatomischen Betrachtungen. *Zoologische Jahrbücher, Abteilung für Anatomie und Ontogenie der Tiere*, 45, 405–518.
- Müller, O.F. (1776) *Zoologiae Danicae prodromus, seu animalium Daniae et Norvegiae Indigenarum characteres, nomina, et synonyma imprimis popularium*. Heineck & Faber, Copenhagen, 32 + 274 pp.
- Nosek, A. (1904) Pavoukovití členovci Černé Hory (Arachnoidea montenigrina). *Sitzungsberichte der Königlich-Böhmischen Gesellschaft der Wissenschaften, Mathematisch-Naturwissenschaftliche Klasse (Věstník Kralovské České Společnosti Nauk, Třída Mathemacko-Přirodovědecká)*, 1903 (46), 1–4.
- Nowicki, M. (1870) Beschreibung neuer Arthropoden. *Jahrbuch der Kaiserlich-Königlichen Gelehrten-Gesellschaft in Krakau*, 41, 57–58.
- Novak, T. (2004) An overview of harvestmen (Arachnida: Opiliones) in Croatia. *Natura croatica*, 13 (3), 231–296.
- Novak, T. (2005) An overview of harvestmen (Arachnida: Opiliones) in Bosnia and Herzegovina. *Natura croatica*, 14 (4), 301–350.
- Novak, T. & Gruber, J. (2000) Remarks on published data on harvestmen (Arachnida: Opiliones) from Slovenia. *Annales: Series historia naturalis anali za istrske in mediteranske študije*, 10 (2/21), 281–308.
- Olivier, G.A. (1792) Fauteur. In: Diderot, D. & d'Alembert, J.L. (Eds), *Encyclopédie Méthodique: Histoire naturelle. Insectes, Tome 6*. Charles Joseph Panckoucke, Paris, pp. 455–461.

- Pabst, W. (1953) Zur Biologie der mitteleuropäischen Trogliden. *Zoologische Jahrbücher. Abteilung für Systematik, Geographie und Biologie der Tiere*, 82, 1–46.
- Packard, A.S. (1877) On a new cave fauna in Utah. *Bulletin of the United States Geological Survey of the Territories*, 3, 157–169.
- Packard, A.S. (1884) New cave arachnids. *American Naturalist*, 18 (2), 202–204.
- Panzer, G.W.F. (1794) *Faunae Insectorum Germanicae initia oder Deutschlands Insecten. Zweyter Jahrgang. XIII–XXIV Heft*. Felseckersche Buchhandlung, Nürnberg, 284 pp.
- Pavesi, P. (1899) Un nuovo nemastomide Americano. *Rendiconti del Reale Istituto Lombardo di Scienze e Lettere*, 32, 530–533.
- Perrier, R., Berland, L. & Bertin, L. (1929) *La Faune de la France en tableaux synoptiques illustrés. Fasc. 2. Arachnides et Crustacés*. Delagrave, Paris, 220 pp.
- Perty, M. (1833) *Delectus animalium articulorum, quae in itinere per Brasilia anni MDCCCXVII–MDCCCXX [1817–1820] jussu et auspiciis Maximiliani Josephi I Bavariae Regis augustissimi peracto, collegerunt Dr. J. B. de Spix et Dr. C. F. Ph. de Martius, Vol. 3*, Friedrich Fleischer, Monachii (München), 205 pp.
- Pinto-da-Rocha, R., Machado, G. & Giribet, G. (2007) *Harvestmen: the biology of Opiliones*. Harvard University Press, Cambridge, 597 pp.
- Pocock, R.I. (1902) Some points in the morphology and classification of the Opiliones. *Annals and Magazine of Natural History*, 7 (10), 504–516.  
<http://dx.doi.org/10.1080/00222930208678711>
- Prieto, C.E. (1990a) The genus *Ischyropsalis* C.L. Koch (Opiliones, Ischyropsalididae) on the Iberian Peninsula. I. Non-troglobitic species. Proceedings of the XI International Congress of Arachnology; Turku, Finland, 7–12 August 1989. *Acta Zoologica Fennica*, 190, 315–320.
- Prieto, C.E. (1990b) The genus *Ischyropsalis* C.L. Koch (Opiliones, Ischyropsalididae) on the Iberian Peninsula. II. Troglobitic species. Comptes rendus du XIIème Colloque européen d'Arachnologie; Paris, 2–4 juillet 1990. *Bulletin de la Société Européenne d'Arachnologie*, N° 1 hors série, 286–292.
- Prieto, C.E. (2004) El género *Nemastomella* Mello-Leitão 1936 (Opiliones: Dyspnoi: Nemastomatidae) en la Península Ibérica, con descripción de la primera especie de Andalucía. *Revista Ibérica de Aracnología*, 9, 107–121.
- Prieto, C.E. (2008) Updating the checklist of the Iberian opiliofauna: corrections, suppressions and additions. *Revista Ibérica de Aracnología*, 16, 49–65.
- Rafalski, J. (1961) Prodrómus faunae opilionum Poloninae. *Poznańskie towarzystwo przyjaciół nauk. Wydział matematyczno-przyrodniczy*, 25, 325–372.
- Rambla, M. (1956) Un nuevo *Mitostoma* de los Vosgos (Opiliones, Nemastomatidae). *Publicaciones del Instituto de Biología Aplicada*, 24, 151–159.
- Rambla, M. (1959) Contribuciones al Estudio de los Opiliones de la fauna Iberica. Opiliones de la Sierra de Guadarrama. *Publicaciones del Instituto de Biología Aplicada*, 29, 59–110.
- Rambla, M. (1967) Opiliones de Portugal. *Revista de Biología*, 6 (1/2), 1–34.
- Rambla, M. (1968) Las especies del grupo *Nemastoma bacilliferum* Simon 1879 en la Península Ibérica (Opiliones, Fam. Nemastomatidae). *Publicaciones del Instituto de Biología Aplicada*, 45, 33–56.
- Rambla, M. (1969) Una n. sp. del gen. *Nemastoma*, grupo *bacilliferum*, de la Península Ibérica (Opiliones, Fam. Nemastomatidae). *Publicaciones del Instituto de Biología Aplicada*, 47, 89–96.
- Rambla, M. (1980) Les Nemastomatidae (Arachnida, Opilions) de la Péninsule Ibérique. V. *Nemastoma scabriculum* Simon 1879 et *Nemastoma hankiewiczii* Kulczynski 1909. In: Rambla, M. (Ed.), *Comptes Rendues du Vème Colloque d'Arachnologie d'expression française*. Universitat de Barcelona, Barcelona, pp. 195–202.
- Rambla, M. (1983) Sobre los Nemastomatidae (Arachnida, Opiliones) de la Península Ibérica. VI. *Acromitostoma rhinocerus* y *Acromitostoma hispanum* (nueva combinación). *Speleon*, 26/27, 21–27.
- Redikortsev, V.V. (1936) Materialy k faune Opiliones SSSR. *Trudy Zoologiceskogo Instituta, Akademija Nauk SSSR*, 3, 33–57.
- Richart, C.H. & Hedin, M. (in press) Three new species in the harvestmen genus *Acuclavella* (Opiliones, Dyspnoi, Ischyropsalidoidea) including description of male *A. quattuor* Shear 1986. *Zookeys*.
- Roewer, C.F. (1914) Die Familien der Ischyropsalidae und Nemastomatidae der Opiliones-Palpatores. *Archiv für Naturgeschichte*, 80A, 99–169.
- Roewer, C.F. (1916) 52 neue Opilioniden. *Archiv für Naturgeschichte*, 82A (2), 90–158.
- Roewer, C.F. (1917) Über Nemastomatiden und ihre Verbreitung. *Archiv für Naturgeschichte*, 83A (2), 140–160.
- Roewer, C.F. (1923) *Die Weberknechte der Erde. Systematische Bearbeitung der bisher bekannten Opiliones*. Gustav Fischer, Jena, 1116 pp.
- Roewer, C.F. (1926) Opilioniden aus Höhlen des Balkan-Gebirges (Arachn.). *Entomologische Mitteilungen*, 15 (3/4), 299–302.
- Roewer, C.F. (1927) Zoologische Streifzüge in Attika, Morea und besonders Kreta. *Abhandlungen herausgegeben vom Naturwissenschaftlichen Verein zu Bremen*, 26 (3) 425–460.
- Roewer, C.F. (1929) Zwei nordamerikanische Höhlen-Opilioniden. *Bollettino del Laboratorio di Zoologia Generale e Agraria della Facoltà Agraria in Portici*, 23, 10–12.
- Roewer, C.F. (1940) Neue Assamiidae und Troglidae. Weitere Weberknechte X. *Veröffentlichungen aus dem Deutschen Kolonial- und Übersee-Museum in Bremen*, 3 (1), 1–32.



- Roewer, C.F. (1950) Über Ischyropsalididae und Troglidae. Weitere Weberknechte XV. *Senckenbergiana*, 31 (1/2), 11–56.
- Roewer, C.F. (1951) Über Nemastomatiden. Weitere Weberknechte XVI. *Senckenbergiana*, 32, 95–153.
- Roewer, C.F. (1953a) Mediterranean Opiliones Palpatores. *Abhandlungen herausgegeben vom Naturwissenschaftlichen Verein zu Bremen*, 33 (2), 201–210.
- Roewer, C.F. (1953b) Cavernicole Arachniden aus Sardinien. *Notes Biospéologiques*, 8, 39–49.
- Roewer, C.F. (1959) Die Araneae, Solifuga und Opiliones der Sammlung des Herrn Dr. K. Lindberg aus Griechenland, Kreta, Anatolien, Iran und Indien. *Meddelanden från Göteborgs Kungliga Vetenskaps- och Vitterhets- Samhälles Handlingar, sjätte följden, Serie B*, 8 (4) 1–47.
- Roewer, C.F. (1962) Über einige mediterrane Arachniden. *Fragmenta Entomologica*, 4 (2), 11–18.
- Sato, I. & Suzuki, S. (1939) Eine merkwürdige Ischyropsaliden-Art aus Japan. *Zoologischer Anzeiger*, 126, 29–32.
- Schenkel, E. (1947) Einige Mitteilungen über Spinnentiere. *Revue suisse de Zoologie*, 54, 1–16.
- Schenkel, E. (1950) Neue Arachnoides aus Nordtirol. *Revue suisse de Zoologie*, 57 (4), 757–767.
- Schmidt, F. (1851) I. Versammlungsberichte. 2. Versammlung am 8. Februar. In: Haidinger, W. (Ed.), *Berichte über die Mittheilungen von Freunden der Naturwissenschaften in Wien*, 7 (1), 42–62.
- Schönhofer, A.L. (2009) *Revision of Troglidae Sundevall, 1833 (Arachnida: Opiliones)*. Ph.D. thesis, Johannes Gutenberg-Universität Mainz, Germany, 197 pp. Available from: <http://ubm.opus.hbz-nrw.de/volltexte/2009/2052/pdf/diss.pdf>.
- Schönhofer, A.L. & Hedin, M. (2012) *Tree of Life: Opiliones, harvestmen*. Available from: <http://tolweb.org/Opiliones/2556> (accessed 13 April 2013).
- Schönhofer, A.L., Karaman, I.M. & Martens, J. (2013a) Revision of the genus *Trogulus* Latreille: The morphologically divergent *Trogulus torosus* species-group of the Balkan Peninsula (Opiliones: Dyspnoi: Troglidae). *Zoological Journal of the Linnean Society*, 167, 360–388. <http://dx.doi.org/10.1111/zoj.12005>.
- Schönhofer, A.L. & Martens, J. (2008) Revision of the genus *Trogulus* Latreille: the *Trogulus coriziformis* species-group of the western Mediterranean (Opiliones: Troglidae). *Invertebrate Systematics*, 22 (5), 523–554. <http://dx.doi.org/10.1071/IS08013>.
- Schönhofer, A.L. & Martens, J. (2009) Revision of the genus *Trogulus* Latreille: the *Trogulus hirtus* species-group (Opiliones: Troglidae). In: Kropf, C. & Horak, P. (Eds), Towards a natural history of arthropods and other organisms. In memoriam Konrad Thaler. *Contributions to Natural History*, 12, 1207–1251.
- Schönhofer, A.L. & Martens, J. (2010a) Hidden Mediterranean diversity: Assessing species taxa by molecular phylogeny within the opilionid family Troglidae (Arachnida, Opiliones). *Molecular Phylogenetics and Evolution*, 54 (1), 59–75. <http://dx.doi.org/10.1016/j.ympev.2009.10.013>
- Schönhofer, A.L. & Martens, J. (2010b) On the identity of *Ischyropsalis dentipalpis* Canestrini, 1872 and description of *Ischyropsalis lithoclasica* sp. n. (Opiliones: Ischyropsalididae). *Zootaxa*, 2613, 1–14.
- Schönhofer, A.L. & Martens, J. (2012) The enigmatic Alpine opilionid *Saccarella schilleri* gen. n., sp. n. (Arachnida: Nemastomatidae) - isolated systematic placement inferred from comparative genital morphology. *Organisms Diversity and Evolution*, 12 (4), 409–419. <http://dx.doi.org/10.1007/s13127-012-0073-7>.
- Schönhofer, A.L., McCormack, L., Tsurusaki, N., Martens, J. & Hedin, M. (2013b) Molecular phylogeny of the harvestmen genus *Sabacon* (Arachnida: Opiliones: Dyspnoi) reveals multiple Eocene-Oligocene intercontinental dispersal events in the Holarctic. *Molecular Phylogenetics and Evolution*, 66, 303–315. <http://dx.doi.org/10.1016/j.ympev.2012.10.001>
- Schönhofer, A.L. & Novak, T. (2011) Identity and identification of *Trogulus banaticus* (Opiliones: Troglidae) - a neglected species in the Northern Balkans. *Arachnologische Mitteilungen*, 42, 5–11. <http://dx.doi.org/10.5431/aramit4202>.
- Schwendinger, P.J. & Gruber, J. (1992) A new *Dendrolasma* (Opiliones, Nemastomatidae) from Thailand. *Bulletin of the British Arachnological Society*, 9 (2), 57–60.
- Scopoli, J.A. (1763) *Entomologia carniolica exhibens insecta carnioliae indigena et distributa in ordines, genera, species, varietates, methodo Linnaeana*. I. T. Trattner, Vienna, 457 pp.
- Shear, W.A. (1974) The opilionid family Caddidae in North America, with notes on species from other regions (Opiliones, Palpatores, Caddoidea). *The Journal of Arachnology*, 2 (2), 65–89.
- Shear, W.A. (1975) The opilionid genera *Sabacon* and *Tomicomerus* in America (Opiliones, Troguloidea, Ischyropsalidae). *The Journal of Arachnology*, 3 (1), 5–29.
- Shear, W.A. (1986) A cladistic analysis of the opilionid superfamily Ischyropsalidoidea, with descriptions of the new family Ceratolasmatidae, the new genus *Acuclavella*, and four new species. *American Museum Novitates*, 2844, 1–29.
- Shear, W.A. (2006) *Martensolasma jocheni*, a new genus and species of harvestman from Mexico (Opiliones: Nemastomatidae: Ortholasmatinae). *Zootaxa*, 1325, 191–198.
- Shear, W.A. (2008) Deletions from the North American harvestman (Opiliones) faunal list: *Phalangomma virginicum*, Roewer 1949 is a synonym of *Erebomaster weyerensis* (Packard, 1888) (Travunioidea: Cladonychiidae), and a note on “*Crosbycus*” *goodnightorum* Roewer, 1951 (Nemastomatidae). *Zootaxa*, 1945, 67–68.
- Shear, W.A. (2010a) New species and records of ortholasmatine harvestmen from México, Honduras, and the western United States (Opiliones, Nemastomatidae, Ortholasmatinae). *ZooKeys*, 52, 9–45. <http://dx.doi.org/10.3897/zookeys.52.471>

- Shear, W.A. (2010b) *Hesperonemastoma smilax*, n. sp., a remarkable new harvestman from a cave in West Virginia, with comments on other reported cave-dwelling *Hesperonemastoma* species (Opiliones, Ischyropsalidoidea, Sabaconidae). *Journal of Cave and Karst Studies*, 72 (2), 105–110.  
<http://dx.doi.org/10.4311/jcks2009isc0103>
- Shear, W.A. & Gruber, J. (1983) The opilionid subfamily Ortholasmatinae (Opiliones, Troguloidea, Nemastomatidae). *American Museum Novitates*, 2757, 1–65.
- Shear, W.A. & Gruber, J. (1987) *Ortholasma setulipes* Shear and Gruber is a synonym of *Ortholasma coronadense* Cockerell. *The Journal of Arachnology*, 15 (1), 134–135.
- Sherborn, C.D. (1933) *Index Animalium sive index nominum quae ab A.D. MDCCLVIII generibus et speciebus animalium imposita sunt. Sectio Secunda. A kalendis Ianuariis, MDCCCI usque ad finem Decembris, MDCCCL. Part XXXIII. Index to trivialia under genera* (Prionopus-Zyxomma; Addenda acetosae-voltzi). British Museum (Natural History), London, pp. 879–1098.
- Shultz, J.W. (1998) Phylogeny of the Opiliones (Arachnida): An assessment of the “Cyphopalpatores” concept. *The Journal of Arachnology*, 26, 257–272.
- Shultz, J.W. & Regier, J.C. (2001) Phylogenetic analysis of Phalangida (Arachnida, Opiliones) using two nuclear protein-encoding genes supports monophyly of Palpatores. *Journal of Arachnology*, 29, 189–200.  
[http://dx.doi.org/10.1636/0161-8202\(2001\)029%5B0189:paopao%5D2.0.co;2](http://dx.doi.org/10.1636/0161-8202(2001)029%5B0189:paopao%5D2.0.co;2)
- Šilhavý, V. (1939) Sekáči skupiny *Nemastoma chrysomelas*. *Entomologické Listy*, 2 (2), 105–114.
- Šilhavý, V. (1956a) *Sekáči - Opilionidea. Fauna ČSR, 7*. Nakladatelství Československé Akademie Věd, Praha, 272 pp.
- Šilhavý, V. (1956b) Výsledky zoologické expedice Národního musea v Praze do Turecka (Resultata Expeditionis Zoologicae Musei Nationalis Pragae in Turicam). 19. Opiliones. *Sborník Entomologického Oddělení Národního Musea v Praze*, 30 (441), 31–39.
- Šilhavý, V. (1961) Die Grundsätze der modernen Weberknechttaxonomie und Revision des bisherigen Systems der Opilioniden. In: Strouhal, H. & Beier, M. (Eds), *Verhandlungen des 11. Internationalen Kongresses für Entomologie in Wien (17–25 August 1960), Bd. 1*. Organisationskomitee des XI. Internationalen Kongresses für Entomologie, Wien, pp. 262–267.
- Šilhavý, V. (1966a) Über die Genitalmorphologie der Nemastomatidae (Arach., Opiliones). *Senckenbergiana biologica*, 47, 67–72.
- Šilhavý, V. (1966b) Neue Troguliden aus dem Kuban-Gebiet und dem Kaukasus (Arach., Opiliones). *Senckenbergiana biologica*, 47 (2), 151–154.
- Šilhavý, V. (1967) *Anarthrotarsus martensi*, ein neuer Weberknecht aus Griechenland (Arach., Opiliones). *Senckenbergiana biologica*, 48 (3), 175–178.
- Šilhavý, V. (1968) *Trogulus rossicus* n. sp., ein neuer Weberknecht aus der UdSSR (Arachnida, Opiliones). *Reichenbachia*, 10 (5), 25–29.
- Šilhavý, V. (1969) Gli opilionidi dell'Italia settentrionale e centrale (Arachn. Opilionidae). *Atti del Reale Istituto Veneto di Scienze, Lettere ed Arti, Classe di Scienze Matematiche e Naturali*, 127, 495–498.
- Šilhavý, V. (1973) Cavernicolous opilionids from Mexico (Arachnida, Opiliones). Subterran. Fauna of Mexico. Part II. *Quaderno della Accademia Nazionale dei Lincei, Problemi Attuali di Scienza e di Cultura*, 171 (2), 175–194.
- Simon, E. (1872a) Notices sur les arachnides cavernicoles et hypogés. *Annales de la Société Entomologique de France, série 5*, 2, 214–244.
- Simon, E. (1872b) Notice complémentaire sur les arachnides cavernicoles et hypogés. *Annales de la Société Entomologique de France, série 5*, 2, 473–488.
- Simon, E. (1879a) Les Ordres des Chernetes, Scorpiones et Opiliones. *Les Arachnides de France*, 7, 1–332.
- Simon, E. (1879b) Descriptions d'Opiliones nouveaux. *Annales de la Société Entomologique de Belgique, Comptes-Rendus Séances*, 22, 70–75.
- Simon, E. (1879c) La description d'une nouvelle espèce d'Arachnide d'Espagne - *Ischyropsalis sharpi*. *Annales de la Société Entomologique de France*, 5 (9), 129.
- Simon, E. (1881a) Arachnides nouveaux ou peu connues des Provinces Basques. *Anales de la Sociedad Española de Historia Natural*, 10, 127–132.
- Simon, E. (1881b) Arachnides nouveaux ou rares de la faune française. *Bulletin de la Société zoologique de France*, 6, 82–91.
- Simon, E. (1885a) Arachnides recueillis dans la vallée de Tempé et sur le Mont Ossa (Thessalie) par M. le Dr. J. Stussiner (de Laibach). Études arachnologiques XXIV. *Annales de la Société Entomologique de France, série 6*, 5, 207–217.
- Simon, E. (1885b) XXV Description d'une espèce nouvelle du genre *Trogulus*. *Annales de la Société entomologique de France*, (6) 5, 218.
- Simon, E. (1907) Araneae, Chernetes et Opiliones (Première série). *Biospeologica*, III. *Archives de zoologie expérimentale et générale, série 4*, 6, 537–553.
- Simon, E. (1911) Araneae et Opiliones (Troisième série). *Biospeologica* XXIII. *Archives de zoologie expérimentale et générale, série 5*, 9, 177–206.
- Simon, E. (1913) Araneae et Opiliones (Quatrième série). *Biospeologica*. XXX. *Archives de zoologie expérimentale et générale, série 5*, 52 (2), 359–386.
- Smith, R., Rassmann, K., Davies, H. & King, N. (2011) *Why Taxonomy Matters*. BioNET-INTERNATIONAL, Egham, UK. Available from: <http://www.bionet-intl.org/why> (Accessed 13 April 2013).

- Snegovaya, N.Y. (2010) New harvestman genus and species from Kyrgyz Republic (Kyrgyzstan) (Arachnida: Opiliones: Nemastomatidae). *Acta Zoologica Bulgarica*, 62 (3), 351–354.
- Snegovaya, N.Y. & Chumachenko, Y.A. (2011) Harvestmen (Arachnida: Opiliones) from the yew and box-tree grove of the Caucasian State Natural Biospheric Reserve, Russia. *Kavkazskii Entomologicheskii Byulleten*, 7 (2), 115–124.
- Snegovaya, N.Y. & Marusik, Y.M. (2012) New species and collections of Opiliones (Arachnida) from Turkey. *Acta Arachnologica*, 61 (2), 59–70.  
<http://dx.doi.org/10.2476/asjaa.61.59>
- Sørensen, W. (1873) Bidrag til Phalangidernes Morphologi og Systematik samt Beskrivelse af nogle nye, herhen hørende Former. *Naturhistorisk Tidsskrift, series 3*, 8, 489–525.
- Sørensen, W. (1879) Om bygningen af Gonyleptiderne, en type af Arachnidernes Classe. *Naturhistorisk Tidsskrift, series 3*, 12, 97–222.
- Spoek, G.L. (1963) The Opilionida (Arachnida) of the Netherlands. *Zoologische Verhandelingen uitgegeven door het Rijksmuseum van Natuurlijke Historie te Leiden*, 63, 1–70.
- Staręga, W. (1966a) Beitrag zur Kenntnis der Weberknecht-Fauna (Opiliones) der Kaukasusländer. *Annales Zoologici*, 23 (13), 387–411.
- Staręga, W. (1966b) Kosarze (Opiliones) Bieszczad. (Die Weberknechte (Opiliones) von Bieszczady-Gebirge). *Fragmenta Faunistica*, 13 (6), 145–157.
- Staręga, W. (1970) Eine neue *Dicranolasma*-Art aus Irak (Opiliones, Trogludidae). *Bulletin de l'Académie Polonaise des Sciences, Cl. II, Série des Sciences Biologiques*, 18 (8), 475–477.
- Staręga, W. (1973) Beitrag zur Kenntnis der Weberknechte (Opiliones) des Nahen Ostens. *Annales Zoologici*, 30 (6), 129–153.
- Staręga, W. (1976) Die Weberknechte (Opiliones, excl. Sironidae) Bulgariens. *Annales Zoologici*, 33 (18), 287–433.
- Staręga, W. (1978) Katalog der Weberknechte (Opiliones) der Sowjet-Union. *Fragmenta Faunistica*, 23 (10), 197–234.
- Staręga, W. (1986) Eine neue Art der Nemastomatidae (Opiliones) aus dem Pamir, nebst nomenklatorisch-taxonomischen Anmerkungen. *Bulletin de l'Académie Polonaise des Sciences, Cl. II, Série des Sciences Biologiques*, 34 (10–12), 301–305.
- Staudt A. (2013) *Nachweiskarten der Spinnentiere Deutschlands (Arachnida: Araneae, Opiliones, Pseudoscorpiones): Weberknechte, Trogludidae*, *Trogulus closanicus*. Available from: [http://www.spiderling.de/arages/Verbreitungskarten/species\\_eng.php?name=Trogulus\\_closanicus](http://www.spiderling.de/arages/Verbreitungskarten/species_eng.php?name=Trogulus_closanicus) (Accessed 13 April 2013).
- Sundevall, C.J. (1833) *Conspectus Arachnidum*. Londini Gothorum, 39 pp.
- Suzuki, S. (1941) Opiliones from Manchoukou and North China, with a description of a new species of the interesting genus *Sabacon* (Ischyropsalidae) (subtitle, primary title in Japanese). *Bulletin of the Biogeographical Society of Japan*, 11 (4), 15–22.
- Suzuki, S. (1949) Studies on the Japanese harvesters. I. *Sabacon dentipalpe*, a new species of the interesting harvesters from Japan. *Journal of Science of the Hiroshima University, Series B, Division 1 (Zoology)*, 11 (1), 7–12.
- Suzuki, S. (1958) A remarkable new phalangid, *Ischyropsalis yezoensis* (Ischyropsalidae, Opiliones), from Hokkaido. *Annotationes Zoologicae Japonenses*, 31 (3), 167–170.
- Suzuki, S. (1963) *Cladolasma parvula* gen. et sp. n. (Trogludidae: Opiliones) from Japan. *Annotationes Zoologicae Japonenses*, 36 (1), 40–44.
- Suzuki, S. (1964) A new member of the genus *Sabacon* (Phalangida) from Japan. *Annotationes Zoologicae Japonenses*, 37 (1), 58–62.
- Suzuki, S. (1965) Three species of Ischyropsalidae (Phalangida) from Hokkaido. *Annotationes Zoologicae Japonenses*, 38 (1), 39–44.
- Suzuki, S. (1966) Four remarkable phalangids from Korea. *Annotationes Zoologicae Japonenses*, 39 (2), 95–106.
- Suzuki, S. (1973) Opiliones from the South-west Islands, Japan. *Journal of Science of the Hiroshima University, Series B, Division 1, Zoology*, 24 (2), 205–279.
- Suzuki, S. (1974a) The Japanese species of the genus *Sabacon* (Arachnida, Opiliones, Ischyropsalidae). *Journal of Science of the Hiroshima University, Series B, Division 1, Zoology*, 25 (1), 83–108.
- Suzuki, S. (1974b) Redescription of *Dendrolasma parvula* (Suzuki) from Japan (Arachnida, Opiliones, Dyspnoi). *Journal of Science of the Hiroshima University, Series B, Division 1, Zoology*, 25 (1), 121–128.
- Suzuki, S. & Tsurusaki, N. (1983) The opilionid fauna of Hokkaido and its adjacent areas. *Journal of the Faculty of Science Hokkaido University, series 6, Zoology*, 23, 195–243.
- Szalay, L. (1952) Opiliones aus der Umgebung von Bátorliget und dem Mecsek-Gebirge in Ungarn. *Acta biologica Academiae Scientiarum Hungaricae*, 2 (1–3), 307–310.
- Tedeschi, M. & Sciaky, R. (1997) Towards a revision of the Italian *Mitostoma*. 1. Subdivision in groups and description of new species (Arachnida, Opiliones, Nemastomatidae). *Revue suisse de Zoologie*, 104 (3), 503–616.
- Thaler, K. (1976) Two remarkable relict arachnids from northern Italy: *Sabacon simoni* Dresco (Opiliones, Ischyropsalidae), *Louisfagea rupicola* (Simon) (Araneae, Tetragnathidae). *Bulletin of the British Arachnological Society*, 3 (8), 205–210.
- Thorell, T. (1876) Sopra alcuni Opilioni d'Europe e dell'Asia occidentale, con un quadro dei generi europei di quest'Ordine. *Annali del Museo Civico di Storia Naturale di Genova, series 1*, 8, 452–508.
- Tsurusaki, N. & Song, D. (1993) Two new species of *Sabacon* from Sichuan Province, China (Arachnida: Opiliones: Sabaconidae) *Zoological Science*, 10, 155–159.

- Wajgel, L. (1874) *Pajęczaki galicyjskie (Arachnoidea haliciae)*. M. Biłousa u Seyfahra i Czajkowskiego we Lwowie, Kołomyja, 36 pp.
- Wankel, H. (1861) Beiträge zur österreichischen Grotten-Fauna. *Sitzungsberichte der kaiserlichen Akademie der Wissenschaften in Wien, mathematisch-naturwissenschaftliche Classe, Abt. 1, Mineralogie, Botanik, Zoologie, Anatomie, Geologie und Paläontologie*, 43, 251–264.
- Weed, C.M. (1893) An American species of *Sabacon*. *The American Naturalist (Entomology)*, 27 (318), 574–576.
- Weiss, I. (1978) Biometrische und ökologische Untersuchung der Gattung *Trogulus* am Konglomerat von Podu Olt in Südsiebenbürgen (Arachnida, Opiliones). *Studii și Comunicări, Științe Naturale*, 22, 213–228.
- Weiss, I. (1996) Die Weberknechtfauna Siebenbürgens (Arachnida: Opiliones). *Stapfia*, 45, 259–280.
- Weiss, I. (1998) *Trogulus martensi* Chemini, 1983 im Raum Basel (Arachnida, Opiliones, Trogulidae). *Arachnologische Mitteilungen*, 16, 21–30.
- Westwood, J.O. (1833) Insectorum Arachnoidumque novorum decades duo. *Zoological Journal*, 5, 440–453.
- Westwood, J.O. (1874) *Thesaurus Entomologicus Oxoniensis: or illustrations of new, rare and interesting insects, for the most part coloured, in the collections presented to the University of Oxford by the Rev. F.W. Hope, XXIV*. McMillan & Co., London, 205 pp.
- Wolf, B. (1938) *Animalium Cavernarum Catalogus. Tome III, 1934–1938*. 's-Gravenhage, Berlin, 918 pp.